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Investigation Work Plan for the Bayo Canyon Aggregate Area

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Prepared by
Environmental Stewardship Division–
Environmental Remediation and Surveillance Program

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EXECUTIVE SUMMARY

This investigation work plan prescribes characterization activities for the Bayo Canyon Aggregate Area at Los Alamos National Laboratory. This area includes Consolidated Units (CUs) 10-001(a)-99 and 10-002(a)-99, Solid Waste Management Unit (SWMU) 10-004(a), and Areas Of Concern (AOCs) C-10-001 and 10-009, located in Bayo Canyon within Technical Area (TA) 10, 0.5 mi. west of the Los Alamos County Sewage Treatment Plant. Three additional sites, AOCs 00-008 and 00-026 and SWMU 00-011(d), are also included in the Bayo Canyon Aggregate Area but are not addressed in this work plan. AOCs 00-008 and 00-026 have been approved for no further action by the U.S. Environmental Protection Agency, and SWMU 00-011(d) is being addressed in the Guaje/Barrancas/Rendija Aggregate Area work plan.

TA-10 was used as a firing site from 1943 through 1961, and the area and all related structures were constructed to test assemblies that contained conventional high explosives, including components made from depleted or natural uranium, and radioactive diagnostic sources. The former facilities of most concern for this investigation are the radiochemistry laboratory, the associated liquid waste disposal system, and the firing pads.

This investigation work plan has the following two primary objectives: (1) to prescribe additional investigation activities necessary to complete the characterization of contamination associated with the TA-10 CUs, SWMUs, and AOCs, and (2) to prescribe the collection of additional data necessary to support the selection of a corrective action. This work plan explicitly identifies data required to meet these objectives and the requirements of the Compliance Order on Consent signed by the New Mexico Environment Department, the U.S. Department of Energy, and the Regents of the University of California on March 1, 2005. Prescribed investigation activities include geodetic, geophysical, and radiological surveys; borehole drilling and sampling; and surface and shallow subsurface sampling.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by the University of California. The Laboratory is located in northcentral New Mexico, approximately 60 mi. northeast of Albuquerque and 20 mi. northwest of Santa Fe. The Laboratory covers 43 sq. mi. of the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from 6200 ft to 7800 ft above sea level.

The Laboratory's Environmental Stewardship (ENV) Division–Environmental Remediation and Surveillance (ERS) Program is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of ENV-ERS is to ensure that past operations under DOE do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, ENV-ERS is currently investigating sites potentially contaminated by past Laboratory operations. These sites under investigation are designated as SWMUs or AOCs.

This investigation work plan prescribes investigation activities for SWMUS and AOCs in the Bayo Canyon Aggregate Area. The sites addressed in this investigation work plan contain both hazardous and radioactive components. The New Mexico Environment Department (NMED) has authority under the New Mexico Hazardous Waste Act (NMHWA) over the cleanup of hazardous waste or hazardous constituents, including the hazardous waste portion of mixed waste (i.e., waste contaminated with both radioactive and hazardous constituents). DOE has authority over the cleanup of radioactive contamination. Radionuclides are regulated under DOE Orders 5400.5, "Radiation Protection of the Public and the Environment," and 435.1, "Radioactive Waste Management."

NMED enforces requirements for the investigation and cleanup activities at the Laboratory through the Compliance Order on Consent (hereafter, the Consent Order) signed by NMED, DOE, and the Regents of the University of California on March 1, 2005. The Consent Order specifies the conditions and requirements for the investigation and cleanup activities at the Laboratory performed by ENV-ERS. In accordance with the Consent Order, the nature and extent of releases of hazardous waste or hazardous constituents are investigated through the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) process.

AOC 00-008 was a former surface disposal area containing building debris that came from a demolished weather hutment called "Point Weather." The hutment was located on Kwage Mesa and was used in connection with shots fired in Bayo Canyon. No laboratory testing activities were conducted on North or Kwage Mesa (LANL 1992, 07668, p. 6-2). This site was proposed for no further action (NFA) in the OU 1071 RFI work plan in 1992 (LANL 1992, 07668). The work plan, including the NFA proposal, was approved by the U.S. Environmental Protection Agency (EPA) in January 1994 (Davis 1993, 15113). This NFA decision was later reviewed and confirmed by EPA (King 2005, 88464). AOC 00-008 is now considered "Administratively Complete" and will not be discussed further in this plan.

AOC 00-026 is known as the "Gun Mount Landfill" because it may contain a buried gun mount, radio poles, and hutments located on North Mesa (LANL 1992, 07668, p. 6-5). This site was proposed for NFA in the OU 1071 RFI work plan in 1992 (LANL 1992, 07668). The work plan, including the NFA proposal, was approved by EPA in January 1994 (Davis 1993, 15113). This NFA decision was later reviewed and confirmed by EPA (King 2005, 88464). AOC 00-026 is now considered "Administratively Complete" and will not be discussed further in this plan.

SWMU 00-011(d) was a firing range in a small north-trending tributary of Bayo Canyon. The site operated from 1944 to 1948 and was recommended for NFA on March 1, 1994. It will be addressed in the Guaje/Barrancas/Rendija Aggregate Area work plan and there is no further discussion of this site in this document.

1.1 General Site Information

The Bayo Canyon Aggregate Area consists of the lower central portion of Bayo Canyon at Technical Area (TA) 10 and three mesa top sites as described in section 1.0. The rationale for the consolidation of Consolidated Units (CUs) 10-001(a)-99 and 10-002(a)-99 was based on the operational history, waste streams, geographical proximity, transport mechanisms, and on the investigation required to assess contamination (LANL 1999, 63175). Two of the mesa top sites (AOCs 00-008 and 00-026) are administratively complete and the third [00-011(d)] is being addressed in another work plan (Guaje/Barrancas/Rendija Aggregate Area). The remainder of this document deals only with the investigation of the TA-10 sites within Bayo Canyon. All further discussion in this work plan will refer to TA-10.

1.2 Objectives

This investigation work plan has the following two primary objectives: (1) to prescribe additional investigation activities necessary to complete the characterization of contamination associated with the TA-10 CUs, SWMUs, and AOCs, and (2) to prescribe the collection of additional data necessary to support the selection of a corrective action.

2.0 BACKGROUND

2.1 Site Description and Operational History

TA-10 is located in the bottom of the central portion of Bayo Canyon, between Kwage Mesa to the south and Otowi Mesa to the north, approximately 0.5 mi. west of the Los Alamos County Sewage Treatment Plant (Figure 2.1-1). Bayo Canyon is located at an elevation of approximately 6000 to 6740 ft above sea level and slopes to the southeast at an approximate 3% grade. The TA-10 area is at an elevation of approximately 6600 to 6700 ft above sea level; the elevations of adjacent mesa tops range from about 7000 to 7100 ft above sea level. The upper portions of the canyon walls are vertical or near-vertical cliffs cut into the upper Tshirege Member of Bandelier Tuff. The canyon floor is mainly cut into the lower Otowi Member of Bandelier Tuff and is overlain with 1 to 6 ft of colluvium on which a sandy soil has developed. A narrow, braided stream channel with low banks runs through the center of the canyon and is underlain with Quaternary stream alluvium (LANL 1996, 54491, p. 3). According to findings during a 1994 drilling operation in Bayo Canyon, the alluvium ranges from approximately 30 to 45 ft below ground surface (bgs). In many areas, the upper 5 to 15 ft of alluvium has been reworked, displaced, backfilled, and mixed with construction debris during the construction, decontamination, and decommissioning activities that took place while the site was operational (LANL 1996, 54491, p. 36). Vegetation is a mix of grass, sagebrush, chamisa, and pine trees.

TA-10 was used as a firing test site from 1943 through 1961, and the area and all related structures were constructed to test assemblies that contained conventional high explosives (HE), including components made from depleted or natural uranium. The principal structures associated with TA-10 were a radiochemistry laboratory (TA-01-1), two assembly buildings (TA-10-10 and TA-10-12), an inspection building (TA-10-8), a personnel building (TA-10-21), and structures at two detonation control complexes

(TA-10-12 and TA-10-15) and adjacent firing pads (Figures 2.1-2 and 2.1-3). Formerly, TA-10 also included various ancillary facilities associated with waste disposal, particularly for the radiochemistry laboratory. Associated facilities included sanitary and radioactive liquid waste sewage lines, personholes, septic tanks, seepage pits, and solid radioactive waste disposal pits (Mayfield 1979, 11717, p. 12).

TA-10 now consists of 27 SWMUs and 2 AOCs (Figures 2.1-4 and 2.1-5). The area underwent extensive decontamination and decommissioning (D&D), including razing all structures. D&D activities began in 1960 and were completed in 1963; all explosive testing ceased in 1961. After D&D, the site was released to Los Alamos County in 1967 but has remained under DOE administrative control. A RCRA facility investigation was conducted in 1994, followed by a voluntary corrective action (VCA) in 1995. Interim actions (IAs) were conducted in 1994 and 1997. These actions included further remediation and the establishment of stormwater and site-access controls. The IA results indicated that any remaining metal (from shrapnel) posed a low level of risk to human health (LANL 1996, 54491, p. 36).

Consolidated Unit 10-001(a)-99 represents the consolidation of SWMUs 10-001(a–e), 10-005, and AOCs 10-001(e) and 10-008. AOC 10-008 was not discovered until a 1994 IA to address shrapnel in Bayo Canyon (LANL 1997, 56660, p. 1). Samples from this site were included in the 1994 RFI (LANL 1996, 54332). In accordance with the RFI results, all the SWMUs that made up the TA-10 firing sites (including SWMU 10-005) were recommended for NFA.

Consolidated Unit 10-002(a)-99 consists of SWMUs 10-002(a, b), 10-003(a–o), 10-004(b), and 10-007 that were once part of a liquid disposal complex. This complex served the radiochemistry laboratory at TA-10, and waste was discharged to leach fields and pits. The entire area underwent D&D in 1963 (Blackwell 1963, 04751), and SWMU 10-007 was created as a building debris landfill where any remaining materials from the D&D activity were placed. This SWMU was in the footprint created by the excavation of solid waste disposal pits (containing radioactive, inorganic, and organic chemicals) used by the radiochemistry laboratory from 1945 to 1950. The wastes were removed, and the pits backfilled with the uncontaminated shot pad building debris and site soil during the 1963 D&D activities.
SWMUs 10-003(a–o) consisted of the bulk of the liquid disposal complex and comprised liquid disposal pits, industrial waste personholes and septic tanks, industrial waste lines, and a leach field that served the radiochemistry laboratory. SWMU 10-004(b) was a reinforced-concrete sanitary septic tank that served the radiochemistry laboratory between 1944 and 1963 and may have received liquid waste from radiochemistry laboratory operations as well. The tank was removed during D&D activities in 1963. The 1996 RFI Report at TA-10 recommended NFA for SWMUs 10-002(a) and (b). However, for SWMUs 10-003(a) and 10-007, RFI results generated an IA. The IA was conducted in February 1997, and included sample collection, installation of stormwater control measures, and the construction of an exclusion zone to minimize the potential for exposure to humans and other animals.

SWMU 10-004(a) was a former 1060-gal. septic tank (structure TA-10-40) that discharged to a pit with associated lines to an outfall located in a stream channel northeast of SWMU 10-002(a). The tank served the personnel building (TA-10-21) from 1949 through 1963 and was removed during the 1963 D&D activities. It is not known whether the 4-in.-diameter tile drain and the soil surrounding the outfall were removed as well. A 1994 RFI recommended this SWMU for NFA.

AOC C-10-001 is within the area associated with SWMU 10-001(a)-99, and consisted of two radioactive (strontium-90) soil contamination areas. These areas were bulldozed during 1963 D&D activities and were rediscovered during shrapnel-removal operations in 1994. A VCA was conducted in 1995 to excavate the radioactive soil and restore the site with clean fill material.

AOC 10-009 is a former landfill that contained materials such as asbestos siding, heavy-gauge and coaxial cable, glass laboratory equipment, and other debris. The EPA was notified of a new SWMU in May 1995 and the site was fenced off until further investigation.

A more detailed description of the sites and their histories is presented in the historical investigation report (HIR) for TA-10 (LANL 2005, in progress).

2.2 Land Use

TA-10 was transferred to Los Alamos County in 1967 but remains under DOE administrative control. Bayo Canyon is currently open to the public and used for recreational activities. However, the area encompassing the central liquid disposal complex [SWMUs 10-003 (a–o)] has been posted with monuments to prohibit excavation before the year 2142. Chainlink fences exist around the two debris landfills (SWMU 10-007 and AOC 10-009). The fence around 10-003(a–o) is also posted as a soil contamination area. Recreation is the current and reasonably foreseeable future land use.

2.3 Relationship to Other SWMUs and AOCs

Bayo Canyon is geographically isolated from the current Laboratory. No SWMUs are located near the TA-10 portion of Bayo Canyon. There is no concern for the transport of contamination into the TA-10/Bayo Canyon area from other sites. However, the upper portions of Bayo Canyon may be impacted by the northern portion of the Los Alamos townsite. These potential impacts will not be addressed in this work plan.

2.4 Conceptual Model

A conceptual model for TA-10 has been developed to focus site characterization efforts. The sampling prescribed in this work plan is based principally on the conceptual model and should ensure complete characterization of the site's nature and extent of contamination. The conceptual exposure model includes potential contaminant source areas, contaminant transport mechanisms, and potential human receptors of contaminant exposures. The conceptual model for the CUs, SWMUs, and AOCs at TA-10 is summarized graphically in Figure 2.4-1.

2.4.1 Potential Contaminant Sources

The conceptual site model includes both surface and subsurface potential sources of contamination, as follows:

- Surface—widely dispersed contamination associated with explosives testing at the firing sites and detonation pile, the septic system outfall, and the exposed portions of the debris landfills.
- Subsurface—residual contamination remaining after the D&D of multiple site structures, the debris landfills, releases from the radiological laboratory's acid waste handling system (including planned discharges from infiltration pits and leaks from lines and tanks), and releases from site septic systems (including planned releases from leach fields and leaks from lines and tanks).

2.4.2 Potential Contaminant Transport Mechanisms

Potential transport mechanisms that may lead to the exposure of potential receptors include

- dissolution and/or particulate transport of surface contaminants from precipitation and runoff,
- airborne transport of contaminated surface soils or particulates,
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock, and
- biotic perturbation and/or translocation of contaminants in subsurface contaminated media.

2.4.3 Potential Contaminant Receptors

Current potential receptors of surface contamination include site remediation workers at former TA-10 and recreational users in Bayo Canyon. Potential receptors for subsurface contamination include potential groundwater users; however, no perched water has been encountered in the area of TA-10 and current unsaturated conditions limit vertical migration. If subsurface materials are excavated and brought to the surface, potential receptors of subsurface contamination will be the same as those listed for surface contamination.

2.5 Previous Investigation and Remediation Activities

The following sections provide a summary of previous environmental investigations and remediation activities conducted by the Laboratory at the individual SWMUs and AOCs within the aggregate area. The TA-10 HIR (LANL 2005, in progress) presents a detailed description of past activities at the sites, including operational and pre-RFI sampling, which are not covered in the following summary.

2.5.1 Previous Investigation Activities

Figures 2.5-1 through 2.5-4 show the locations of RFI sampling conducted within TA-10. The TA-10 HIR (LANL 2005, in progress) provides a summary of RFI sampling results. RFIs, VCAs, and IAs performed at TA-10 are discussed below.

2.5.1.1 Consolidated Unit 10-001(a)-99

Two RFIs were conducted at SWMUs in this CU, one in June 1994 and the other in October and November 1994. The June 1994 RFI was conducted at SWMUs 10-001(a–d) to determine if residual hazardous constituents existed in surface deposits near the firing pads and to confirm that no human health or ecological risk was attributable to the radiological constituents identified in previous investigations (Ford, Bacon & Davis Utah, Inc. 1981, 08032). The activities included collecting 145 surface soil and stream sediment samples at 93 locations (Figure 2.5-1). These samples were collected in the portions of the canyon floor that were possibly impacted by testing activities. In October and November 1994, RFI sampling was conducted at SWMU 10-005 (Figure 2.5-2). AOCs 10-008 and 10-001(e) were characterized using data collected from the surface sampling for SWMUs 10-001 (a–d). All of the investigations targeted possible subsurface releases of strontium-90, total uranium, lead, beryllium, barium, inorganic chemicals, and HE. The RFIs included geodetic, radiological, and geophysical surveys. In accordance with the RFI results, NFA was recommended for SWMUs 10-001(a), 10-001(b), 10-001(c), 10-001(d), 10-001(e) (LANL 1995, 49974, p. v), 10-005 (LANL 1996, 54332, p. 103), and AOC 10-008 (LANL 1997, 56660, p. 27).

2.5.1.2 Consolidated Unit 10-002(a)-99

This CU consists of SWMUs 10-002(a), 10-002(b), 10-003 (a–o), 10-004(b), and 10-007. The Laboratory conducted an RFI from May through November 1994, which targeted possible subsurface contamination at these SWMUs. Investigation activities included geodetic surveys, radiological surveys, geophysical surveys, drilling, and subsurface sampling. In all, 269 samples were collected from 67 locations (see HIR Figure 3.2-1 [LANL 2005, in progress]). In accordance with the RFI results, the Laboratory recommended NFA for SWMUs 10-002(a), 10-002(b), and 10-004(b) (LANL 1996, 54332, p. ii). The NFA recommendation was based on investigation data indicating that the sites were adequately characterized in accordance with applicable state and federal regulations and that the sites posed no unacceptable risk under current and projected land use. At SWMU 10-003(a–o), the Laboratory identified the potential for an unacceptable risk because of the concentrations of strontium-90 present. The Laboratory planned and implemented an IA (discussed below) in accordance with this finding. SWMU 10-007 has not been investigated.

2.5.1.3 SWMU 10-004(a)

The Laboratory conducted an RFI at SWMU 10-004(a) in September and October 1994. A total of 31 subsurface samples were collected at 8 locations (see HIR Figure 3.2-3 [LANL 2005, in progress]). Samples were analyzed for inorganic chemicals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total uranium, HE, and strontium-90. In accordance with the RFI results, NFA was recommended (LANL 1996, 54332, p. 90).

2.5.1.4 AOC C-10-001

AOC C-10-001 consists of two areas in Bayo Canyon where the Laboratory discovered elevated radiation levels during routine shrapnel-removal operations in 1994 (see HIR Figure 3.2-5 [LANL 2005, in progress]). At one area, the elevated radiation levels were associated with a single piece of shrapnel, which was removed from the site (LANL 1996, 54491, p. 5). At the other area, soil contaminated with strontium-90, possibly bulldozed onto the location during D&D operations, was found. In response, the Laboratory planned and implemented a VCA (discussed below).

2.5.1.5 AOC 10-009

AOC 10-009 is a debris landfill discovered during routine surface shrapnel characterization activities in Bayo Canyon. LANL notified EPA of the new SWMU in May 1995. The Laboratory fenced the site in 1995, pending further investigation.

2.5.2 Previous Remediation Activities

2.5.2.1 Consolidated Unit 10-001(a)-99

In addition to the structural removals conducted during D&D operations in the early 1960s, the Laboratory removed contaminated soils associated with structures and the shot pads. The Laboratory also removed shrapnel from the site by hand.

2.5.2.2 Consolidated Unit 10-002(a)-99

This area underwent D&D from 1960 through 1963. All above-ground and subsurface structures were removed or excavated. The Laboratory conducted the IA at CU 10-002(a)-99 in February 1997. The IA objectives were to minimize the exposure of receptors to strontium-90 contamination until the implementation of a final remedy and to reduce the potential for the migration of contaminants in soil and plant litter by stormwater runoff.

A soil contamination area was established around the site to limit access; the area is defined by a locked chainlink fence with signs declaring “Soil Contamination Area” posted every 30 ft along the fence (LANL 1997, 55889, p. 12). Stormwater control measures include a silt fence constructed inside the exclusion zone fence along the northern and eastern parts of the site to trap soil or debris that might be transported by sheet flow. In addition, straw bales were placed along the edge of a channel that emerges from a culvert along the western part of the site to prevent a potential high-discharge storm event from flowing onto the site. The last best management practice inspection was in 2001 when the site was declared stable (Veenis 2005, 88799).

2.5.2.3 SWMU 10-004(a)

The SWMU 10-004(a) septic tank was removed during D&D activities in 1963. The resulting excavation was backfilled and the tank was disposed at TA-54. It is unknown if the associated 4-in.-diameter tile drain and the soil around the outfall were removed during D&D.

2.5.2.4 AOC C-10-001

The Laboratory conducted a VCA in August 1995 at AOC C-10-001 to address strontium-90 contaminated soil at two sites within the AOC. The VCA included site radiological surveys to delineate the contaminated areas, hand augering within and around the areas of surface contamination to determine the extent of subsurface contamination, and removal of soil containing strontium-90 at activities above 97 pCi/g in accordance with calculations performed in residual radioactivity (RESRAD) (LANL 1995, 49833, p. 2). The Laboratory containerized the contaminated soil and disposed of it at TA-54. The site was restored by filling the excavated area with clean fill material and covering the surface with pine needles. Confirmatory samples were collected from the area where the contaminated soil had been found and removed (Figure 2.5-5).

2.6 Data Evaluation

The existing TA-10 site data are evaluated in the following sections to establish the adequacy of site characterization and to identify additional data needed to fully define the nature and extent of contamination across TA-10. The data assessments are performed specifically for CUs 10-001(a)-99 and 10-002(a)-99, SWMU 10-004(a), and AOCs C-10-001 and 10-009. The evaluation of the nature and extent of contamination is based only on the fixed-laboratory data collected for the RFI and the later IA and VCA sampling; these data are evaluated and presented in their entirety in the TA-10 HIR (Plates 1 through 4 [LANL 2005, in progress]). The quality of the data are also discussed in the HIR, and the data forming the basis of this evaluation are of good quality and sufficient to support site decisions.

The data requirements specified in the Consent Order are also explicitly identified as necessary additional investigation data in the discussions for each CU, SWMU, or AOC. Section IV.C.5 of the Consent Order requires analysis of VOCs, SVOCs, explosive compounds, target analyte list (TAL) metals, perchlorate, and cyanide for all TA-10 sites. This work plan proposes this full suite of analyses for all investigation samples, along with an analysis for strontium-90. These analyses were selected in accordance with the prescribed analytical suite, historic processes, and known contamination at TA-10 (see the HIR [LANL 2005, in progress]).

2.6.1 Consolidated Unit 10-001(a)-99

Grid sampling over the entire CU 10-001(a)-99 area identified isolated surface sampling (0 to 0.33 ft bgs) locations containing inorganic chemicals above background value (BV) and strontium-90 above the fallout value (FV), and detected organic chemicals.

Cadmium, copper, lead, mercury, and zinc were reported at concentrations above BV in one or more surface samples collected from 14 locations. Nitrobenzene was detected in three surface samples; high-melting explosive (HMX [1,3,5,7-teranitro-1,3,5,7-tetrazacyclo-octane]) was detected in one surface sample. Two surface samples contained strontium-90 at concentrations above FV. Grid samples were only collected from the surface. As a result, the vertical extent of contamination for these chemicals is not defined.

In addition to the grid samples, four boreholes (10-01281 through 10-01284) were drilled to a depth of 50 ft and sampled at CU 10-001(a)-99, specifically targeting SWMU 10-005. Samples from two boreholes (10-01281 and 10-01282) contained cadmium at concentrations above BV; however, cadmium was not observed at depths greater than 28.5 ft. Trichlorofluoromethane was also detected in one sample at borehole 10-01284. Strontium-90 was detected at 10-01281 at a depth of 2.5 ft.

Surface radiological data were not collected with adequate spatial density or aerial coverage to effectively support a complete assessment of the potential exposure to site users. Further, shrapnel is known to remain on the site, particularly within the TA-10 fenced area; however, it is not known what percentage of the remaining shrapnel is radioactively contaminated, to what degree shrapnel correlates with elevated surface radiation levels, or if it presents a physical hazard.

Finally, perchlorate data have not been collected at CU 10-001(a)-99.

The review of the existing site data for CU 10-001(a)-99 revealed additional data requirements, as follows:

1. the vertical extent of cadmium, copper, lead, mercury, and zinc contamination at surface locations containing these inorganic chemicals at concentrations above BV;
2. the vertical extent of nitrobenzene and HMX contamination at surface locations containing these organic chemicals at concentrations above detection limits;
3. the vertical extent of strontium-90 contamination at surface locations containing this radionuclide at concentrations above FV;
4. the lateral extent of strontium-90 north and south of borehole 10-01281;
5. the lateral extent of cadmium north and south of boreholes 10-01281 and 10-01282;
6. current radiological conditions for the canyon bottom areas of TA-10 to identify previously unidentified areas of elevated radioactivity at the surface and to assess the co-location of radiation levels with remaining surface shrapnel;
7. the distribution of remaining shrapnel within the fenced portion of TA-10 to evaluate the physical threat posed by large pieces of shrapnel and the radiological threat posed by contaminated shrapnel at the surface; and
8. the presence and distribution of perchlorate and cyanide across the site.

2.6.2 Consolidated Unit 10-002(a)-99

CU 10-002(a)-99 covers a large geographic region and consists of multiple sites, many of which are only indirectly related by historical process. Therefore, to facilitate the evaluation of contaminant distributions across the CU and to focus the identification of additional data required to complete site characterization, CU 10-002(a)-99's central area (the Central Area) is considered separately from the remainder of CU 10-002(a)-99.

Data for CU 10-002(a)-99 (originally presented in the 1994 RFI report [LANL 1996, 54332]) were collected from cross-shaped arrays (HIR Figure 3.2-3 and Plates 1 through 4 [LANL 2005, in progress]) of boreholes distributed throughout the area. The location of the central borehole in each array targeted either areas of subsurface contamination identified during the 1976 Formerly Utilized Sites Remedial Action Program (FUSRAP) investigations (LANL 1979, 11717) or was centered on the approximate location of a former structure (LANL 1995, 49073, p. 3-1). For SWMUs 10-002(a), 10-003(a–d), and 10-003(f–m), a borehole was drilled and sampled in the center of the former structure or within approximately 10 ft of the former structure location. The remaining borehole locations in the sample arrays extend beyond the former structure locations. This sampling approach has ensured that possible contaminant sources were effectively targeted and has provided good coverage for the identification of residual contamination remaining at CU 10-002(a)-99.

2.6.2.1 Consolidated Unit 10-002(a)-99 Central Area

The Central Area (see HIR Figure 3.2.-3 [LANL 2005, in progress]) consists of multiple, now-removed liquid disposal pits and lines and the extant SWMU 10-007 debris landfill. Four arrays of boreholes were installed within the Central Area. A crossed array of nine boreholes was centered on liquid disposal pit 10-41 [SWMU 10-003(a)]. Similarly, a 5-borehole array was centered on personhole 10-50 [SWMU 10-003(g)]. In addition, a 10-borehole and an 8-borehole array were centered on known contaminant locations identified during the FUSRAP investigation.

Antimony, beryllium, cadmium, mercury, and zinc are present at concentrations above BV in one or more boreholes. Samples collected from borehole 10-01213 between 19.2 and 39.2 ft bgs contained antimony and zinc at concentrations above BV; samples collected from greater depths did not contain these chemicals at concentrations above BV. Samples collected throughout borehole 10-01205 contained cadmium at concentrations above BV; the sample from a depth of 26.5 ft in borehole 10-01294 contained mercury at a concentration above BV. Beryllium was detected at concentrations above BV in samples collected from boreholes 10-01209 (48.4 to 49.2 ft) and 10-0220 (49.4 to 50.0 ft). Some of the inorganic chemical analyses yielded elevated mercury detection limits above the BV. No perchlorate or cyanide data were collected at CU 10-002(a)-99.

Ethylbenzene and xylene were both detected in the two deepest samples (36.6 to 37.4 ft bgs and 49.4 to 50 ft bgs) at borehole 10-01294. In addition, a sample collected from a depth of 17.5 ft bgs in borehole 10-01201 and another sample collected from a depth of 36 ft bgs in borehole 10-02221 contained detected concentrations of naphthalene; naphthalene was not detected in deeper samples in either borehole.

Strontium-90 is present at activities greater than 100 pCi/g in multiple samples collected throughout the CU 10-002(a)-99 Central Area, with samples collected from borehole 10-02220 containing the highest activities of strontium-90 (up to approximately 40,000 pCi/g at 17.0 to 17.5 ft). Please refer to Plate 4 in the HIR (LANL 2005, in progress) for further details. However, clearly decreasing trends in strontium-90 activities contained in samples collected from boreholes 10-02220 to 10-02210 indicate that the nature and extent of strontium-90 contamination in the Central Area has been effectively defined (see Plate 4 in the HIR [LANL 2005, in progress]).

Total uranium is detected in the subsurface in all boreholes and nearly all surface soil samples at concentrations above BV. The Phase I RFI (LANL 1996, 54332, p. 19) attributed the uranium concentrations to a high percentage of pumice fragments in the samples. Uranium concentrations contained in samples collected from a depth of approximately 40 to 50 ft bgs yielded two to three times the concentration of uranium contained in samples collected from shallower depths. This depth corresponds to the approximate depth where the Qal stratum contacts the Qbo, Qbof, or Qbog strata, and indicates that the elevated uranium concentrations are representative of formation geochemistry and not a release.

The SWMU 10-007 debris landfill is co-located with the Central Area liquid waste disposal complex. Several of the RFI array boreholes planned for the Central Area were originally sited immediately over the landfill location. During the RFI, landfill debris repeatedly prevented the array boreholes from being advanced to the planned total depth; many of the boreholes required relocation to reach the planned sampling depths. The original borehole and relocated borehole locations provide some information on the size and location of the landfill. The area where landfill debris was encountered is defined by boreholes 10-02210 through 10-02212, 10-02216, 10-02219 through 10-02222, and 10-02224, which are shown in Figure 3.2-3 in the HIR (LANL 2005, in progress; LANL 1995, 49073, pp. 4-6, 4-7), but the full extent of the landfill is not known.

The review of the existing site data for the Central Area of CU 10-002(a)-99 revealed additional data requirements, as follows:

1. lateral extent of antimony and zinc to the west of borehole 10-01213;
2. vertical extent of cadmium at borehole 10-01205 and the lateral extent of cadmium northwest of this location;
3. lateral extent of mercury to the north of borehole 10-01294;
4. additional mercury data from across the site to improve the mercury data set;
5. lateral extent of beryllium, particularly to the northwest of borehole 10-01209 and east of borehole 10-0220;
6. the presence and distribution of perchlorate and cyanide across the site;
7. vertical extent of ethylbenzene and xylene at borehole 10-01294;
8. lateral extent of naphthalene detected at boreholes 10-01201 and 10-02221;
9. confirmation of the highest strontium-90 concentrations at borehole 10-2220 as a result of the significance and age of the existing data;
10. confirmation of the lateral extent of strontium-90 contamination to the west and north of Array 1;
11. geophysical and test pit and physical inspection data to confirm the physical extent of the SWMU 10-007 debris landfill; and
12. the depth to the top of the debris and the physical makeup of the debris to finalize any future remedial designs (discussed in section 4.3).

2.6.2.2 Consolidated Unit 10-002(a)-99 Excluding the Central Area

The remainder of CU 10-002(a)-99 includes the liquid waste disposal system and septic system SWMUs north-northeast of the former radiochemistry building location, as well as the SWMU 10-002(a) and 10-002(b) waste disposal pits. Seven additional borehole arrays were drilled within CU 10-002(a)-99 outside of the Central Area. Borehole arrays drilled in 1994 are shown in Figure 3.2-3 of the HIR (LANL 2005, in progress).

Inorganic chemicals were reported at concentrations above BV in samples collected from the three borehole arrays that targeted the liquid waste disposal and septic system SWMUs. A single shallow sample collected at borehole 10-01244 and another single shallow sample collected at borehole 10-01266 contained beryllium and cadmium at concentrations above BV. A single shallow sample collected at borehole 10-01242 contained chromium, copper, lead, and mercury at concentrations above BV. A single sample collected at borehole 10-01266 from a depth of 16.2 to 16.8 ft contained arsenic at a concentration greater than BV. In addition, two samples collected at borehole 10-01228 from depths of 21.4 to 21.8 ft and 32.1 to 32.5 ft, and a sample at borehole 10-01232 (21.5 to 21.9 ft) in the northernmost array, contained beryllium at concentrations above BV. Decreasing trends in the existing site data (refer to the discussion in section 4.2 of the HIR as well as the HIR's Appendix B and Plates 1 and 2 [LANL 2005, in progress]) demonstrate that the vertical extent of inorganic chemicals has been adequately defined.

Three samples collected from borehole 10-01271 contained detected concentrations of di-n-butylphthalate. Decreasing trends in the existing site data demonstrate that the vertical extent of organic chemicals has been adequately defined.

In the area of SWMU 10-002(a), one array consisting of five boreholes was drilled. Samples collected from boreholes 10-01251 (44.0 to 44.6 ft) and 10-01254 (28.4 to 29.3 ft) contained beryllium at concentrations above BV; samples collected from borehole 10-01253 (37.5 to 38.1 ft) contained cadmium at concentrations above BV. In addition, the sample collected from 49.4 to 50.0 ft in borehole 10-01251 contained a detected concentration of bis(2-ethylhexyl)phthalate.

In the area of SWMU 10-002(b), two arrays consisting of nine boreholes each were drilled as shown in Figure 3.2-3 in the HIR (LANL 2005, in progress). Four boreholes fall within the currently defined footprint of the SWMU; an additional eight boreholes were drilled and sampled within 15 ft of the SWMU.

Samples collected at SWMU 10-002(b) boreholes 10-01259 and 10-01262 from depths of 48.6–49.5 ft and 15.0–15. 8 ft contained antimony at concentrations above BV. In addition, a sample collected from a depth of 2.5–3.9 ft from borehole 10-01293 contained copper at a concentration above BV. Single samples collected at borehole 10-01288 contained detected concentrations of acetone (at a depth of 46.2–47.0 ft) and di-n-butyl phthalate (at a depth of 4.2 to 5.0 ft), and pentachlorophenol and phenol were also detected once each in a single sample collected from a depth of 3.6–4.2 ft at borehole 10-01257. Existing site data adequately define the nature and extent of inorganic and organic chemicals.

Strontium-90 was detected above FV in several surface samples collected from the borehole arrays around SWMU 10-002(b). A sample collected from a depth of 3.6 ft bgs at borehole 10-01257 contained strontium-90 at an activity of 340 pCi/g. Decreasing concentration trends in the existing site data adequately define the extent of strontium-90 vertically and to the east, west, and south; no boreholes are located directly north of this location. Strontium-90 is present in borehole 10-01293 at an activity of 3.39 pCi/g at a depth of 10 ft bgs and at an activity of 3.19 pCi/g at 48.6 ft bgs. Decreasing concentration trends in the existing site data adequately define the extent of strontium-90 at this location vertically and to the north, east, and west. Finally, a sample collected from a depth of 11.4–12.1 ft at borehole 10-01289 contained strontium-90 at an activity of 158 pCi/g. Decreasing concentration trends in the existing site data also adequately define the extent of strontium-90 at this location vertically and to the east and west.

In addition, as identified in Section IV.C.5.iii of the Consent Order, the locations of SWMU 10-002(b) and the SWMU 10-003(n) leach field may not be known. Further, it is not known if the SWMU 10-004(b) drain line remains buried in place. The Consent Order requires verification of the SWMU locations and data derived from the footprints of these SWMUs (discussed further in section 4).

The review of the existing site data for CU 10-002(a)-99 outside of the Central Area revealed additional data requirements, as follows:

1. lateral extent of beryllium and cadmium northwest of borehole 10-01244 and northeast of borehole 10-01266;
2. lateral extent of chromium, copper, lead, and mercury north of borehole 10-01242;
3. lateral extent of arsenic north and east of borehole 10-01269;
4. lateral extent of di-n-butylphthalate south of borehole 10-01271;
5. lateral extent of beryllium north, west, and south of borehole 10-01228 and 10-01232;
6. lateral extent of beryllium north of borehole 10-01251 and west of 10-01254;
7. lateral extent of cadmium south of borehole 10-01253;
8. vertical extent of bis(2-ethylhexy)phthalate at borehole 10-01251;
9. lateral extent of antimony north and south of borehole 10-01259 and south of 10-01262;
10. lateral extent of copper south of borehole 10-01293;
11. lateral extent of strontium-90 north of borehole 10-01257;
12. lateral extent of strontium-90 north and south of borehole 10-01289;
13. lateral extent of strontium-90 south of borehole 10-01293;
14. the presence and distribution of perchlorate and cyanide across the site;
15. geophysical and pothole data to confirm the physical location of the SWMU 10-003(n) leach field, the SMWU 10-002(b) pit, and the presence of the SWMU 10-004(b) drain line; and
16. data from the footprints of the SWMU 10-003(n) leach field, the SWMU 10-002(b) pit, and the SWMU 10-004(b) drain line.

2.6.3 SWMU 10-004(a)

A single array consisting of eight boreholes was drilled at SWMU 10-004(a) near structure 10-40 (HIR Figure 3.2-3 [LANL 2005, in progress]). A single sample contained antimony at a concentration above BV; the remaining site data adequately define the lateral and vertical extent of this chemical. A single sample from the bottom of borehole 10-01277 contained beryllium at a concentration above BV at a depth of 61.5 to 62.5 ft. Two samples in borehole 10-01278 collected from depths of 2.5 to 3.7 ft and 19.2 to 20 ft, as well as a single sample from borehole 10-01279 collected from a depth of 14.0 to 15.0 ft, contained cadmium at concentrations above BV. A sample collected from the bottom of borehole 10-01277 at a depth of 61.5 to 62.5 ft contained lead at a concentration above BV. Boreholes 10-01273 and 10-01276 both had several samples collected from depths ranging from 2.5 to 50 ft that contained mercury at concentrations above BV. Boreholes 10-01272 and 10-01277 each had one sample that contained zinc at concentrations above BV. In addition, boreholes 10-01274 and 10-01275 each had one sample that contained detected concentrations of bis(2-ethylhexyl)phthalate.

The review of the existing site data for SWMU 10-004(a) revealed additional data requirements, as follows:

1. vertical extent of beryllium at borehole 10-01277;
2. lateral extent of cadmium west of borehole 10-01278 and 10-01279;
3. vertical extent of lead at borehole 10-01277;
4. lateral extent of mercury north of borehole 10-01273 and east of 10-01274;
5. vertical extent of zinc at borehole 10-01277;
6. lateral extent of bis(2-ethylhexyl)phthalate east of borehole 10-01274 and south of borehole 10-01275; and
7. the presence and distribution of perchlorate and cyanide across the site.

2.6.4 AOC C-10-001

Strontium-90 activities up to 3,518 pCi/g were previously identified at AOC C-10-001 before the VCA implementation at the site. The maximum activity of strontium-90 in the samples collected after the excavation activities was 12.8 pCi/g (LANL 1995, 53782, p. 1-2). The existing site data collected during the VCA adequately define the nature and extent of residual strontium-90 remaining on-site. Historically, no data have been collected from the site for hazardous constituents; the proposed collection of site data is designed to document the presence and distribution of hazardous constituents and perchlorate and cyanide.

2.6.5 AOC 10-009

No data are available for AOC 10-009. The presence and distribution of inorganic chemicals (including perchlorate and cyanide), organic chemicals, and radioisotopes will be evaluated. The physical extent and location of the debris landfill also require characterization using geophysical surveys and/or the excavation of test pits, and the surface radiation levels require characterization. Data necessary to support corrective action decisions are discussed in section 4.

3.0 SITE CONDITIONS

The following sections present the current surface features and the existing subsurface geologic characteristics beneath Bayo Canyon in general and TA-10 in particular. Known surface and subsurface traits and their potential effects on the occurrence and concentration of contaminants include

- canyon terrain, which affects meteorological conditions and ecological habitats at the surface;
- a semiarid climate with low precipitation and a high evapotranspiration rate, which limits the extent of subsurface moisture percolation and the amount of moisture available to leach radionuclides or other hazardous waste constituents; and
- a thick, relatively dry unsaturated (vadose) zone, which greatly restricts or prevents downward migration of contaminants through the vadose zone to the regional aquifer.

3.1 Surface Conditions

3.1.1 Surface Water

Surface water (stream) flow in the canyon is intermittent, with runoff occurring during the summer months (July through August) from heavy thunderstorms. The runoff is generally of short duration over a period of several hours. Streamflow can also occur as a result of spring snowmelt runoff. Individual flooding events may cause realignment of the main channel. No perched or alluvial aquifers were encountered to depths of 89.43 ft during subsurface investigations at TA-10. The elevation of the regional aquifer is about 6000 ft above sea level or approximately 600 ft below the surface of Bayo Canyon (LANL 1997, 56660, p. 6).

Historical sedimentation on the floor of Bayo Canyon is minimal. The channel is discontinuous, and precipitation runoff generally spreads out over the grassy valley bottom. These areas of unchanneled flow are potential areas of sediment deposition (Broxton and Eller, 1995, 58207, pp. 67–68).

3.1.2 Soils

Surface soils in Bayo Canyon consist of poorly developed, well-drained soils of the Totavi Series on Bandelier Tuff and alluvium. These soils are generally 2 to 4 in. thick. In many parts of TA-10, the soil has been disturbed by operations and previous remediation activities.

3.2 Subsurface Conditions

This section describes the subsurface conditions in the Bayo Canyon area, including the area's stratigraphic and hydrogeologic conditions.

3.2.1 Stratigraphy

TA-10 is located on the floor of Bayo Canyon at an elevation ranging from 6600 to 6740 ft above sea level. The mesa tops range in approximate elevation from 7000 to 7100 ft above sea level. The upper portion of the canyon walls is vertical, cut into the upper (Tshirege) member of Bandelier Tuff. From the base of the cliffs, steep slopes ranging from 10 to 30 degrees lead downward to a wide, gently sloping to flat canyon floor. The slopes and canyon floor are mainly cut into the lower (Otowi) member of Bandelier Tuff. The slopes are overlain by talus and colluvium from the cliffs above. The gentle side slopes of the canyon floor are covered with less than 1.5 ft to more than 6.5 ft of colluvium (Drake and Inoue 1993, 53456, p. 10). The canyon floor also includes a narrow inner canyon consisting of the modern braided stream channel with low banks ranging in height from 1.5 to 6 ft. Up to 40 ft of Quaternary stream alluvium underlie the canyon floor. Near the site of the former radiochemistry laboratory (TA-10-1), sediments of the Puye Formation underlie Bandelier Tuff at a depth of approximately 62 ft bgs (LANL 1996, 54332).

3.2.2 Hydrogeology

3.2.2.1 Surface Water

Surface water flow on the canyon slopes and floor occurs predominantly by sheet flow during seasonal heavy rains. Several shallow tributary channels collect water that flows over the cliffs and across the ground surface. The only sediment sampling station in Bayo Canyon is located at its intersection with Los Alamos Canyon, approximately 2 mi. east of TA-10. A surface water gauging station is located just east of TA-10 (Figure 3.2-1).

The ephemeral stream in Bayo Canyon carries water only during periods of heavy rain. Anecdotal reports indicate that flooding has occurred on several occasions while TA-10 was in operation.

3.2.3.2 Perched Groundwater

Observations of perched intermediate groundwater in LANL wells are rare on the Pajarito Plateau. Perched waters are thought to form mainly at horizons where medium properties change dramatically, such as at paleosol horizons with clay or caliche found in basalt and volcanic sediment sequences. The Cerro Toledo interval, Guaje Pumice Bed, and Puye Formation are local examples.

No perched or alluvial aquifers are known to be present in Bayo Canyon, and none were encountered during the drilling of 93 boreholes in 1994. The boreholes were advanced to a minimum depth of 50 ft bgs (LANL 1996, 54332.2, pp. 7, 15). To date, no saturated conditions have been observed in the area.

3.2.3.3 Regional Aquifer

The regional aquifer in the Los Alamos area rises westward from the Rio Grande within the Santa Fe Group into the Puye Formation beneath the central and western portion of the Pajarito Plateau. The depth of the aquifer decreases from about 1200 ft bgs along the western margin of the plateau to about 600 ft bgs along the eastern margin. The regional aquifer is approximately 600 ft below the level of Bayo Canyon at the former TA-10 site.

4.0 SCOPE OF ACTIVITIES

The primary purpose of the activities prescribed in this investigation work plan is to achieve the objectives defined in section 1.2. Data collection activities for site characterization and for corrective action selection are specified. The site characterization activities are in accordance with the requirements outlined in the Consent Order and the additional data requirements identified in section 2.6 within the framework of the site conceptual model. The data necessary to support the selection of an appropriate corrective action for remaining contamination and shrapnel at TA-10 is based on the corrective action evaluation presented in section 4.4.

Table 4.0-1 presents a crosswalk between the Consent Order and the scope proposed in this section. The only significant deviation from the Consent Order is that no intermediate or deep regional groundwater monitoring wells are planned to be drilled because over 100 boreholes have been drilled in Bayo Canyon to various depths (maximum total depth [TD] of 88.9 ft [27.1 m] bgs) without encountering saturation. Regional Well R-24 will be drilled during the summer of 2005, just downgradient of TA-10, thereby providing suitable groundwater monitoring for releases from TA-10. Should shallow perched or intermediate water be encountered in any of the boreholes, including R-24, monitoring wells will be added to this scope of activities.

4.1 Surveys

Three surveys of the SWMUs and AOCs will be conducted before the start of characterization and remediation activities. A geodetic survey will be performed to locate former structures and predefined sampling locations. A site-wide radiological survey will be performed to identify areas of elevated radiation attributable to structure locations, releases, or radioactive shrapnel. Geophysical surveys to locate remaining buried structures, and indications of former structures, associated with the radiochemistry laboratory and the acid waste disposal complex will be performed across CU 10-002(a)-99. Additional geophysical surveys will be conducted across all of TA-10 to identify buried shrapnel.

4.1.1 Geodetic Survey

Geodetic surveys will be conducted during the implementation of this work plan to reestablish previous sampling locations planned for resampling; these locations are principally within CU 10-001(a)-99. This will allow the verification of previously identified contaminant concentrations and the collection of data at greater depth beneath locations with known concentrations of contaminants requiring further characterization. In addition, locations of important former structures, also critical to ensure adequate characterization of the nature and extent of contaminant releases and residual contamination, will be reestablished. Targeted structures are principally within CU 10-002(a)-99 and include former septic tanks, septic lines, acid waste lines, and disposal pits. All new sampling locations will be surveyed by a New Mexico-licensed land surveyor as specified in Section IX.B.2.f of the Consent Order.

4.1.2 Radiological Survey

A walkover radiological survey of the areas where radiological contamination is expected to occur will be performed with Geiger-Mueller detectors (or equivalent) to locate areas of elevated radiation. The surveys will quantify and bound the extent of surface radiological contamination. The surveys will be conducted at a line spacing of approximately 10 ft between detectors, with additional focused surveys to better define areas of elevated count rates. In accordance with observations in the field, this configuration may be modified to improve the quality of the data collection. The results will be presented in contour maps of count rates that will guide surface sampling activities.

4.1.3 Geophysical Survey

Geophysical surveys targeting buried shrapnel will be conducted over the same area as covered by the radiological survey. Focused electromagnetic geophysical surveys to identify buried structures and buried debris will be conducted at CU 10-002(a)-99 and AOC 10-009. The focused surveys, using EM-31 and EM-61 equipment, will produce anomaly maps that will be compared to existing information about the site, including engineering drawings where available. In accordance with this review, areas will be selected for further definition using ground-penetrating radar (GPR). The features to be identified in the geophysical survey include

- the physical limits of the landfills to define the extent of the debris;
- the former location of structures, such as the SWMU 10-002(b) disposal pits south of the radiochemistry building, to guide the placement of surface samples and boreholes for further characterization;
- the presence or location of buried pipes, such as the drain line associated with the SWMU 10-004(b) septic system, to confirm whether they were removed, and to guide the placement of surface samples and boreholes for further characterization; and
- the areas with the highest density of remaining shrapnel pieces.

Data from the radiological and geophysical surveys will be used to refine the sampling locations proposed below.

4.2 Sampling Activities

Both drilling and surface and shallow subsurface sampling activities are prescribed by this work plan. In addition to the primary environmental samples, quality assurance/quality control (QA/QC) samples will be collected at frequencies specified in the Consent Order and in accordance with the applicable standard operating procedures (SOPs) listed in section 5. At a minimum, QA/QC samples will include field duplicate samples to evaluate sample variability and rinsate blanks to confirm decontamination procedures. A summary of samples to be collected during the implementation of this work plan and the specific data requirements addressed by the borehole and surface samples is presented in Table 4.2-1.

4.2.1 Borehole Sampling

Borehole sampling is proposed to characterize AOC 10-009 and will be conducted in CU 10-002(a)-99's central area, the remainder of CU 10-002(a)-99, SWMU 10-004(a), and AOC 10-009. Boreholes will extend to the minimum depths required by the Consent Order (25 to 30 ft bgs) and as deep as is required to bound the vertical extent of contamination.

The boreholes will be continuously cored, logged, and sampled on 5-ft intervals. All recovered cores will be field screened for VOCs and gross alpha, beta, and gamma activity. A minimum of two fixed laboratory analytical samples will be collected from each borehole. As specified in the Consent Order, samples will be submitted from the depth correlating to the maximum observed radioactivity screening or headspace VOC concentration and from the bottom of the borehole. Additional samples may also be collected from intervals where contamination is suspected as a result of elevated field-screening results and/or if visual inspection reveals fractures or staining. Borehole samples will be submitted for the full suite of analyses specified in the Consent Order and section 2.6 of this document.

Two boreholes will be advanced and sampled at CU 10-001(a)-99 in the area of SWMU 10-005. The borehole locations specified for this area were selected to define the lateral extent of strontium-90 and vertical extent of cadmium. The specified locations of the boreholes for this area are shown in Figure 4.2-1.

Six boreholes will be completed in the central area of CU 10-002(a)-99. The borehole locations defined in this work plan were selected principally to define the lateral and vertical extent of a small number of inorganic and organic chemicals, and to verify the extent of strontium-90 at depth beneath the Central Area. In addition, two core samples will be collected for the analysis of saturated and unsaturated hydraulic conductivity, porosity, and bulk density from borehole 10-02220 since it is the area of highest contamination.

Sixteen boreholes will be completed across the remainder of CU 10-002(a)-99. The borehole locations defined in this work plan were selected principally to define the lateral and vertical extent of a small number of inorganic and organic chemicals, and to define the lateral and vertical extent of strontium-90 in the area of SWMU 10-002(b). The remaining locations of additional boreholes will be in accordance with the results of geophysical surveys.

Five boreholes will be completed in the area of SWMU 10-004(a). The specified borehole locations for this site are intended to define the vertical and lateral extent of a small number of inorganic chemicals and the lateral extent of bis(2-ethylhexyl)phthalate.

The locations of the proposed boreholes for the above CU and SWMUs are shown in Figure 4.2-2.

Five boreholes will be completed in the area of AOC 10-009. The borehole locations defined in this work plan were selected principally to establish the presence and distribution of chemicals and radionuclides. The boreholes will also support the evaluation of the physical dimensions of the debris landfill. The specified locations of the boreholes for this site are depicted in Figure 4.2-3.

4.2.2 Surface and Shallow Subsurface Sampling

Surface and shallow subsurface sampling is prescribed across CU 10-001(a)-99 and at AOC C-10-001. All specified locations will be sampled at two depth intervals, from 0 to 0.5 ft bgs and from 1.5 to 2.0 ft bgs. Samples may be collected, if practical, from greater depths if field-screening data indicate the possibility of contamination.

Samples will be collected from 22 locations across CU 10-001(a)-99; all locations were previously sampled during the 1994 RFI. The specified sampling locations were selected principally to define the vertical extent of a small number of inorganic and organic chemicals and strontium-90. The specified sampling locations for CU 10-001(a)-99 are shown in Figure 4.2-4.

Samples will be collected from 5 locations at AOC C-10-001. The sampling strategy specified for AOC C-10-001 is designed to characterize the area and establish the extent of contamination. The specified sampling locations for AOC C-10-001 are shown in Figure 4.2-3.

4.3 Preliminary Corrective Action Evaluation for TA-10

The following is a preliminary evaluation of the corrective action that is appropriate for Bayo Canyon. This preliminary evaluation is included to help identify the additional data requirements needed to finalize the corrective action selection for the site.

4.3.1 Primary Concerns

The presence of the following substances and/or materials may indicate that the site is unsuitable for an unrestricted release of the property (the materials in their current locations and concentrations/activities may require corrective action):

- strontium-90 in the TA-10 central area subsurface
- near-surface debris that could injure trail users through direct contact;
- chamisa contaminated with strontium-90; and
- potentially contaminated shrapnel.

The portion of the central area of TA-10 (SWMU 10-007) where elevated levels of strontium-90 were detected may exceed DOE 5400.5 guidelines for residual radioactive material. However, there is no viable exposure pathway to recreational users because the area of elevated activity is too deep to impact recreational users. This contamination could leach from the source area into the surrounding tuff formation, and may be the source of radionuclides in some of the chamisa (LANL 1996, 54617, p. 62)

Near-surface debris presenting a physical and/or a radiological hazard to recreational users is located in two areas of TA-10—SWMU10-007 and AOC 10-009. SWMU 10-007 contains the location of the disposal pits and a landfill created during the removal of those disposal pits, which were used to handle the waste and building debris generated during D&D activities. AOC 10-009 has a variety of surface and buried debris of unknown origin.

Chamisa plant samples collected from the central area have exhibited elevated beta radiation above BV (LANL 1997, 55889, p. 3). These chamisa plants, decomposition products (litter), and pollen could be contacted by recreational users or foraging animals; decomposition products and pollen could be transported by wind and water.

Despite the previous shrapnel removal action, some shrapnel may be encountered by a trail user, and a small percentage of the shrapnel may be radioactive.

4.3.2 Requirements and Preliminary Corrective Action Goals and Objectives

Table 4.3-1 contains applicable requirements that will help select the corrective action. Groundwater has no applicable requirement because groundwater quality standards have not been exceeded. Surface water requirements are not included because Bayo Canyon is an ephemeral drainage and there is no evidence of contaminant transport by surface water. Future potential for surface water and groundwater impacts will be addressed as part of the preliminary evaluation of the corrective action.

The following preliminary corrective action goals were developed for the Bayo Canyon property:

- prevent strontium-90 from impacting groundwater;
- prevent direct contact with strontium-90;
- prevent direct contact with debris and radioactive shrapnel;
- limit exposure to shrapnel; and
- prevent inhalation and incidental ingestion of radioactive chamisa.

The following preliminary corrective action objectives are intended to meet the goals described above:

- prevent formation or movement of leachate from strontium-90 in the central area of TA-10;
- prevent direct contact with potentially contaminated debris in the TA-10 central area;
- isolate trail users from the debris in two shallow debris areas;
- isolate trail users from shrapnel;
- isolate trail users from radioactive chamisa; and
- control radioactive chamisa pollen and dust.

4.3.3 Comparison of Preliminary Corrective Action Alternatives

A value analysis of corrective action technologies was conducted to identify those that would be most appropriate for corrective action. Presumptive remedies were considered; containment is the most applicable since it is the EPA’s presumptive remedy for municipal waste landfills (EPA 1993, 88001). As the debris landfills in Bayo Canyon are relatively small and the Consent Oder mandated the evaluation of removal for SWMU 10-007, removal was also considered.

Preliminary corrective action alternatives were formulated to represent a range of cost and effectiveness at meeting the requirements and objectives described above. The following are the preliminary alternatives:

- Preliminary Alternative 1: no action;
- Preliminary Alternative 2: extensive institutional controls (maintain fences, cut vegetation, and monitor frequently); land use restricted to recreational;
- Preliminary Alternative 3: extensive institutional controls plus subsurface, low-permeability grout barrier; application of herbicide above barrier; land use restricted to recreational;
- Preliminary Alternative 4: moderate institutional controls (maintain fences and monitor periodically) plus excavation and disposal to remove strontium-90 in the Central Area; land use restricted to recreational;
- Preliminary Alternative 5: simple institutional controls (monitor occasionally) plus the excavation and disposal of debris and strontium-90 in the TA-10 central area; land use restricted to industrial; and
- Preliminary Alternative 6: extensive institutional controls plus engineered simple cap over both debris areas; divert surface water with low barrier; land use restricted to recreational.

The following criteria for comparing the preliminary alternatives are in accordance with the Consent Order (Section VII.D.4) and with DOE Order 5400.5:

- protect human health and the environment;
- meet standards (including as-low-as-reasonably-achievable [ALARA] and worker exposure);
- control source term (reduce or eliminate future releases);
- attain standards for the management of waste removed as part of corrective action;
- ensure long-term reliability and effectiveness;
- reduce toxicity and mobility;
- ensure short-term effectiveness;
- ensure implementability; and
- minimize cost (capital and maintenance).

The preliminary alternatives were compared to each other with respect to their ability to satisfy the comparison criteria. The ranking of preliminary alternatives considered the relative importance of each of the comparison criteria, with protectiveness of human health and the environment the most important criterion and reduction of toxicity and mobility the least important. Reduction of toxicity and mobility were judged to be less important because the most significant concern, the elevated strontium, is too deep to affect receptors directly and too small to result in a significant plume.

The preferred preliminary alternative for corrective action at SWMU 10-007 is Preliminary Alternative 6—an engineered cap over the debris area. Although Preliminary Alternative 6 was not ranked the best preliminary alternative to meet any one single comparison criteria, it consistently ranked high for each of the comparison criteria and did rank first when all comparison criteria were considered. Furthermore, adjusting the relative importance of comparison criteria (sensitivity analysis) to reflect different stakeholder perspectives resulted in Preliminary Alternative 6 still being the best or nearly the best preliminary alternative. Because of its limited size, the preliminary preferred alternative proposed for the debris area identified as AOC 10-009 is removal and site restoration. Details on the evaluation of alternatives are presented in Appendix C.

Preliminary Alternative 6 would likely be a one- or two-layer cap designed to reduce infiltration of surface water and isolate the debris from recreational users. Because SWMU 10-007 is on the canyon floor, a berm/ditch system would be constructed to divert storm flows. Extensive institutional controls would be employed to maintain the integrity of the cap.

The following additional data searches are needed to refine the comparison of preliminary alternatives:

1. test pits in the debris areas extending to the top of debris or a maximum of 5 ft deep on a 100-ft grid to estimate the horizontal limits of debris in accordance with the visual classification of the test pit material;
2. two test pits at each debris area extending to 12 ft bgs to characterize the physical, chemical, and radiological characteristics of the debris that could possibly impact a recreational or industrial user; samples will be collected where significant changes in material type are observed (but no more than 5 ft apart vertically) for analytical testing of the hazardous and radiological chemicals of potential concern (COPCs); and
3. material availability study to identify potential sources of material for cover construction and backfill; note that this study does not require direct coordination with the sampling campaign prescribed by this work plan and may be conducted independently.

4.4 Site Restoration Activities

Site restoration will be conducted if needed in areas disturbed by drilling and sampling activities at TA-10. Best management practices installed during field activities will be inspected, maintained, and restructured where necessary to control surface runoff and impede erosion processes. Disturbed areas will be regraded as close to original grade as possible; reseeding, along with the addition of soil amendments and fertilizer, will follow using Laboratory-approved seed mixtures.

4.5 Waste Management

The waste streams generated during the implementation of this work plan will be characterized as a result of the direct sampling of waste, analytical data generated as a result of sampling described in this plan, and other acceptable knowledge. All wastes will be managed in accordance with applicable Federal, State, DOE, and Laboratory requirements. Anticipated waste streams, regulatory classification, amounts, and disposal pathways are presented in the Management Plan of Investigation-Derived Waste (Appendix B).

5.0 INVESTIGATION METHODS

The principal investigation methods that will be used during the implementation of this work plan are various site surveys, including geodetic, geophysical, and radiation surveys; drilling; hand sampling of surface and shallow subsurface media; and mechanized potholing. Potential monitoring well installation, borehole abandonment, and equipment decontamination are also discussed in this section. Investigation methods are summarized in Table 5.0-1.

The following ENV-Environmental Remediation and Characterization (ECR) SOPs are applicable to the investigation methods proposed in this plan:

- SOP-1.01 General Instructions for Field Investigations
- SOP-1.02 Sample Containers and Preservation
- SOP-1.03 Handling, Packaging, and Transporting Field Samples
- SOP-1.04 Sample Control and Field Documentation
- SOP-1.05 Field Quality Control Samples
- SOP-1.06 Management of ENV-ERS Waste
- SOP-1.08 Field Decontamination of Drilling and Sampling Equipment
- SOP-3.11 Geodetic Surveys
- SOP-4.01 Drilling Plan Development
- SOP-4.04 Contract Geophysical Logging
- SOP-5.01 Well Construction
- SOP-5.02 Well Development
- SOP-5.03 Monitoring Well and RFI Borehole Abandonment
- SOP-6.01 Purging and Sampling Methods for Single Completion Wells
- SOP-6.03 Sampling for Volatile Organic Compounds in Groundwater
- SOP-6.09 Spade and Scoop Method for Collection of Soil Samples
- SOP-6.10 Hand Auger and Thin-Wall Tube Sampler
- SOP-6.14 Sediment Material Collection
- SOP-6.24 Sample Collection from Split-Spoon Samplers and Shelby-Tube Sampler
- SOP-6.26 Core Barrel Sampling for Subsurface Earth Materials
- SOP-6.31 Sampling of Subatmospheric Air
- SOP-7.05 Subsurface Moisture Measurements Using a Neutron Probe
- SOP-12.01 Field Logging, Handling, and Documentation of Borehole Materials

Complete SOP descriptions can be found at http://erinternal.lanl.gov/procedures.shtml. Additional procedures may be added as necessary to describe and document quality affecting activities.

5.1 Site Surveys

Geodetic, geophysical, and radiological surveys will be conducted to meet the data requirements specified in this work plan.

5.1.1 Geodetic Surveys

Geodetic surveying will be conducted in accordance with SOP-3.11, Geodetic Surveys. Horizontal coordinates and elevations will be determined by a professional, registered New Mexico land surveyor using the New Mexico State Plane Coordinate System. The survey results will be presented as part of the investigation report. Sample coordinates will be incorporated into LANL's Environmental Restoration Database.

5.1.2 Geophysical Surveys

The principal geophysical methods to be used during the investigation prescribed by this work plan are EM-31, EM-61, and GPR. A focused geophysical survey will also be conducted to locate shrapnel remaining at TA-10. All surveys will be conducted in accordance with the vendor's specifications. All results will be presented in the investigation report.

For this investigation, EM-31 and EM-61 data will be recorded at approximately 2-ft intervals along lines spaced approximately 20 ft apart. Higher resolution coverage (as needed) will be completed in selected target areas using 5-ft line spacing. Line and station separation may sometimes vary depending upon surface obstructions, such as the presence of cultural interference (e.g., aboveground metal objects and overhead power lines) and dense vegetation. Geodetic coordinates will be recorded at 1-second intervals using an integrated global positioning system (GPS). A base station free from cultural interference will be occupied at the beginning and end of each survey day to calibrate the instrument and perform system functional tests. During these tests, battery, phasing, and sensitivity checks will be performed.

The GPR survey will be performed using a digital SIR-2 subsurface interface radar system (or equivalent). After initial field tests will be conducted to determine maximum penetration and sufficient resolution, an appropriate transducer will be selected to perform the survey. Different transducers may be used in an attempt to provide greater penetration depths. Data will be digitally recorded, displayed, and analyzed during acquisition to allow real-time interpretation. Line locations will be selected based on EM anomaly location and surface obstructions.

Electromagnetic induction is anticipated to be the geophysical technology best suited to identify and locate nonferrous metallic fragments such as shrapnel. The two most appropriate systems are the Geonics Mark II EM-61 and the G-tek TM-5EMU. Both are widely used to map small, buried metallic targets in surveys for unexploded ordinance surveys. The TM-5EMU is better suited to identifying small near-surface targets than the EM-61, and is therefore likely the best instrument to locate shrapnel at TA-10. Instrument configuration and survey parameters, such as traverse spacing and sampling frequency, will be optimized during field implementation in accordance with site-specific conditions. The results will be used to produce digital survey maps.

5.1.3 Radiological Surveys

The walkover beta/gamma surveys will be performed to identify any areas with potentially elevated radiation emission rates. An integrated GPS-radiological survey system will be used. The system will consist of a Ludlum Model 2221 ratemeter/scaler with a Geiger-Mueller detector coupled to a Trimble Pro XRS mapping-grade GPS instrument. The Ludlum Model 2221 will be operated in ratemeter mode allowing for a beta/gamma count rate tagged with its corresponding coordinates to be collected at timed (approximately 2-second) intervals. The detectors will be carried at a height determined by the radiological contractor either in backpacks worn by field personnel or mounted on a "baby jogger" pushcart. High-and-low density surveys may be conducted. High-density surveys will be performed at the discretion of the survey team to better define anomalies using a detector spacing of approximately 2.5 ft and a survey speed of 1 ft per second (ft/s); low-density surveys will be performed with a detector spacing of 5 ft and a survey speed of 2.5 ft/s. All surveys will be conducted in accordance with the vendor's specifications. All results will be presented in the investigation report.

At the end of each survey day, the field data will be downloaded into a laptop computer and processed on-site using a combination of Trimble Pathfinder Office and ESRI ArcView GIS computer applications. Team personnel will review the daily data to ensure completeness of coverage.

5.2 Drilling and Deep Subsurface Sampling Methods

All drilling activities will be conducted in accordance with the appropriate SOPs (refer to Table 5.0-1), the site-specific health and safety plan, and radiation work permits to ensure health and safety issues are reviewed and addressed during field operations.

All boreholes will be drilled using hollow-stem auger drilling methods with 4.25-in.-inside-diameter auger flights. Each borehole will be continuously cored and sampled using a split barrel sampler. Core will be radiologically screened, field-analyzed for VOCs (using head-space analysis techniques), visually inspected, and geologically logged. Field screening, with the exception of x-ray defraction (XRF) which does not have sufficient sensitivity to detect background levels of inorganic chemicals, will be conducted in accordance with the requirements specified in the Consent Order. Screening for gross alpha activity will be conducted using an air proportional probe and a Ludlum model 139 rate meter (or equivalent); screening for gross beta/gamma radiation will be conducted using and ESP-1 rate meter and HP-260 Geiger-Mueller detector (or equivalent). VOC screening will be performed using a photoionization detector equipped with an 11.7-eV bulb.

Borehole locations have been proposed (presented in section 4) in accordance with the data evaluation discussed in section 2.6 and the Consent Order. One borehole will be drilled at the previously sampled borehole 10-02220 within Array 3 at the Central Area. The state-planar coordinates for this borehole location will be established in the field using geodetic survey methods and the existing survey data for this point. Other borehole locations will be established in the field using geodetic survey methods and approximate state-planer coordinates derived from the borehole sampling location maps presented in section 4. In addition, boreholes planned to target the footprints of SWMUs, such as at SWMUs 10-002(b), 10-003(n), and 10-004(b), will be located in accordance with geophysical survey results. Each proposed borehole location will be thoroughly examined to identify potential hazards for subsurface drilling; the exact location of some boreholes may require adjustment in accordance with utility surveys conducted as part of the excavation permitting process or the identification of other hazards.

Continuous core subsurface tuff samples will be inspected, in accordance with SOP-6.26, for lithologic and structural features and removed from the split-barrel sampler for sample collection. Samples will be collected at the depths specified in section 4.

Sample jars and/or ziplock bags will be filled with discrete segments of the core and will be shipped through the sample management office (SMO) to off-site laboratories for analysis. Sample analyses will be performed using methods specified by contract requirements of the Laboratory's SMO (LANL 2000, 71233).

In addition, all geotechnical analyses will be performed using methods specified by contract requirements of the Laboratory's SMO (LANL 2000, 71233).

5.3 Hand and Shallow Subsurface Sampling Methods

The most common method for surface and shallow subsurface sampling will be the spade and scoop method (SOP-6.09). In accordance with this method, a sample is collected by digging a hole to the target depth (as specified in this work plan), and collecting a discrete grab of sample material. Stainless steel shovels, spades, scoops, and bowls are used to ease decontamination. Disposable tools made of polystyrene or Teflon can also be used, if necessary. In some cases, hand-augering tools will be used to collect shallow subsurface samples if geologic material conditions permit. Acceptable tools and their use are covered in SOP-6.10. If the surface location is at bedrock, an axe or hammer and chisel may be necessary to produce sufficient material for a full-suite analytical sample.

All surface and shallow subsurface sampling locations prescribed by this work plan were sampled during previous sampling campaigns. These locations will be reestablished in the field using geodetic survey methods and the existing survey data for these locations. Samples will be collected at the proposed depths; however, if field-screening data indicate the possibility of contamination at deeper sample depths, additional samples will be collected either using hand sampling methods or, if appropriate, drilling.

Surface and shallow subsurface samples will be radiologically screened and field-analyzed for VOCs (using head-space analysis techniques) prior to collection, and placed in zip-lock bags and/or sample jars as grabs derived from hand augers, scoops, or chiseling devices in accordance with appropriate SOPs (see section 5.0). Field screening will be conducted in accordance with the requirements specified in the Consent Order. Screening for gross alpha activity will be conducted using an air proportional probe and a Ludlum model 139 rate meter (or equivalent); screening for gross beta/gamma radiation will be conducted using and ESP-1 rate meter and HP-260 Geiger-Mueller detector (or equivalent). VOC screening will be performed using a photoionization detector equipped with an 11.7-eV bulb. Samples will be shipped through the SMO to off-site laboratories for analysis. Sample analyses will be performed using methods specified by contract requirements of the Laboratory's SMO (LANL 2000, 71233). See Table 4.2-1 for a summary of the screening and analytical requirements.

5.4 Excavation of Test Pits

A backhoe or track-mounted excavator will be used to install all test pits as part of the investigations at the landfill and debris pits to evaluate the physical extent and type of material disposed at TA-10. Test pit locations will be in accordance with field observations, requirements specified in section 4.0, and the current understanding of the site. The approximate dimensions of test pits will be in accordance with field observations and conditions encountered during excavation. Screening of the excavated materials will be conducted as necessary, and samples of excavated test pit materials may be collected for laboratory analyses if conditions warrant a higher level of characterization.

5.5 Potential Perched Saturation Zone Monitoring Well Installation

If saturation is encountered as a borehole is advanced, drilling will be stopped to determine whether sufficient water volume is available to analyze the water quality. Generally, the total volume required is approximately 0.5 to 1.0 L. If the minimum volume of groundwater cannot be collected, the borehole will be continued to the planned total depth or until saturation is again encountered and the process is repeated. Insufficient water sample volumes from discrete depths will not be composited to make the required volume for screening analysis.

If sufficient volume exists, a groundwater sample will be collected and analyzed for cations and anions, alkalinity, total organic carbon, total inorganic carbon, and total dissolved solids on a rapid turnaround basis. Typically, results of groundwater screening samples are available within 48 hr. While awaiting screening, the borehole will be advanced to the base of saturation, or the perching horizon, and halted. If possible, the perching horizon will be identified and not penetrated. This activity will determine the thickness of the zone of saturation and the characteristics of the perching horizon. Borehole drilling will cease, a monitoring well will be designed, and the design will be submitted to NMED for approval. After the design has been approved, the well will be installed. A borehole will be drilled adjacent to the well and the saturated zone isolated with a double wall casing advancement drilling method to isolate the known saturated zone. The additional borehole will then be completed to the planned depth and the process repeated.

If perched groundwater monitoring wells are installed, a regular monitoring program will be implemented for data collection and analysis (see section 6.0).

5.6 Borehole Abandonment

All boreholes will be abandoned by pressure grouting, using tremie pipe in accordance with the procedures outlined in SOP-5.03. The procedure takes into account any subsurface characteristics (such as perched zones) that would require isolation if the decision to abandon versus well installation had been made. The placement of backfill materials (such as bentonite and cement), the volume (calculated and actual), intervals of placement, and additives used to enhance backfilling will be documented.

5.7 Equipment Decontamination

After the investigation activities, equipment will be decontaminated. Residual material adhering to equipment will be removed using dry decontamination methods, including the use of wire brushes and scrapers followed with a spray detergent and wiping with clean paper towels (SOP-1.08). High concentrations of organic chemicals are not present in the areas to be sampled, so the use of methanol as a rinse is not necessary. Nitric acid rinses will only be implemented if stainless steel or disposable sampling supplies are not used. Field QA/QC suites will include the collection of rinsate samples, which will document the effectiveness of the decontamination process.

Prior to demobilization, all sampling equipment will be screened and radiological swipes counted to confirm that the equipment can be removed from the site. If equipment cannot be free-released after dry decontamination, a high-pressure sprayer along with long-handled brushes and rods will be used to more effectively remove contaminated material from equipment. Pressure washing of equipment will be performed on a temporary wash pad with a high-density polyethylene liner. Cleaning solutions and wash water will be collected and contained for proper disposal as discussed in Appendix B. Decontamination solutions will be sampled to determine final disposition. Air filters on equipment operating in the exclusion zone will be considered contaminated and will be removed and replaced before equipment leaves the site. Equipment ready for demobilization will be surveyed by a Health, Safety, and Radiation (HSR-1) Radiation Control Technician before being released from the site, if necessary.

6.0 MONITORING AND SAMPLING PROGRAM

Currently, no monitoring is being conducted at TA-10 after the implementation of this work plan. However, intermediate groundwater-monitoring wells will be installed if the presence of shallow perched water is indicated. If any monitoring wells are necessary, a monitoring plan will be developed and submitted for review and approval from NMED. The monitoring plan will detail the parameters to be monitored, monitoring frequency, and procedures to be followed.

7.0 SCHEDULE

After the approval of this work plan by NMED, readiness review and site preparation activities can begin. Preparation activities and implementation of the fieldwork is anticipated to require 4 to 6 months through demobilization from the site. Sample submittals to the SMO should be completed by this time. Receipt of analytical data are anticipated within 30 days of demobilization. After receiving data, a preliminary review of the investigation results will be carried out by Laboratory and NMED personnel. An investigation report will be written and is currently due to NMED by January 31, 2008.

8.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author, publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the ENV-ERS Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the ENV-ERS reference set titled "Reference Set for OU 1079."

Copies of the reference sets are maintained at NMED Hazardous Waste Bureau; DOE Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and at ENV-ERS. The sets were developed to ensure the administrative authority has all material needed to review this document, and they are updated periodically as needed. Documents previously submitted to the administrative authority are not included.

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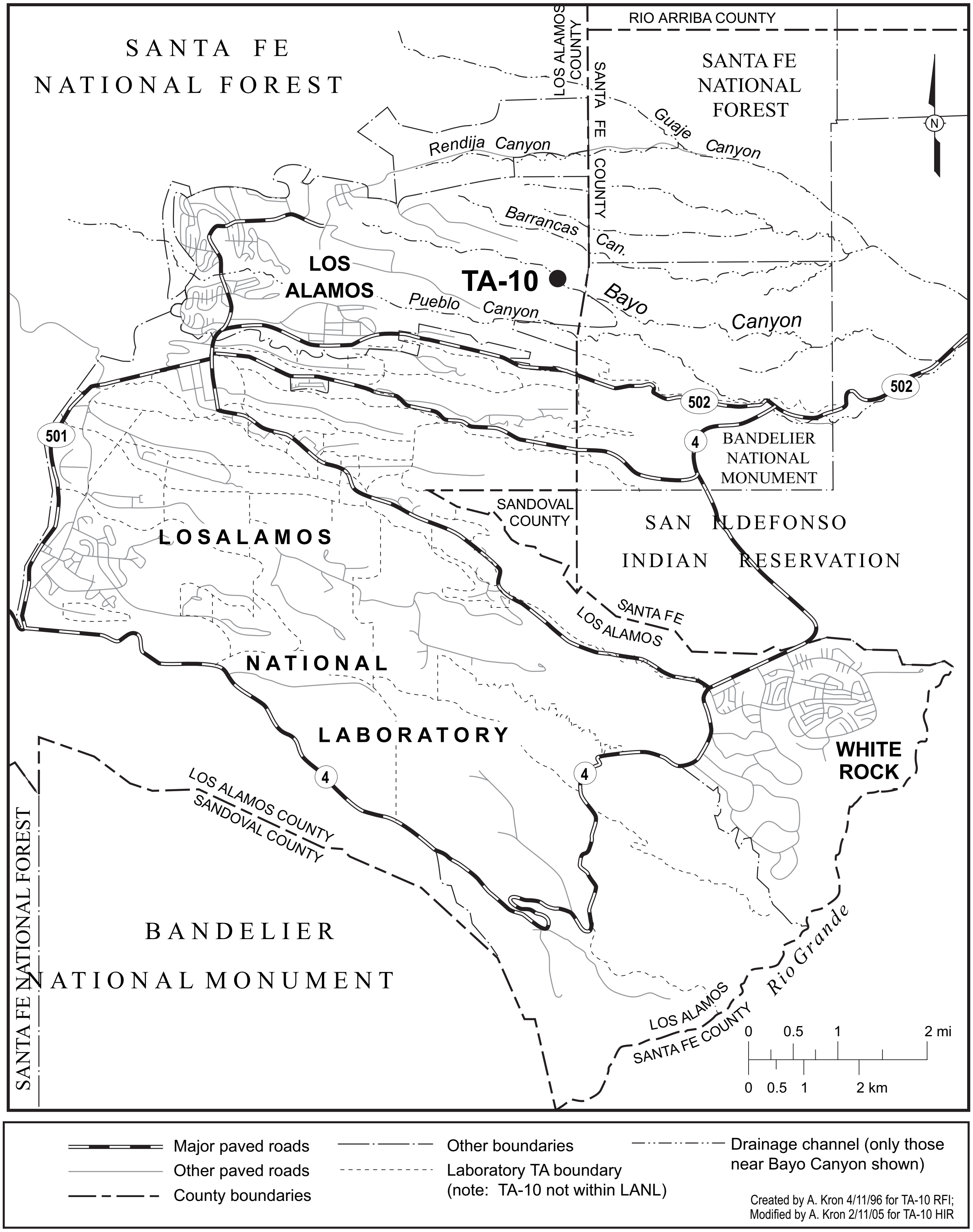

Figure 2.1-1. Locations of Bayo Canyon and TA-10 with respect to Laboratory TAs and surrounding landholdings

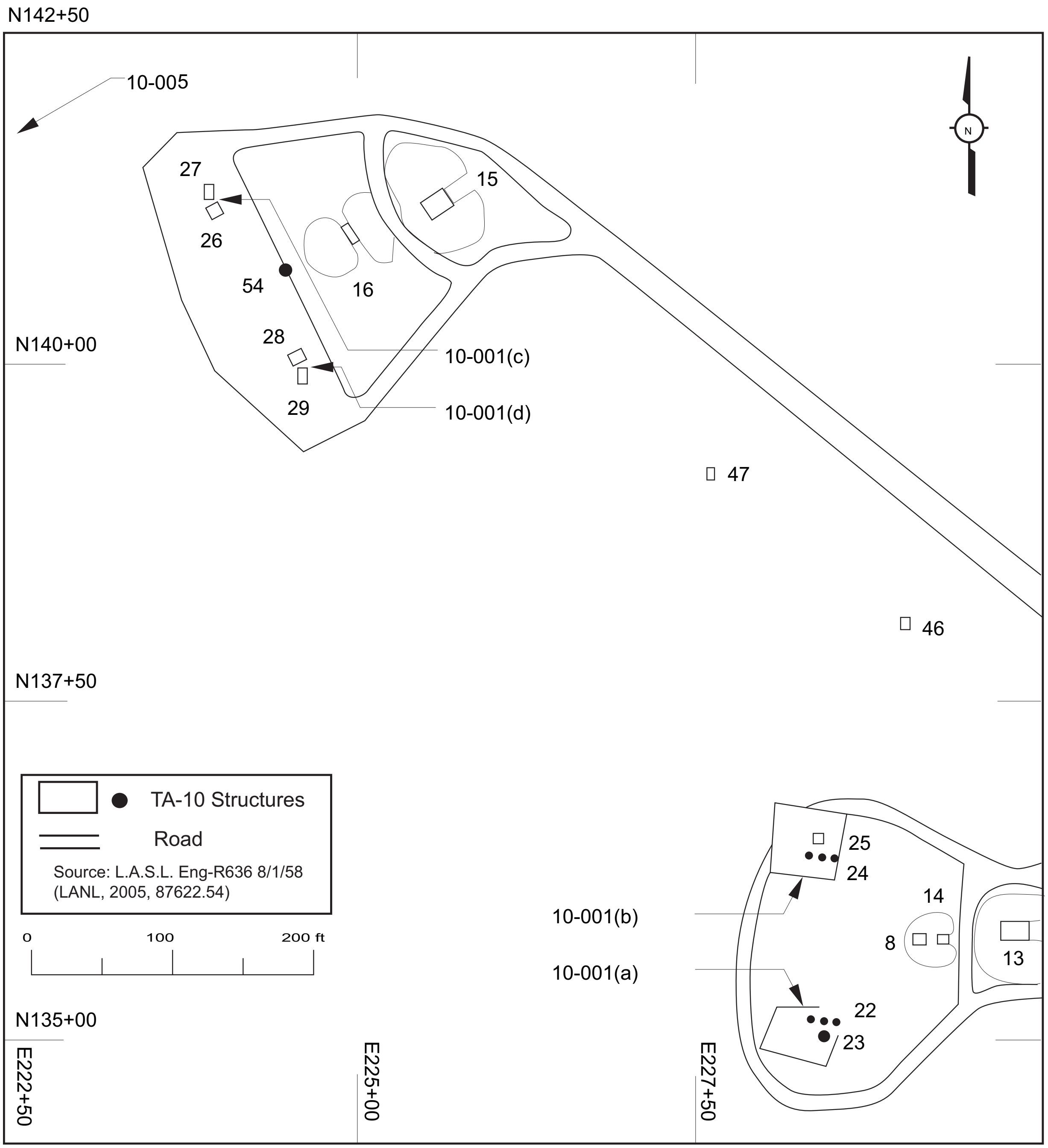

Figure 2.1-2. TA-10 firing sites with associated SWMUs

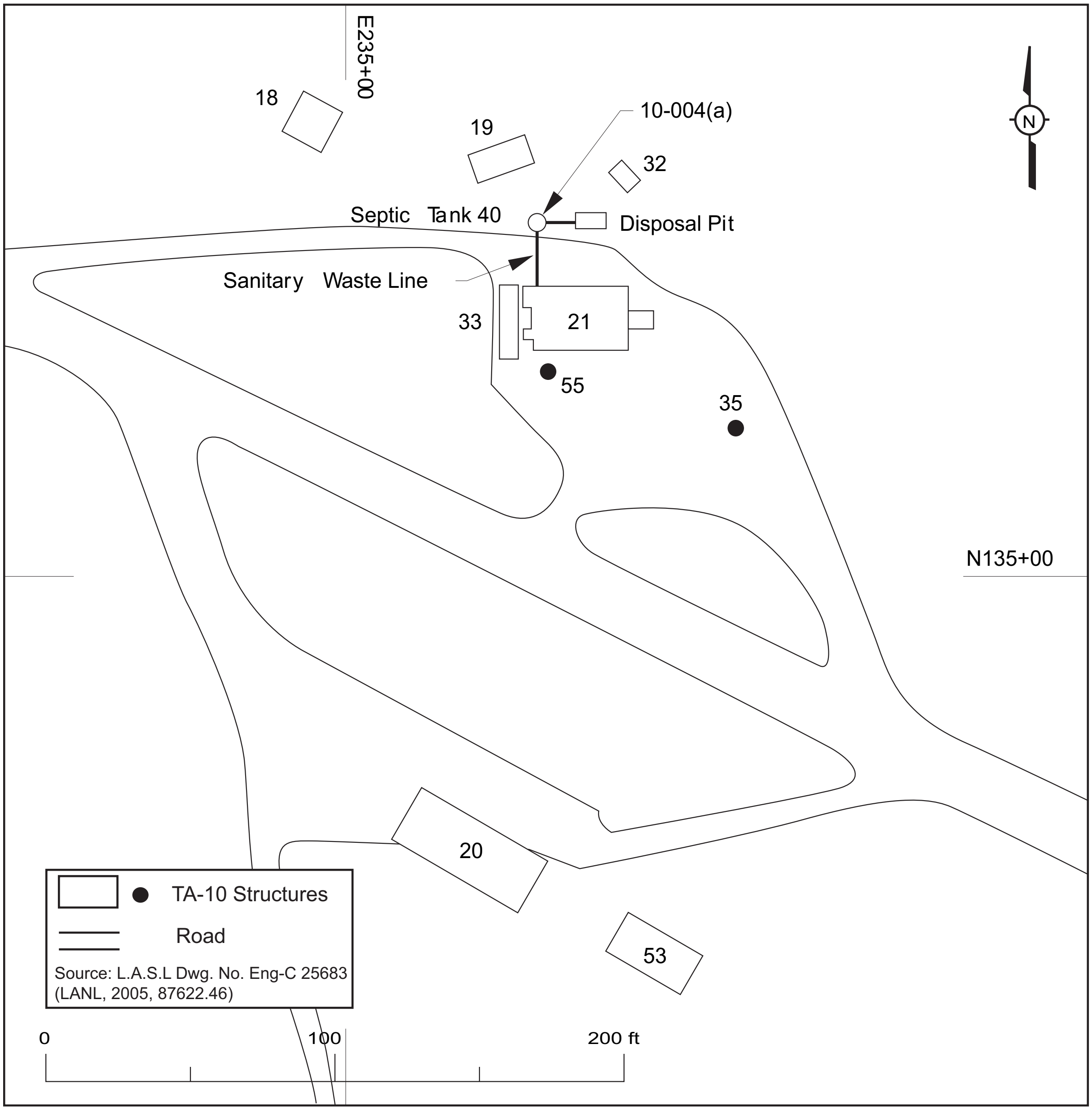

Figure 2.1-3. SWMU 10-004(a) and associated structures

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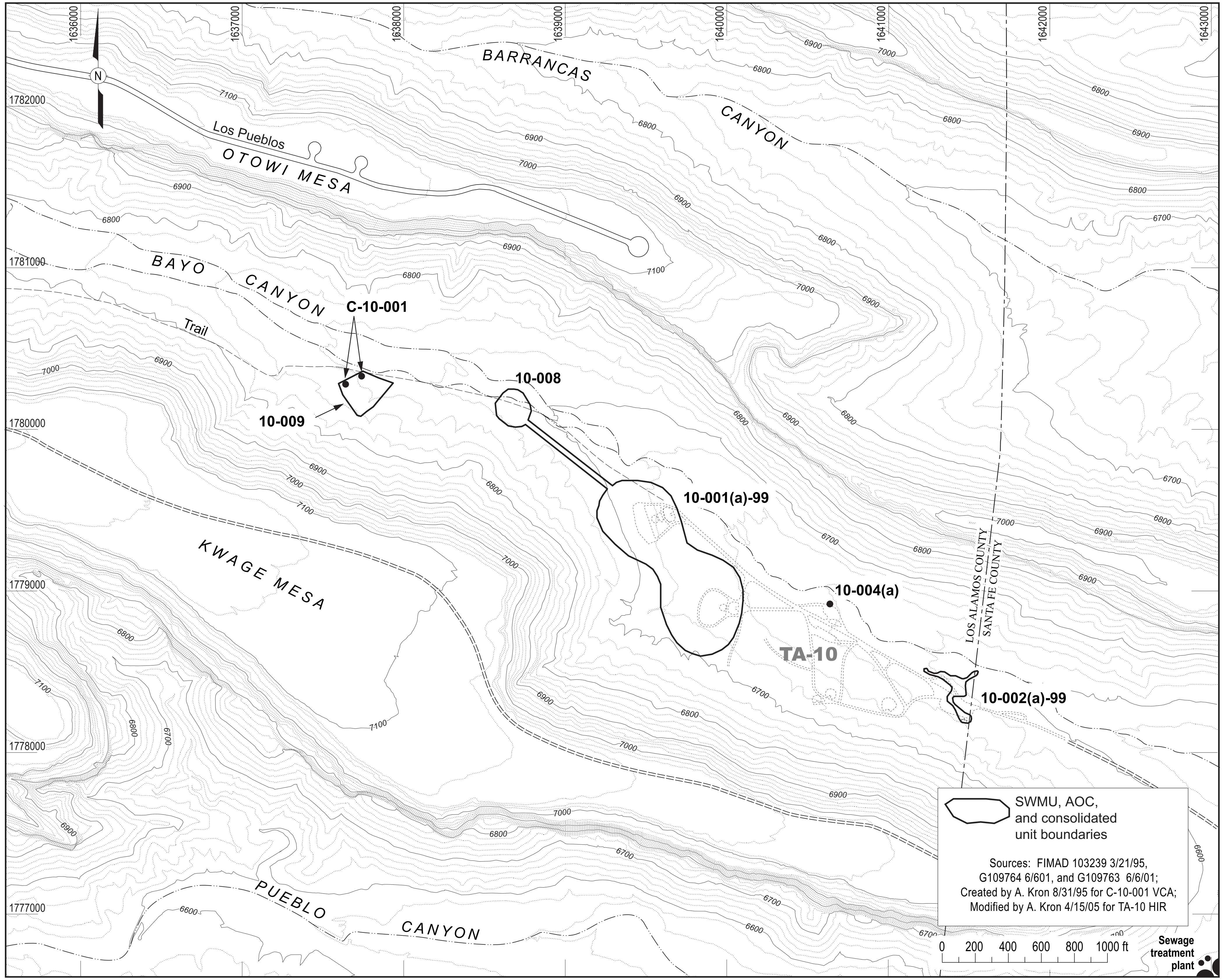

Figure 2.1-4. Locations of consolidated units, SWMUs, and AOCs

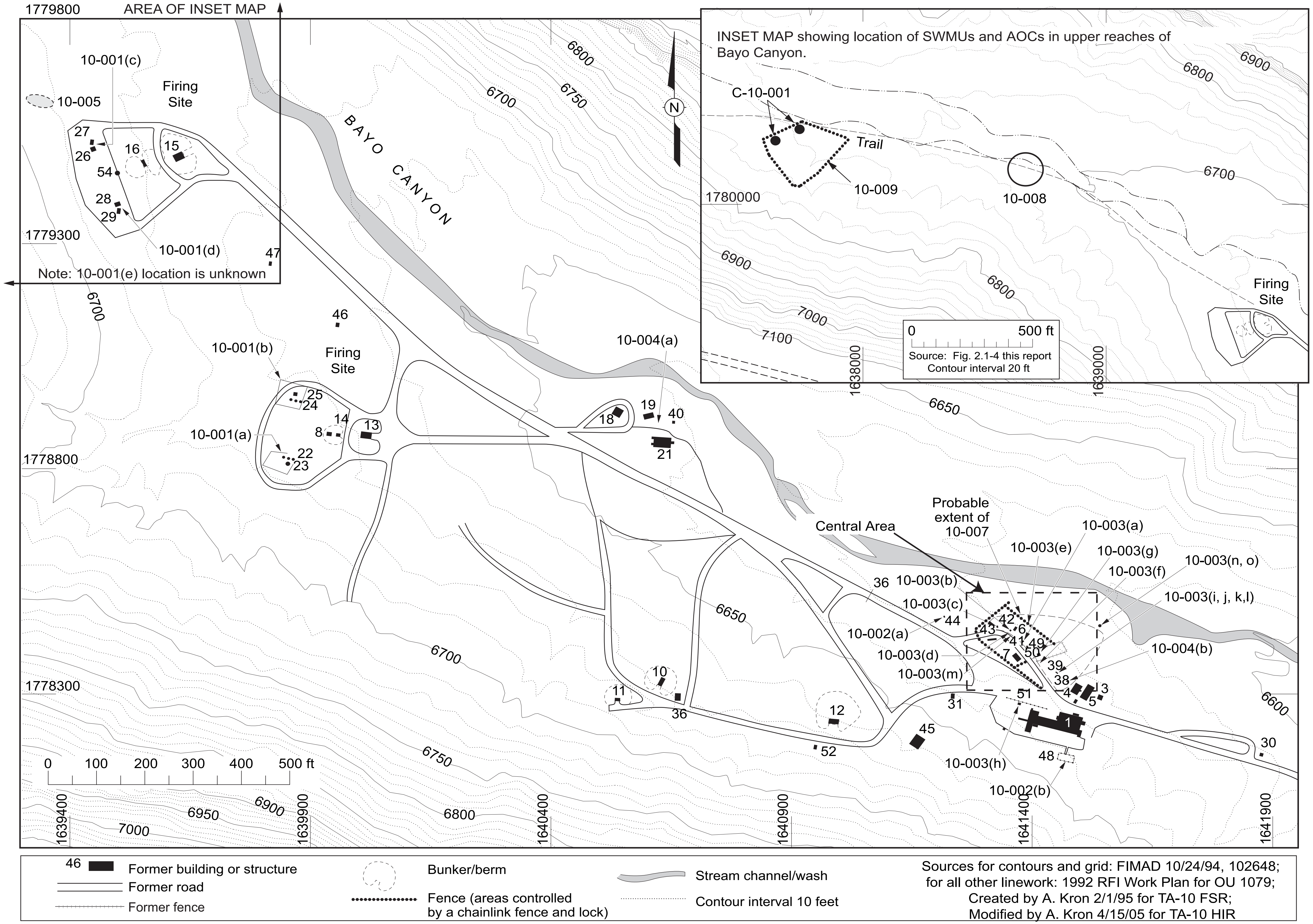

Figure 2.1-5. Locations of all SWMUs and AOCs at TA-10

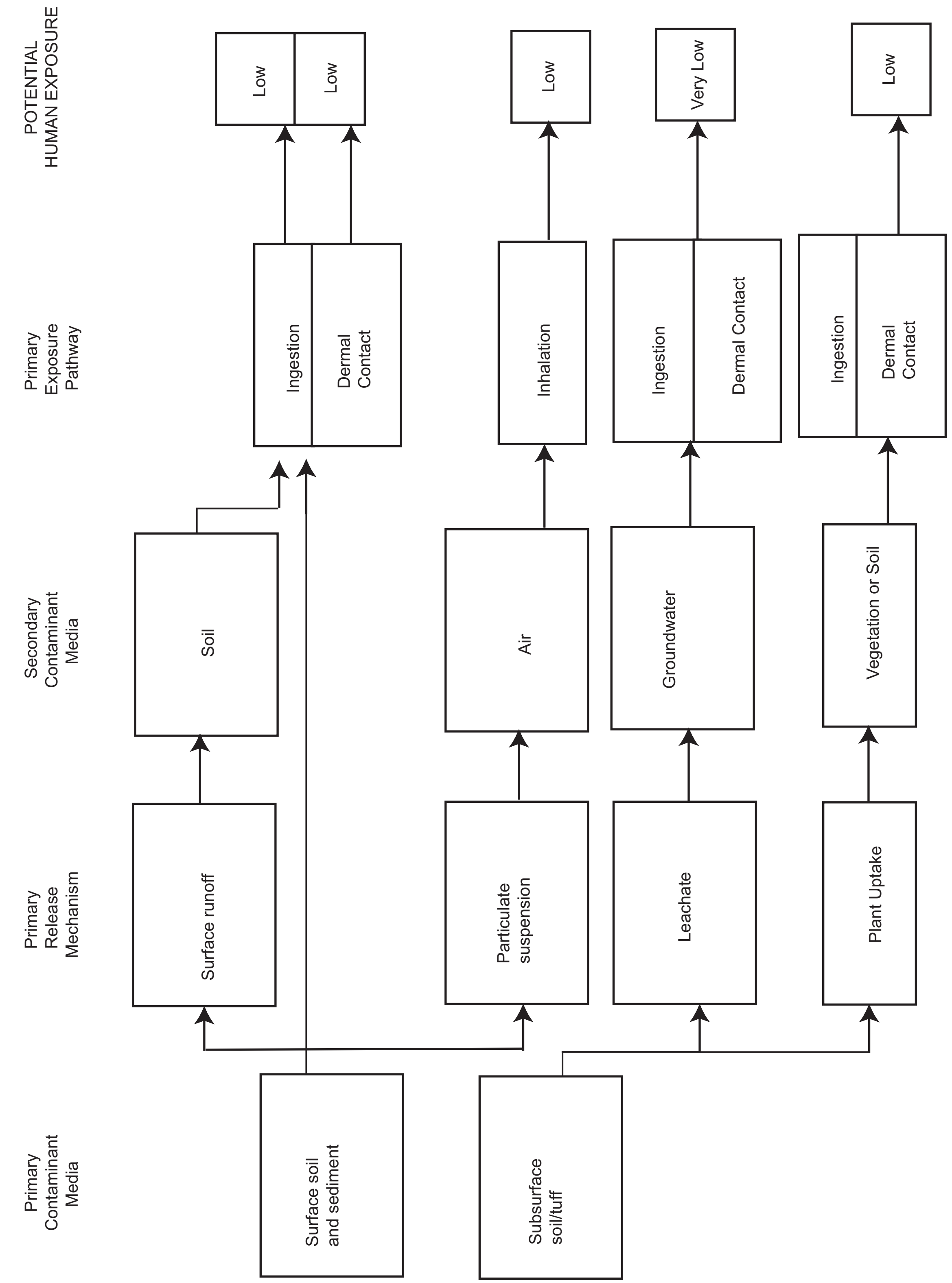

Figure 2.4-1. Conceptual model for human health exposure pathways at TA-10, Bayo Canyon

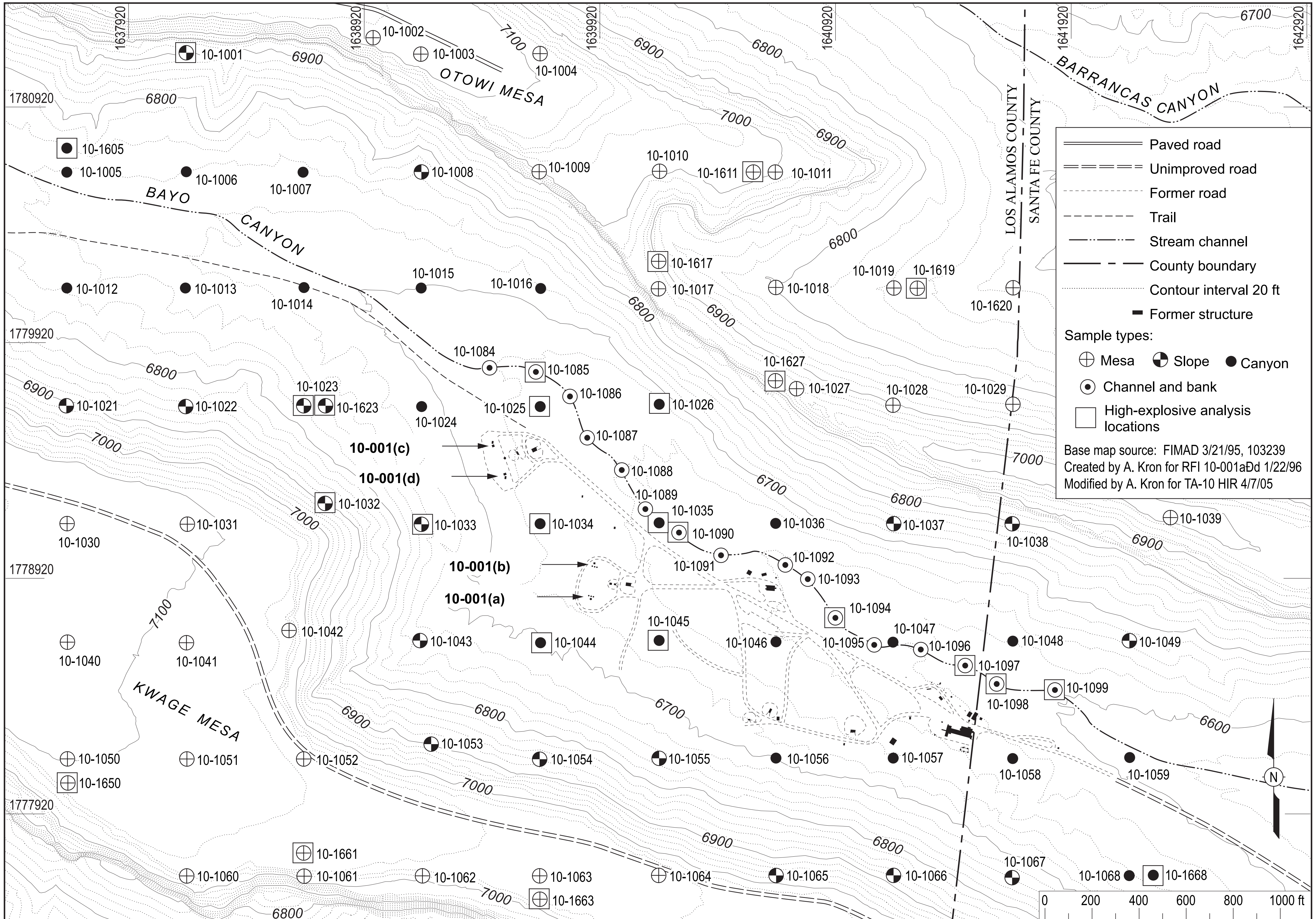

Figure 2.5-1. 1994 RFI surface samples collected for SWMU 10-001(a–d)

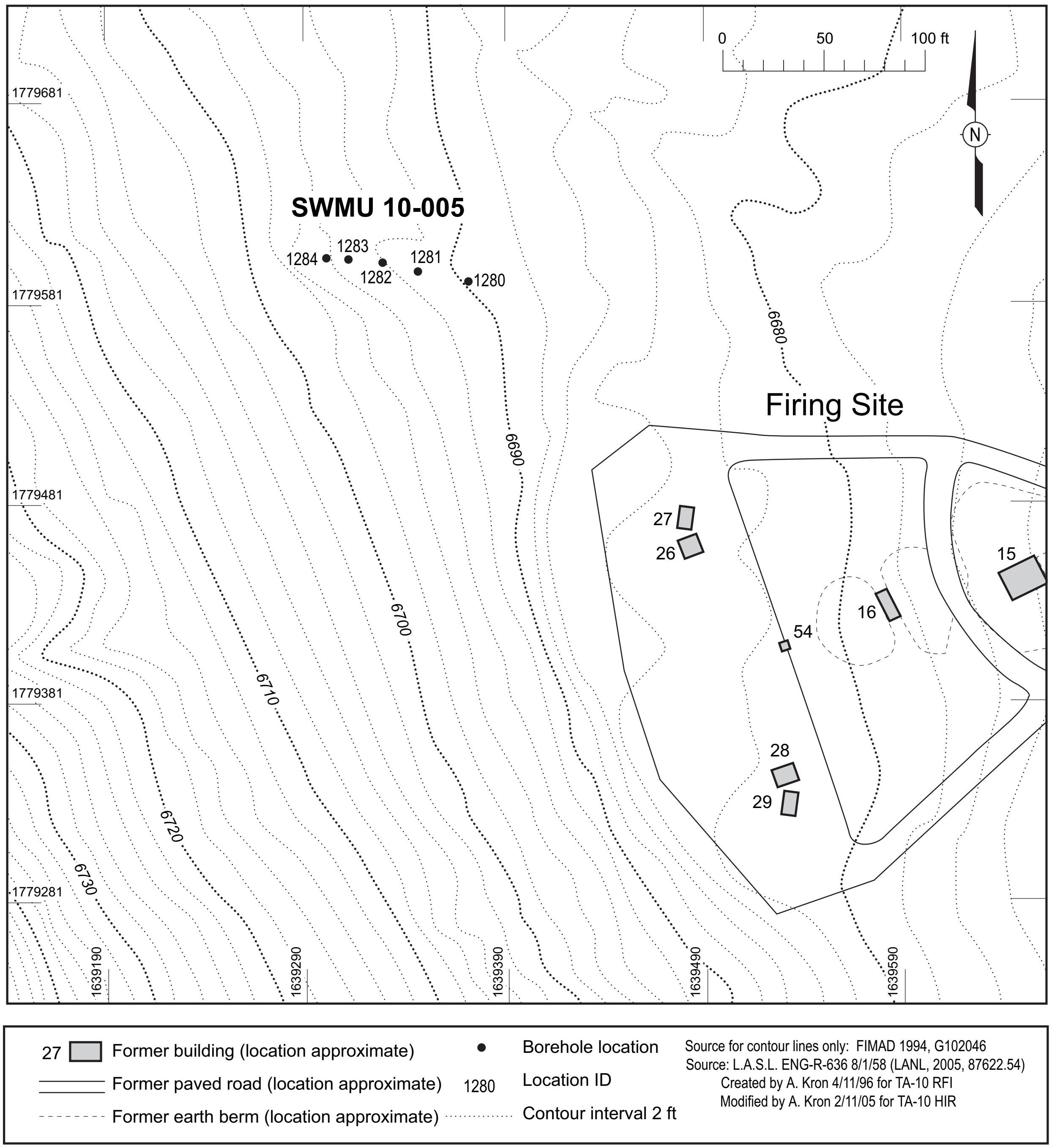

Figure 2.5-2. 1994 borehole locations at SWMU 10-005

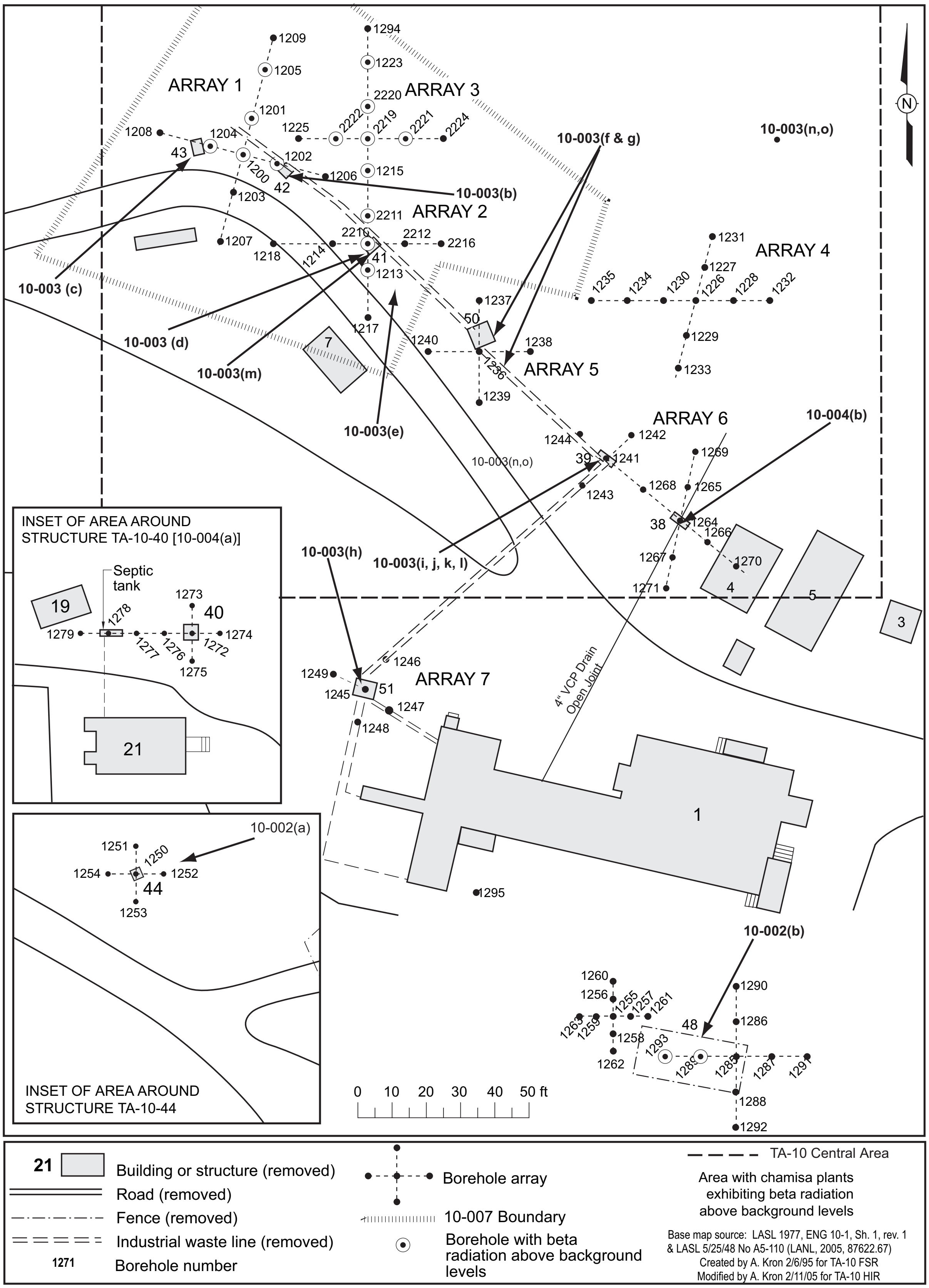

Figure 2.5-3. 1994 RFI borehole locations, Central Area

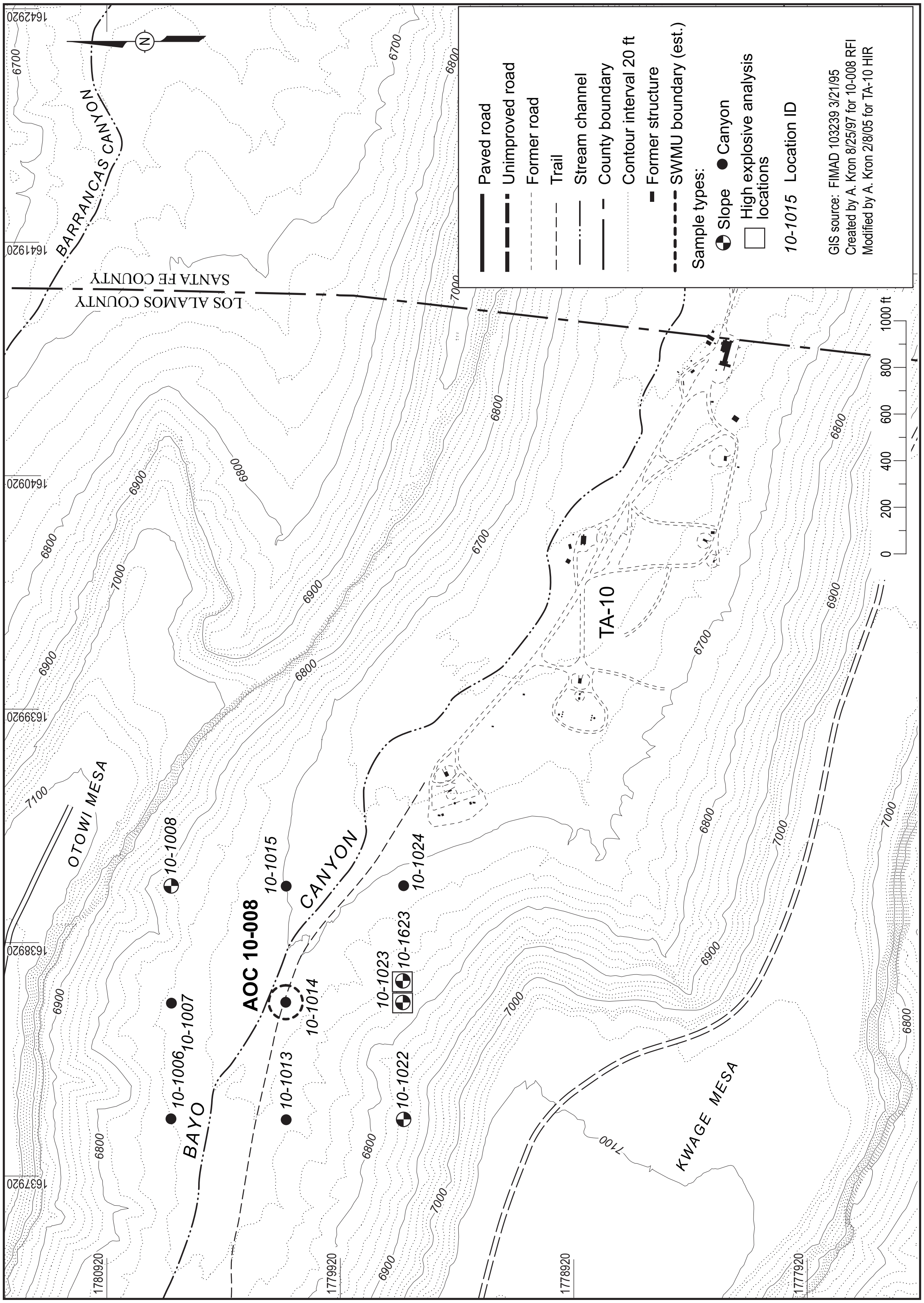

Figure 2.5-4. 1994 RFI sampling locations at AOC 10-008

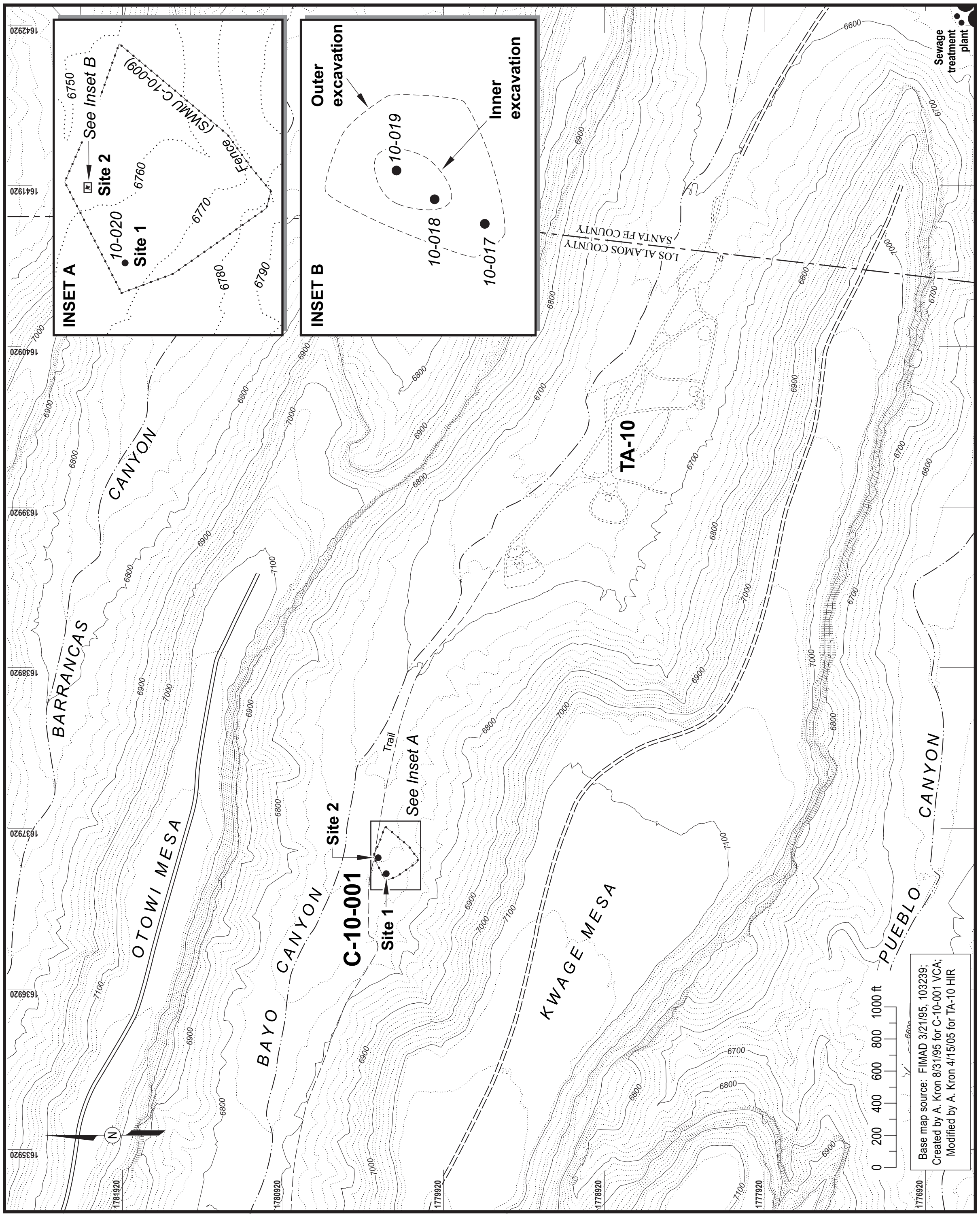

Figure 2.5-5. Locations of confirmation samples at AOC C-10-001

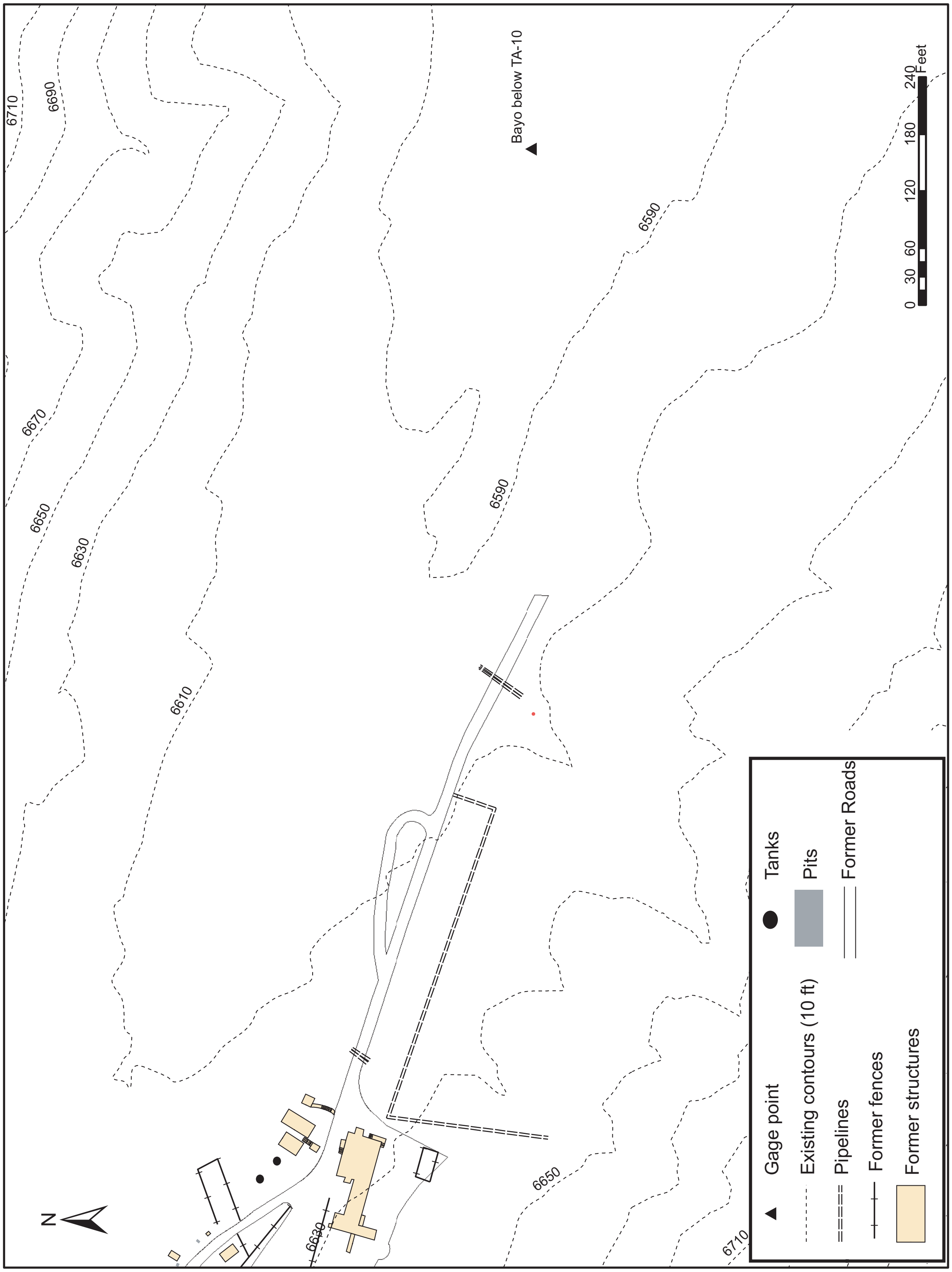

Figure 3.2-1. Location of stream gaging station east of TA-10

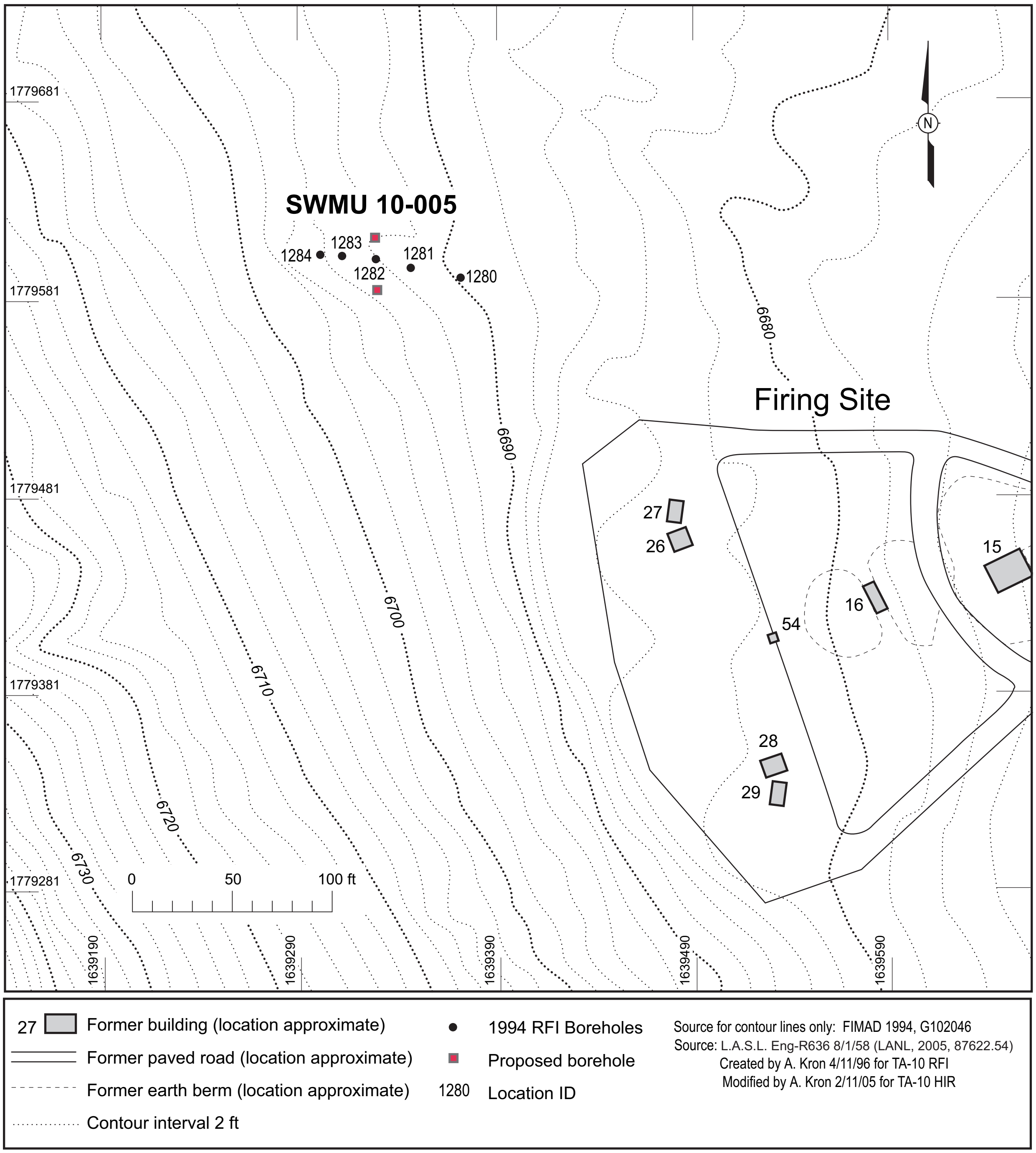

Figure 4.2-1. 1994 borehole locations at SWMU 10-005 and proposed borehole locations

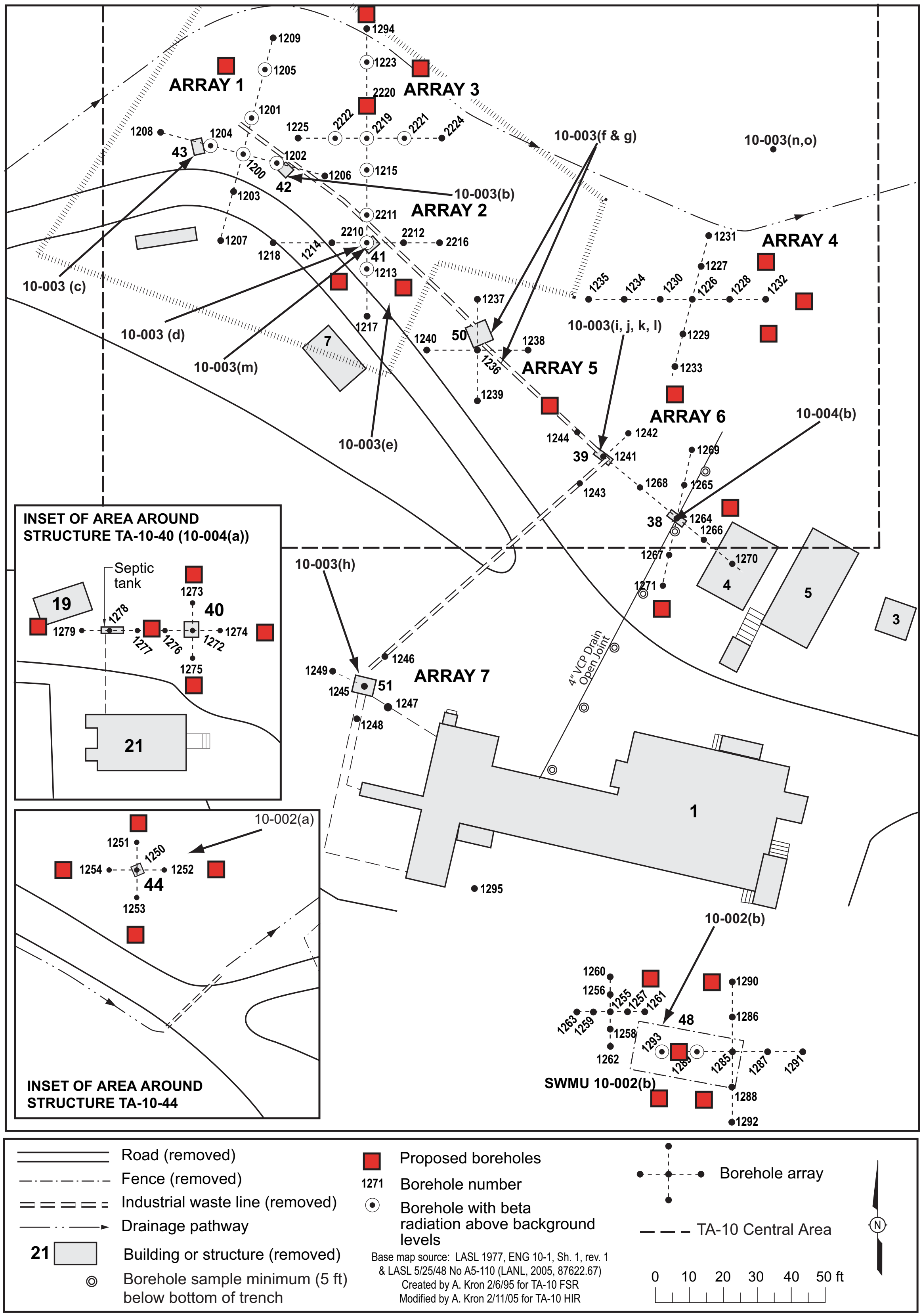

Figure 4.2-2. 1994 RFI boreholes and proposed boreholes in the Central Area

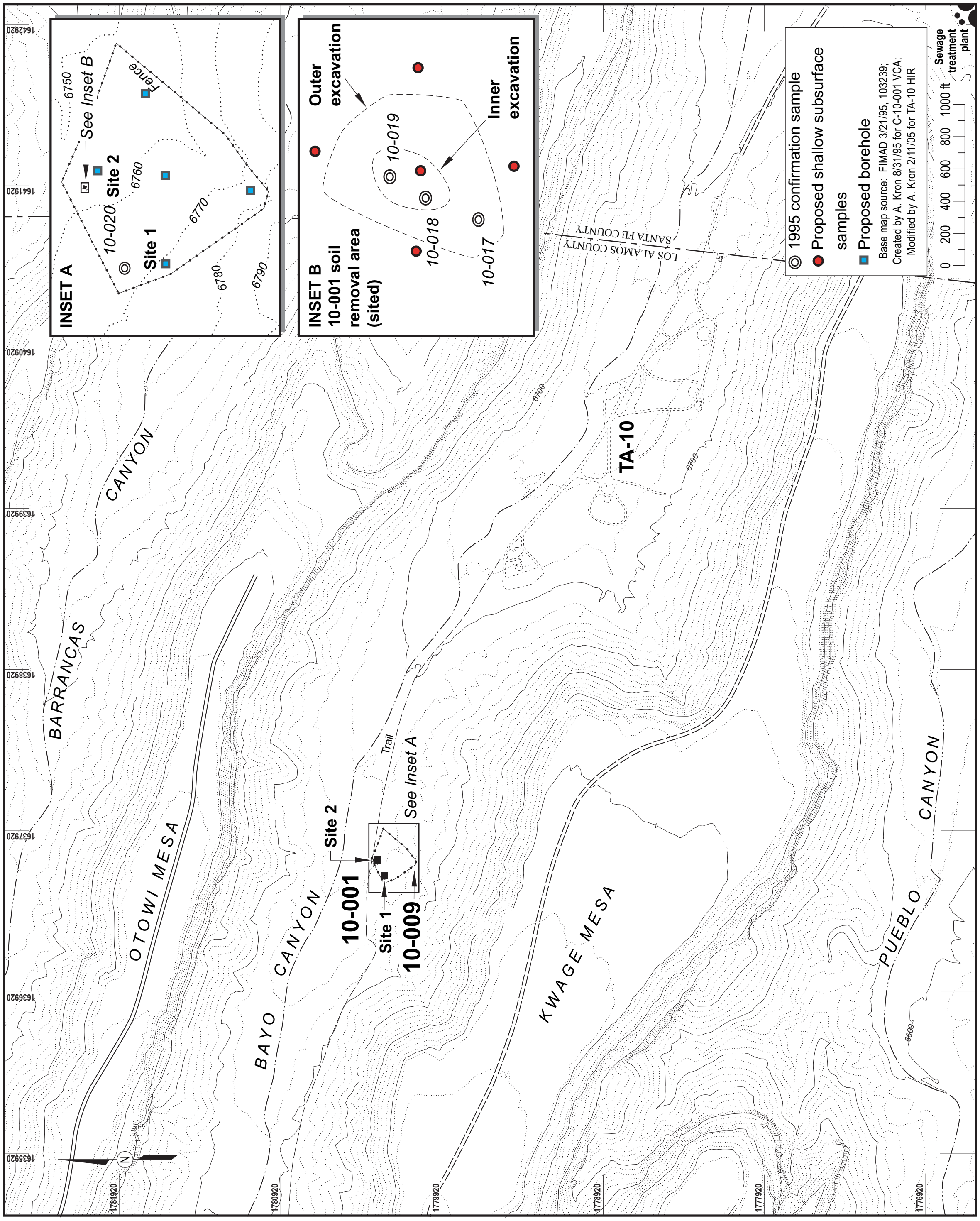

Figure 4.2-3. 1995 VCA confirmation sampling locations and proposed shallow sampling and borehole locations at AOCs C-10-001 and 10-009

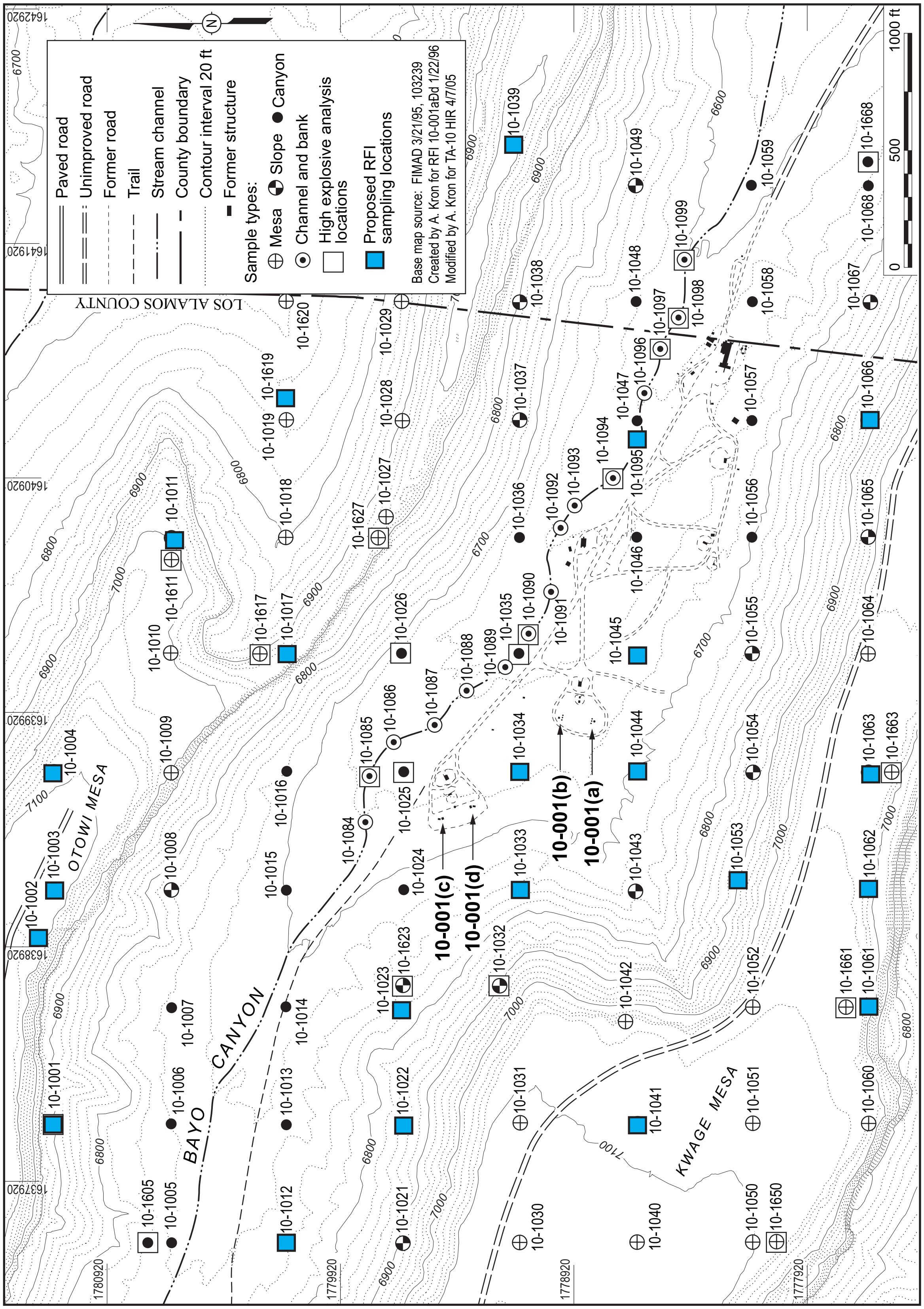

Figure 4.2-4. 1994 RFI shallow sampling locations and proposed sampling locations for surface and shallow subsurface site-wide nature and extent

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Table 4.0-1
Crosswalk between Consent Order and Investigation Work Plan

Consent Order	LANL Proposed Alternative Scope	Consent Order Requirements Met?
IV.C.5.c.ii Technical Area 10 Survey of Disposal Units		
The Respondents shall conduct a survey of the disposal units at TA-10. The Respondents shall determine the dimensions and total depth of each disposal shaft, pit, and other unit into which contaminants were disposed, and the base profile, topography, low elevation point, and down-slope end of the base of each disposal shaft, pit, and other unit into which waste was disposed.		
1. The dimensions and base elevations of each pit, shaft, and other unit shall be determined using as-built construction drawings and boring logs.	1. The engineering drawings are listed in HIR Appendix C (LANL 2005, in progress).	**Yes**
2. If unavailable, ground penetrating radar, magnetic surveys, or other methods shall be used.	2. None. (See section 4.1).	**Yes**
3. The methods used to evaluate the disposal units shall be approved by the Department prior to implementation.	3. None. Work will be performed in accordance with the approved investigation work plan.	**Yes**
4. The survey shall be completed prior to implementation of the drilling explorations under Section IV.C.5.c.iii.	4. None. The survey will be completed prior to implementation of drilling.	**Yes**
(Numbering added to facilitate discussion)		
IV.C.5.c.iii Technical Area 10 Drilling Explorations		
The Respondents shall submit to the Department for the review and approval a work plan at TA-10. The work shall be conducted in accordance with Section IX.B. The work plan shall meet the following requirements:		
1. The type and concentrations of contaminants present at, and off-site from, each SWMU and/or AOC.	1. None. Historical data are presented in the HIR (LANL 2005, in progress).	**Yes**
2. The presence of subsurface moisture and the extent of any zones of saturation in the canyon alluvium or bedrock above the regional aquifer.	2. None. Moisture will be noted during borehole logging	**Yes**
3. Prior to the implementation of drilling explorations, the respondents shall determine the locations, dimensions, remaining structures, and the total depths of facility related features at each SWMU and AOC, and the types of contaminants released from each SWMU and AOC.	3. None. Locations and dimensions of structures and types of contaminants are described in the engineering drawings listed in the HIR (LANL 2005, in progress). Geophysical investigations will be performed as noted in number 2 above.	**Yes**

Table 4.0-1 (continued)

Consent Order	LANL Proposed Alternative Scope	Consent Order Requirements Met?
The characterization shall be completed utilizing data acquired from samples, drill cuttings, cores, and downhole geophysical data. The subsurface conditions shall be characterized by evaluating samples of soil, rock, sediments, and groundwater for field screening and laboratory chemical analysis. The following are requirements for completing subsurface explorations:	Discussions of former structures and past releases are presented in the HIR.	
1.The exact location of former SWMU 10-002(b) shall be identified and a minimum of ten borings shall be advanced to depths of 25 ft bgs in the vicinity of the former disposal pit.	1. None. Four boreholes were drilled within the footprint of SWMU 10-002(b) during the 1994 RFI. After the completion of geophysical surveys, additional boreholes will be drilled and sampled for a total of 10 boreholes at SWMU 10-002(b).	**Yes**
2. Ten borings shall be advanced to depths of 30 ft bgs in the vicinity of the leach field.	2. None. Array 4 targets the vicinity of the leach field; ten borings were advanced at Array 4 to a minimum depth of 50 ft bgs. Based on the findings of the geophysical surveys, additional boreholes will be drilled and sampled to comply with the required ten boreholes.	**Yes**
3. The presence or absence of drain lines at former SWMU 10-004(b) shall be determined. If present, the drain lines shall be removed, and samples shall be collected from the excavation at 20-ft intervals for field screening and laboratory analyses. If the drain line is not excavated, borings shall be advanced to depths at 25-ft intervals along the entire length of the drain line to depths of five ft below the base of the drain line trench.	3. None. Site will be checked with geophysical surveys to determine if the drain line remains in place. LANL will collect samples in accordance with the results of the surveys and as required.	**Yes**
4. The drilling activities shall be conducted in accordance with Section X of this Consent Order.	4. None.	**Yes**
5. The boring locations shall be approved by the Department prior to the start of drilling activities. The borings shall be advanced using hollow-stem auger drilling methods, where practicable, or other drilling methods approved by the Department.	5. None.	**Yes**
6. Two borings shall be advanced to first water to evaluate for fractures in rock beneath the alluvium and the presence of perched groundwater at depth beneath the site.	6. No borehole is planned to a depth of first water since no shallow or intermediate water has been encountered at TA-10. Regional well R-24 will be drilled as soon as July 2005 to the east of the TA-10 site. Based on the findings at R-24, additional borings and wells will be planned if intermediate water is discovered.	**No**

Table 4.0-1 (continued)

Consent Order	LANL Proposed Alternative Scope	Consent Order Requirements Met?
IV. C.5.c.iv Technical Area 10 Soil and Rock Sampling		
The Respondents shall, at a minimum, conduct soil and rock sampling during subsurface explorations activities at TA-10 in accordance with the following requirements:	See investigation work plan section 5.2	
1. Soil samples shall be collected from each boring at five-ft intervals and from the native material directly below the base of each SWMU or AOC structure or excavation. A sample also shall be obtained at the maximum depth of each boring.	1. None.	**Yes**
2. Samples shall be collected and screened in accordance with the methods described in Section IX.B of this Consent Order.	2. Field-screening methods conform to the requirements of section IX.B with the exception of XRF screening. XRF screening does not provide adequate detection limits to be useful in guiding sample collection at TA-10.	**No**
3. Two cores, or the number specified in the Department approved work plan, shall be obtained from selected borings, at depths approved by the Department, for permeability testing in accordance with Section IX. B of this Consent Order.	3. None.	**Yes**
4. Two samples, or the number specified in the Department-approved work plan shall be selected from each boring for submittal to a laboratory for analysis of VOCs, SVOCs, explosive compounds, perchlorate, TAL metals, and cyanide.	4. None.	**Yes**
5. The sample displaying the greatest field-screening evidence of VOC concentrations shall be selected for submittal to the analytical laboratory for chemical analysis.	5. None.	**Yes**
6. If field-screening evidence of contamination is not observed in a boring, the sample obtained from the native material located directly below the limits of the original construction excavation shall be submitted for the chemical analyses.	6. None	**Yes**
7. The sample obtained from the maximum depth of each boring also shall be submitted to an analytical laboratory for the analyses.	7. None	**Yes**
8. All borings not completed as monitoring wells shall be properly plugged and abandoned in accordance with Section X.D of this Consent Order. The Respondents shall provide a status report describing the details of borehole abandonment to the Department as an appendix to the investigation report.	8. None. See investigation work plan section 5.6	**Yes**

Table 4.0-1 (continued)

Consent Order	LANL Proposed Alternative Scope	Consent Order Requirements Met?
9. Evaluate the need for removal of the landfill material at SWMU 10-007 for disposal at an approved landfill. Collect samples from the limits of the excavation at locations specified by the Department.	9. Remedial alternatives are evaluated in section 4. Boreholes are proposed beyond the inferred limits of SWMU 10-007.	**Yes**
IV. C.5.c.v Technical Area 10 Groundwater Well Installation The Respondents shall submit to the Department for review and approval a work plan for groundwater well installation at TA-10. The work shall be conducted in accordance with Section IX.B. Implementation of the approved work plan shall meet the following requirements, subject to the procedures of Section III.M of this Consent Order:		
1. Two borings shall be advanced to depths intersecting the first significant presence of intermediate zone perched groundwater downgradient of the former liquid waste treatment facility at locations approved by the Department. The respondents shall construct monitoring wells in the borings in accordance with section X of the Consent Order if groundwater is observed in zones above the regional aquifer.	1. Water zones above the regional aquifer are not anticipated at TA-10 and no boreholes deeper than 55 ft are proposed. If intermediate saturated horizons are encountered during drilling of R-24, just downgradient from TA-10, additional boreholes targeting these horizons beneath TA-10 will be proposed.	**No**
2. One well shall be installed intersecting the regional aquifer at a location approved by the Department.	2. Regional groundwater monitoring well R-24 is located immediately down canyon from TA-10 and will provide the required data. R-24 is being installed as part of the interim site-wide groundwater monitoring program, independently of the investigation prescribed by this work plan.	**Yes**
3. Core and groundwater samples shall be collected from the boring prior to well construction. The core samples shall be collected to evaluate hydraulic parameters, Kd, and for potential contaminants.	3. None. Groundwater monitoring will be performed in accordance with the interim site-wide groundwater monitoring plan required by Section IV.A.3 of the Consent Order.	**Yes**

Table 4.0-1 (continued)

Consent Order	LANL Proposed Alternative Scope	Consent Order Requirements Met?
IV. C.5.c.vi Technical Area 10 Groundwater Monitoring The respondents shall monitor and sample all wells specified below containing alluvial, intermediate, and regional groundwater in accordance with the Interim Plan approved by the Department under Section IV.A.3.b that meets the requirements listed below, subject to the procedures in Section III.M of this Consent Order. Such monitoring and sampling shall also be conducted in accordance with Section IX of this Consent Order. After completing the installation of all additional monitoring wells in the Los Alamos Canyon watershed as described in Section IV.B and subject to the procedures in Section III.M of this Consent Order, the Respondents shall submit to the Department for review and written approval a watershed-specific long-term groundwater monitoring plan for Los Alamos Canyon. Upon Department approval of the long-term monitoring plan for Los Alamos Canyon watershed, the requirements of the long-term monitoring plan shall apply and shall supersede the requirements of the Los Alamos Canyon watershed section of the Interim Plan.		

Table 4.2-1
Sampling Activities

Consolidated Unit / SWMU / AOC	Figure Number	Number of Sampling Locations	Number of Samples*	Screening Frequency	Sample Media	Issue Addressed
Consolidated Unit 10-001(a)-99	4.2-1	2 boreholes	Minimum 4 samples + 1 QA/QC suite	Every 5 ft	Qal, Qbo, Qbof, Qbog	Inorganic chemical and strontium-90 detections in borehole sampling locations See section 2.6.1; data requirements 4 and 5
Consolidated Unit 10-002(a)-99 Central Area	4.2-2	6 boreholes	Minimum 12 samples + 1 QA/QC suite	Every 5 ft	Qal, Qbo, Qbof, Qbog	Inorganic chemical and organic chemical detections in borehole sampling locations See section 2.6.2.1; data requirements 1–8
Consolidated Unit 10-002(a)-99 Excluding Central Area	4.2-2	16 boreholes	Minimum 32 samples + 3 QA/QC suite	Every 5 ft	Qal, Qbo, Qbof, Qbog	Determine lateral extent of inorganic, organic and strontium-90 detections outside the Central Area See section 2.6.2.2; data requirements 1–14
SWMU 10-004(a)	4.2-2	5 boreholes	Minimum 10 samples + 1 QA/QC	Every 5 ft	Qal, Qbo, Qbof, Qbog	Determine lateral extent of inorganic and organic detections See section 2.6.3; data requirements 1–7
AOC C-10-009	4.2-3	5 boreholes	Minimum 10 samples + 1 QA/QC	Every 5 ft	Qal, Qbo, Qbof, Qbog	No characterization data exists See section 2.6.5
Consolidated Unit 10-001(a)-99	4.2-4	22 shallow sampling locations	44 samples + 4 QA/QC suite	Each sample	ALLH, SED	Inorganic, organic and strontium-90 detections in surface sampling locations See section 2.6.1; data requirements 1–5 and 8.
AOC C-10-001	4.2-3	3 shallow sampling locations	6 samples + 1 QA/QC suite	Each sample	ALLH	RCRA samples not previously collected See section 2.6.4

* From each borehole, a minimum of two samples will be collected for fixed laboratory analysis, one from the highest field VOC field-screening result, and one from the maximum depth of the borehole (minimum depth of 30 ft bgs). In the absence of elevated field-screening results a sample will be collected from the first native material below the target structure. Shallow samples will collected at 0.0 to 0.5 ft bgs and 1.5 to 2.0 ft bgs and will continue to depths greater than 2 ft bgs if indicated by field screening or previous sampling.

Table 4.3-1
Corrective Action Requirements

Citation	Action	Basic Requirements
DOE 5400.5 II (5) (a)	Release of property having residual radioactive material	Release of real property shall be in accordance with the guidelines and requirements for residual radioactive material presented in Chapter IV. These guidelines and requirements apply to both DOE-owned facilities and to private properties that are being prepared by DOE for release.
DOE 5400.5 IV (2) (e)	Implement ALARA	The monitoring, cleanup, and control of residual radioactive material are subject to the ALARA policy of this DOE Order. Applications of ALARA policy shall be documented and filed as a permanent record.
DOE 5400.5 II (2) (b)	Evaluations under the As Low As Reasonably Achievable (ALARA) Process	"Therefore, except for meeting requirements of the National Environmental Policy Act, qualitative analyses are acceptable, in most instances, for ALARA judgments, especially where potential doses are well below the dose limit."
DOE 5400.5 IV (3)	Limit radiation exposures to public	The basic public dose limits for exposure to residual radioactive material, in addition to natural occurring "background" exposures, are 100 mrem (1 mSv) effective dose equivalent in a year.
DOE Albuquerque memo dated June 13, 2000 (DOE 2000, 67153)	Limit radiation exposures to public	Limit dose to 15 mrem per year over background.
DOE 5400.5 IV (4) (a)	Residual concentrations of other radionuclides	Guidelines for residual concentrations of radionuclides other than radium and thorium shall be derived from the basic dose limits by means of an environmental pathway analysis using specific property data where available. Residual concentrations of radioactive material in soil are defined as those in excess of background concentrations averaged over an area of 100 m^2.
DOE 5400.5 IV (4) (a) (1)	Elevated local concentrations	If the average concentration in any surface or below-surface area less than or equal to 25 m^2, exceeds the limit or guideline by a factor of $(100/A)^{0.5}$, (where A is the area [in square meters] of the region in which concentrations are elevated), limits for "hot spots" shall also be developed and applied. Reasonable efforts shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.
NESHAPS 40 CFR §61.92, 61.93 Subpart H	Limit doses because of emissions of radionuclides to the air	Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr (0.1 mSv/yr).
Consent Order	Protection of human health and the environment Nonradionuclides only	Corrective measures will be required if NMED determines that there has been a release of contaminants into the environment at a SWMU or AOC and that corrective action is necessary to protect human health or the environment from such a release.
DOE 5400.5 IV (7)	Supplemental limits and exceptions	If special specific property circumstances indicate that the guidelines or authorized limits established for a given property are not appropriate for any portion of that property, then DOE-Field Office Manager may request, through the Program Office, that supplemental limits or an exception be applied.

Table 5.0-1
Summary of ENV-ERS Investigation Methods

Title	Summary
General Instructions for Field Investigations	Provides an overview of instructions regarding activities to be performed before, during, and after field investigations completed by the Los Alamos National Laboratory's Environmental Stewardship Division-Environmental Remediation and Surveillance (ENV-ERS) Program. It is assumed that field investigations involve standard sampling equipment, personal protective equipment, waste-management, and site-control equipment/materials. Procedure covers premobilization activities, mobilization to the site, documentation and sample collection activities, sample media evaluation, surveying, and completing lessons learned.
Sample Containers and Preservation	Describes the specific requirements/process for sample containers, preservation techniques, and holding times as specified by field regulations and guidance documents. The use of specific types of sample container, and preservation techniques is mandatory for hazardous site investigations because the integrity of any sample is diminished over time. Physical factors (such as light, pressure, temperature); chemical factors (such as changes in pH, volatilization); and biological factors may alter the original quality of the sample. Because the various target parameters are uniquely altered at varying rates, distinct sample containers, preservation techniques, and holding times have been established to maintain sample integrity for a reasonable and acceptable period of time. Procedure covers documenting SOP deviations, using proper sample containers and preservatives, performing data entry, implementing containment procedures, preserving samples, implementing holding times, completing documentation, implementing postoperation activities, and performing lessons learned.
Handling, Packaging and Transporting Field Samples	Directs field team members in the preparation of environmental and waste characterization samples for transportation to the Sample Management Office or an approved radiation screening laboratory. In general, samples taken for the Remediation Services Project are expected to have a low concentration of potential contaminants, although higher concentrations will be present in some cases. These low-concentration samples that do not satisfy the DOT hazard-class definitions are classified as environmental samples and are not subject to DOT regulations. Historical data, knowledge of processes, and field-screening results will assist the team members in making decisions as to whether a sample can be designated as "environmental" or needs to be treated as a DOT-regulated material. Procedure covers transportation of environmental and DOT-regulated samples.
Sample Control and Field Documentation	Describes the process for documenting samples collected for the ENV-ERS Program using sample control and field documentation, specifically, container labels, sample collection logs, chain-of-custody/request for analysis forms, and daily activity log forms or field notebooks. Procedure covers performing request notification, generating sample control and field documentation, completing sample collection logs, using field chain-of-custody forms, delivering samples to the sample management office, delivering samples to another analytical laboratory, using custody seals, collecting the samples, completing sample control and field documentation, completing field investigation summaries, and performing field closeouts.
Field Quality Control Samples	Describes the requirements for the collection of field quality control (QC) samples to ensure the reliability and validity of field and laboratory data. Field QC samples shall be collected as described in this procedure and taken to the Los Alamos National Laboratory sample management office with the regular field samples for subsequent chemical and physical testing. Procedure covers preoperation activities, collecting and preparing each type of QC sample, including equipment rinsate blank, field duplicate, and trip blank.

Table 5.0-1 (continued)

Title	Summary
Management of Environmental Restoration Project Wastes	Describes the process for managing waste generated during corrective action activities. This procedure outlines the preparation, approval, and retention of all required documents associated with waste generation. Procedure covers waste identification and characterization, waste minimization/recycling, waste generation/storage, segregation, waste treatment, authorized release limits, packaging/transportation, disposal options, and specific ENV-ERS Program policies, including area of contamination policy, environmental media, and contained in policy.
Field Decontamination of Drilling and Sampling Equipment	Describes the process for the general field decontamination of drilling and sampling equipment. It is intended to help ensure the integrity of soil, sediment, rock, water, and other samples collected from potentially contaminated sites and to minimize the potential for cross contamination between sampling locations. Implementation of this procedure will help protect site and community personnel, requiring that equipment not be removed from a controlled area without proper decontamination. Procedure covers set up of dry and wet decontamination areas, drilling/excavation equipment decontamination, and sampling equipment decontamination.
Field Site Closeout Checklist	Describes the process for documenting completion of fieldwork at individual ENV-ERS sites This checklist is designed to ensure that upon demobilization from an ENV-ERS field site all necessary field compliance activities, equipment accountability, and documentation is complete. The procedure is applicable to all subcontractor and University of California project personnel who participate if field activities. Field activities included in this procedure are site investigation, remediation, and interim action projects. Field activities that do not generate waste, collect samples, or fulfill regulatory requirements (e.g., BMP inspection) are exempt from this procedure. Periodic activities (such as BMP inspection) can postpone site closeout activities until the end of the period of performance or annually whichever is shorter.
Coordinating and Evaluating Geodetic Surveys	Describes the methodology for coordinating and evaluating geodetic surveys and establishing quality assurance (QA) and control for geodetic survey data. Procedure covers evaluating geodetic survey requirements, preparing to perform a geodetic survey, performing geodetic survey field activities, preparing geodetic survey data for QA review, performing QA review of geodetic survey data, and submitting geodetic survey data.
Drilling Methods and Drill Site Management	Describes the drilling methods and drilling-package implementation to meet subsurface sampling requirements. Various drilling methods have been developed to achieve successful subsurface contact for retrieving suitable formation, gas, and water samples. These include, but are not limited to, solid-stem augering, hollow-stem augering, direct rotary drilling, reverse rotary drilling, cable-tool drilling, and hand augering.
Contract Geophysical Logging	States the responsibilities and describes the general process for obtaining borehole logging data of acceptable quality regardless of logging system or logging contractor, to meet site-characterization and/or subsurface-sampling requirements of the investigation. Borehole-logging techniques are used in situ to determine physical, chemical, geological, and hydrological conditions in an open borehole. Procedure covers precontract considerations, preoperation activities, borehole geophysical logging activities, and postoperation activities. Primary concerns during logging activities are monitoring the logging equipment as it emerges from the borehole or before it leaves the work site for contamination, verifying field calibration both immediately before and immediately after a logging run or runs with a given logging tool, and ensuring that the logging equipment is decontaminated between sampling events.

Table 5.0-1 (continued)

Title	Summary
Monitoring Well and RFI Borehole Abandonment	Describes the process for monitoring well and RFI borehole abandonment. Procedures described in this SOP are consistent with acceptable practice for monitoring well and borehole abandonment under RFI guidance. Procedure covers monitoring well and RFI borehole abandonment, placement of the appropriate sealing and fill material, options for destroying monitoring wells and RFI boreholes in urban areas and near active technical areas, and reporting requirements.
Operation of LANL Owned Borehole Logging Trailer	Describes the process for operation and maintenance of the borehole video/geophysics logging trailer. Procedure covers running the borehole video camera system, running the borehole caliper tool, running the borehole conductivity/resistivity (induction) tool, running the gamma tool, and running the borehole spontaneous potential/single point resistance tool.
Purging and Sampling Methods for Single Completion Wells	Describes methods used for evacuating stagnant water from a well bore in sufficient quantities so that the water samples that are collected afterwards are representative of the formation interval open to the well bore. Groundwater that is stagnant in the well bore is subject to chemical reactions that may significantly alter the composition of the formation water. Prior to collecting a representative ground water sample for laboratory analysis, ground water must be purged. Procedure covers preliminary activities, preoperation field activities, well purging operations, water sampling operations, and postoperation activities.
Sampling for Volatile Organic Compounds in Groundwater	States the responsibilities and describes the process for sampling for volatile organic compounds in groundwater. This SOP also describes the selection of equipment and materials used in the sampling process. The objectives are to collect valid samples for volatile organic analysis and to subject samples to the least amount of turbulence and subsequent possible aeration. Procedure covers conducting preoperation activities, sampling, preparing documentation, and conducting postoperation activities.
Spade and Scoop Method for the Collection of Soil Samples	Describes the process for spade-and-scoop collection of shallow (i.e., typically 0 to 12 inches) soil samples. The “spade-and-scoop” method involves digging a hole to the desired depth, as prescribed in the sampling and analysis plan, and collecting a discrete grab or portion of a composite sample. Procedure covers presampling activities, sampling activities, and post sampling activities.
Hand Auger and Thin-Wall Tube Sampler	States the responsibilities and describes the process for collecting surface and subsurface (up to about 15 ft.) soil samples with a hand auger and thin-wall tube sampler. This procedure describes the selection and use of sampling methods and equipment at sites that may include contamination with hazardous or radioactive materials. Procedure covers presampling activities, sampling activities, collecting field duplicates, and post sampling activities.
Sample Collection from Split-Spoon Samplers and Shelby-Tube Samplers	States the responsibilities and describes the process for collecting soil and sediment samples using either split-spoon samplers or Shelby-tube samplers. A split-spoon sampler is used to take subsurface soil or sediment samples by forcefully driving the sampler into the soil or sediment at the bottom of a borehole. The Shelby tube is a similar type of sampling apparatus. The split spoon is a multi-piece sampler; the Shelby tube is a single-piece metal tube of thinner gauge. Procedure covers presampling activities, sampling activities, and post sampling activities.
Core-Barrel Sampling for Subsurface Earth Materials	Describes the process for collecting core-barrel samples of subsurface earth materials. This procedure is limited to sampling of subsurface sediments for radionuclides (including tritium), metals, polychlorinated biphenyls, total petroleum hydrocarbons, and volatile and semivolatile organic compounds. The field team may sample for other constituents under this SOP (or modifications thereof) at the discretion of the field team leader and project leader. Procedure covers presampling activities, sampling activities, and post sampling activities.

Table 5.0-1 (continued)

Title	Summary
Sampling of Subatmospheric Air	Describes the process of sampling subatmospheric air from vapor ports in monitoring wells and boreholes. Procedure covers presampling activities, sampling to detect and quantify gaseous organic concentration in air, SUMMA sampling (a passive collection and containment system of laboratory-quality air samples), adsorbent column sampling, sampling through the packer system (a sampling system that uses inflatable bladders to seal off a desired interval in an open borehole, or at the end of drill casing, to obtain a sample from a discrete section), and post sampling activities.
Headspace Vapor Screening with a Photoionization Detector	Describes the process for screening headspace vapor for volatile organic compounds in soil samples with a photoionization detector. The PID is a portable, nonspecific, vapor/gas detector employing the principle of photoionization to detect and measure real-time concentrations of a variety of chemical compounds, both organic and inorganic, in air. Procedure covers performing field calibration, operating, and post operating activities.
Subsurface Moisture Measurements Using a Neutron Probe	Describes the process of collecting subsurface moisture measurements using a neutron probe for the ENV-ERS Program. A neutron probe is used to measure the subsurface moisture, utilizing a probe containing a source of high-energy neutrons and a slow neutron detector. Procedure covers performing a daily field standard count, preparing instrument for field measurements, taking a field measurement, and documenting the results of the field measurement.
Field Sampling of Core and Cuttings for Geological Analysis	Describes the process for subsampling core or cuttings in the field for geological analysis on the ENV-ERS Program. Specifically, this procedure covers the activity and associated documentation for collection and transport of core or cuttings subsamples from a drill site directly to EES-1 sample preparation or analysis sites at LANL. The examination or subsampling of materials at the sample management facility is not covered under this procedure; for such activities the appropriate governing SOP should be employed.
Field Logging, Handling, and Documentation of Borehole Materials	Prescribes the specific borehole material management methods to be followed, and documentation to be prepared, during handling and field logging of selected borehole materials identified in the site guidance documents and waste characterization strategy form. This procedure is limited to the activities necessary to take custody of core and cuttings from drill rig personnel, conduct field screening, remove time sensitive analytical samples and subsamples for preliminary characterization, complete photo documentation when necessary, perform field structural and lithologic description, and mark, package, and temporarily store the borehole materials at a drill site borehole material storage trailer. This procedure describes the handling of the subset of borehole materials to be curated from the time they are withdrawn from the borehole to the time they are ready to be transported to the Remediation Services Project's FSF for curating and archiving. For the purposes of this SOP, borehole material may also refer to other solid materials, such as drive samples or augured materials. Procedure covers borehole material staging, temporary packaging of time sensitive analytical samples, measurement and determination of material loss, marking core (depth notation and stripes), core photography, core logging, removal of analytical samples (core), and core box loading and storing.

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Appendix A

Acronyms, Glossary, and Metric Conversion Table

A-1.0 ACRONYMS

AEC	Atomic Energy Commission
ALARA	as-low-as-reasonably-achievable
AOC	area of concern
bgs	below ground surface
BMP	best management practice
BV	background value
COPC	chemical of potential concern
CU	consolidated unit
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
ECR	Environmental Characterization and Remediation
EPA	U.S. Environmental Protection Agency
ENV	Environmental Stewardship (a Los Alamos National Laboratory division)
ERS	Environmental Remediation and Surveillance (a Los Alamos National Laboratory program)
FUSRAP	Formerly Utilized Sites Remedial Action Program
FV	fallout value
GPR	ground-penetrating radar
GPS	global positioning system
HE	high explosives
HIR	historical investigation report
HMX	high-melting explosive (1,3,5,7-teranitro-1,3,5,7-tetrazacyclo-octane)
HSR	Health, Safety, and Radiation (a Los Alamos National Laboratory division)
HSR-1	Health Physics Operations Group (a Los Alamos National Laboratory group)
IA	interim action
IDW	investigation-derived waste
IWP	investigation work plan
LANL	Los Alamos National Laboratory
LASL	Los Alamos Scientific Laboratory
LLW	low-level waste
MCAL	mobile chemical analytical laboratory (chem van)
MDA	material disposal area
MED	Manhattan Engineer District
MRAL	mobile radiological analytical laboratory (rad van)

NFA	no further action
NMED	New Mexico Environment Department (NM Environmental Improvement Div. before 1991)
NMHWA	New Mexico Hazardous Waste Act
PID	photoionization detector
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RESRAD	residual radioactivity
RFI	RCRA facility investigation
RPF	Records Processing Facility
SAL	screening action level
SMO	sample management office
SWMU	solid waste management unit
SOP	standard operating procedure
SVOC	semivolatile organic compound
TA	technical area
TAL	target analyte list
TCLP	toxicity characteristic leaching procedure
UC	University of California
VA	value analysis
VCA	voluntary corrective action
VOC	volatile organic compound
WCSF	waste characterization strategy form
XRF	x-ray defraction

A-2.0 GLOSSARY

administrative authority—For Los Alamos National Laboratory, one or more regulatory agencies, such as the New Mexico Environment Department, the U.S. Environmental Protection Agency, or the U.S. Department of Energy, as appropriate.

alluvium—Soil deposited by a river or other running water.

area of concern—(1) A release that may warrant investigation or remediation and is not a specific solid waste management unit (SWMU). (2) An area at Los Alamos National Laboratory[0] that may have had a release of a hazardous waste or a hazardous constituent but is not a SWMU.

background value (BV)—A statistically derived concentration (i.e., the upper tolerance limit [UTL]) of a chemical used to represent the background data set. If a UTL cannot be derived, either the detection limit or maximum reported value in the background data set is used.

calibration—A process used to identify the relationship between the true analyte concentration or other variable and the response of a measurement instrument, chemical analysis method, or other measurement system.

chemical of potential concern (COPC)—A detected chemical compound or element that has the potential to adversely affect human receptors as a result of its concentration, distribution, and toxicity.

Curie—A unit of radioactivity defined as the quantity of any radioactive nuclide that has an activity of 3.7×10^{10} disintegrations per second (dps).

data validation—A systematic process that applies a defined set of performance-based criteria to a body of data and that may result in the qualification of the data. The data-validation process is performed independently of the analytical laboratory that generates the data set and occurs before conclusions are drawn from the data. The process may include a standardized data review (routine data validation) and/or a problem-specific data review (focused data validation).

detection limit—The minimum concentration that can be determined by a single measurement of an instrument. A detection limit implies a specified statistical confidence that the analytical concentration is greater than zero.

dose (dosage)—(1) The actual quantity of a chemical that is administered to an organism or to which it is exposed. (2) The amount of a substance that reaches a specific tissue (e.g., the liver). (3) The amount of a substance that is available for interaction with metabolic processes after it has crossed an organism's outer boundary.

ecological screening levels—Soil, sediment, or water concentrations that are used to screen for potential ecological effects. The concentrations are based on a chemical's no-observed-adverse-effect level for a receptor, below which no risk is indicated.

Environmental Protection Agency (EPA). Federal agency responsible for enforcing environmental laws. While state regulatory agencies may be authorized to administer some of this responsibility, the EPA retains oversight authority to ensure protection of human health and the environment.

exposure pathway—Any path from the sources of contaminants to humans and other species or settings through soil, water, or food.

fallout radionuclides—Radionuclides that are present at globally elevated levels in the environment as a result of fallout from world-wide atomic weapons tests. The Los Alamos National Laboratory (the Laboratory) background data sets consist of environmental surveillance samples taken from marginal and regional locations for the following radionuclides associated with fallout: tritium, cesium-137, americium-241, plutonium-238, plutonium-239/240, and strontium-90. Samples were collected from regional and marginal locations in the Laboratory's vicinity that were (1) representative of geological media found within Laboratory boundaries, and (2) were not impacted by Laboratory operations.

field duplicate (replicate) samples—Two separate, independent samples taken from the same source, which are collected as collocated samples (i.e., equally representative of a sample matrix at a given location and time).

gamma radiation—A form of electromagnetic, high-energy ionizing radiation emitted from a nucleus. Gamma rays are essentially the same as x-rays (though at higher energy) and require heavy shielding, such as concrete or steel, to be blocked.

groundwater—Interstitial water that occurs in saturated earth material and is capable of entering a well in sufficient amounts to be used as a water supply.

Hazardous and Solid Waste Amendments (HSWA)—Public Law No. 98-616, 98 Stat. 3221, enacted in 1984, which amended the Resource Conservation and Recovery Act of 1976 (42 United States Code § 6901 et seq).

HSWA module—Module VIII of the Los Alamos National Laboratory (the Laboratory) Hazardous Waste Facility Permit. This permit allows the Laboratory to operate as a hazardous-waste treatment, storage, and disposal facility. Module VIII incorporates requirements from the Hazardous and Solid Waste Amendments, including the requirement of corrective actions for releases from solid waste management units.

hydraulic conductivity—(1) A coefficient of proportionality that describes the rate at which a fluid can move through a permeable medium. The rate is a function of both the medium and the fluid flowing through it. (2) The quantity of water that will flow through a unit of cross-sectional area of a porous material per unit time under a hydraulic gradient of 1.00 (measured at right angles to the direction of flow) at a specified temperature.

model—A schematic description of a physical, biological, or social system, theory, or phenomenon that accounts for its known or inferred properties and may be used for the further study of its characteristics.

no further action—Under the Resource Conservation and Recovery Act, a corrective-action determination whereby, based on evidence or risk assessment, no further investigation or remediation is warranted.

operable units (OUs)—At Los Alamos National Laboratory, 24 areas originally established for administering the Environmental Remediation Project. Set up as groups of potential release sites, the OUs were aggregated according to geographic proximity for the purposes of planning and conducting Resource Conservation and Recovery Act (RCRA) facility assessments and RCRA facility investigations. As the project matured, it became apparent that there were too many areas to allow efficient communication and to ensure consistency in approach. In 1994, the 24 OUs were reduced to 6 administrative field units.

perched water—A zone of unpressurized water held above the water table by impermeable rock or sediment.

potential release site (PRS)—A potentially contaminated site at Los Alamos National Laboratory. PRSs include both solid waste management units and areas of contamination.

quality assurance/quality control—A system of procedures, checks, audits, and corrective actions set up to ensure that all U.S. Environmental Protection Agency research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

radionuclide—Radioactive particle (human-made or natural) with a distinct atomic weight number; can have as long a life as soil or water pollutants.

RCRA facility investigation (RFI)—A Resource Conservation and Recovery Act (RCRA) investigation that determines if a release has occurred and characterizes the nature and extent of contamination at a hazardous waste facility. The RFI is generally equivalent to the remedial investigation portion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.

receptor—A person, other animal, plant, or geographical location that is exposed to a chemical or physical agent released to the environment by human activities**.**

regional aquifer—Geologic material(s) or unit(s) of regional extent whose saturated portion yields significant quantities of water to wells, contains the regional zone of saturation, and is characterized by the regional water table or potentiometric surface.

release—Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste or hazardous constituents into the environment.

Resource Conservation and Recovery Act—The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976. (Public Law [PL] 94-580, as amended by PL 95-609 and PL 96-482, United States Code 6901 et seq.)

runoff—The portion of the precipitation on a drainage area that is discharged from the area either by sheet flow or adjacent stream channels.

run-on—Surface water that flows onto an area as a result of runoff occurring higher up on a slope.

sample—A portion of a material (e.g., rock, soil, water, or air), which, alone or in combination with other portions, is expected to be representative of the material or area from which it is taken. Samples are typically either sent to a laboratory for analysis or inspection or are analyzed in the field. When referring to samples of environmental media, the term field sample may be used.

screening risk assessment—A risk assessment that is performed with few data and many assumptions in order to identify exposures that should be evaluated more carefully for potential risk.

sediment—(1) A mass of fragmented inorganic solid that comes from the weathering of rock and is carried or dropped by air, water, gravity, or ice. (2) A mass that is accumulated by any other natural agent and that forms in layers on the Earth's surface (e.g., sand, gravel, silt, mud, fill, or loess). (3) A solid material that is not in solution and is either distributed through the liquid or has settled out of the liquid.

site characterization—Defining the pathways and methods of migration of hazardous waste or constituents, including the media affected; the extent, direction and speed of the contaminants; complicating factors influencing movement; or concentration profiles. (U.S. Environmental Protection Agency, May 1994. Publication EPA-520/R-94/004)

site conceptual model—A qualitative or quantitative description of sources of contamination, environmental transport pathways for contamination, and receptors that may be impacted by contamination and whose relationships describe qualitatively or quantitatively the release of contamination from the sources, the movement of contamination along the pathways to the exposure points, and the uptake of contaminants by the receptors.

solid waste management unit (SWMU)—(1) Any discernible site at which solid wastes have been placed at any time, whether or not the site use was intended to be the management of solid or hazardous waste. SWMUs include any site at a facility at which solid wastes have been routinely and systematically released. This definition includes regulated sites (i.e., landfills, surface impoundments, waste piles, and land treatment sites), but does not include passive leakage or one-time spills from production areas and sites in which wastes have not been managed (e.g., product storage areas). (2) According to the New Mexico Environment Department (NMED) Consent Order, any discernible site at which solid waste has been placed at any time, and from which NMED determines there may be a risk of a release of hazardous waste or hazardous waste constituents (hazardous constituents), whether or not the site use was intended to be the management of solid or hazardous waste. Such sites include any area in Los Alamos National Laboratory at which solid wastes have been routinely and systematically released; they do not include one-time spills.

standard operating procedure—A document that details the officially approved method(s) for an operation, analysis, or action, with thoroughly prescribed techniques and steps.

stratigraphy—The study of the formation, composition, and sequence of sediments, whether consolidated or not.

target analyte—A chemical or parameter, the concentration, mass, or magnitude of which is designed to be quantified by a particular test method.

technical area (TA)—At Los Alamos National Laboratory, an administrative unit of operational organization (e.g., TA-21).

topography—The physical or natural features of an object or entity and their structural relationships.

tuff—Consolidated volcanic ash, composed largely of fragments produced by volcanic eruptions.

U.S. Department of Energy (DOE)—The federal agency that sponsors energy research and regulates nuclear materials for weapons production.

U.S. Environmental Protection Agency (EPA)—The federal agency responsible for enforcing environmental laws. Although state regulatory agencies may be authorized to administer some of this responsibility, EPA retains oversight authority to ensure the protection of human health and the environment.

uranium—(1) Natural (Primordial) Uranium: Uranium which was incorporated in to earth's lithosphere at the time of creation. This uranium is universally distributed in the lithosphere in varying concentrations, but it is normally in equilibrium with its decay products. It contains 99.27% of Uranium 238 and 0.72% of Uranium 235. (2) Normal Uranium. Uranium which has been refined from primordial uranium by removing its decay products. It contains 99.27% of Uranium 238 and 0.72% of Uranium 235. Frequently called natural uranium. (3) Depleted uranium: Uranium which has been depleted to less than 0.72% uranium 235.

vadose zone—The zone between the land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

A-3.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.62137	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.2808	feet (ft)
meters (m)	39.3701	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.3937	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.00004	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.4710	acres
square meters (m^2)	10.7639	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (l)	0.26471	gallons (gal.)
milligrams per liter (mg/l)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

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Appendix B

Management of Investigation-Derived Waste

This appendix to the work plan describes how investigation-derived waste (IDW) generated during the investigation of TA-10 at Los Alamos National Laboratory will be managed. IDW is solid waste generated as a result of field investigation activities and may include, but is not limited to, drill cuttings; purge water; contaminated personal protective equipment (PPE), sampling supplies, and plastic; fluids from the decontamination of PPE and sampling equipment; and all other wastes potentially contacting contaminants. IDW generated during the investigation of TA-10 will be managed to protect human health and the environment, comply with applicable regulatory requirements, and adhere to the Laboratory waste minimization goals.

All IDW generated during field investigation activities will be managed in accordance with applicable Environmental Stewardship Division–Environmental Characterization and Remediation (ECR) Group standard operating procedures. These SOPs incorporate the requirements of all applicable EPA and NMED regulations, DOE orders, and laboratory implementation requirements. ENV-ECR SOPs applicable to the characterization and management of IDW are

SOP-01.06, Management of Environmental Restoration Project Waste

SOP-01.10, Waste Characterization

These SOPs are among the SOPs applicable to the investigation at TA-10 and are available online at http://erproject.lanl.gov/documents/procedures.html. Before starting field investigation activities, a waste characterization strategy form (WCSF) will be prepared and approved in accordance with the requirements outlined in SOP 01.10. The WCSF will provide detailed information on IDW characterization, management, containerization, and on possible volumes. IDW characterization will be completed through the review of existing data and/or documentation, by direct sampling of the IDW, and/or by sampling the media being investigated (i.e., surface soil, subsurface soil, etc.). If direct waste characterization sampling is necessary, it will be described in the WCSF.

The Laboratory's 2004 Pollution Prevention Roadmap will be implemented during field investigations at TA-10 to minimize waste generation. This plan is updated annually as a requirement of Module VIII of the Laboratory's Hazardous Waste Facility Permit.

The IDW waste streams associated with the investigation of TA-10 are identified in Table B-1 and are briefly described below. Table B-1 also summarizes the waste type, estimated volume, and method of on-site management.

Drill cuttings. The drill cuttings waste stream will consist of cuttings from all boreholes drilled during field activities. Drill cuttings will be collected and containerized at the point of generation (i.e., at the drill rig). If needed, the drill cutting waste stream will be characterized with analytical results from core samples augmented by direct sampling of the containerized waste. The maximum detected concentrations of radionuclides will be compared with background/fallout values. If maximum concentrations exceed background/fallout values, the waste cuttings will be designated as low-level radioactive waste (LLW). Total concentrations of toxicity characteristic leaching procedure (TCLP) constituents will be compared with 20 times the TCLP regulatory level. If total concentrations are less than 20 times the TCLP regulatory level, the waste cuttings will be designated nonhazardous by characteristic. If total concentrations exceed 20 times the TCLP regulatory level, the waste cuttings will be sampled and analyzed using the TCLP to determine if it is hazardous by characteristic. If potential listed hazardous waste constituents are detected, the Laboratory will conduct a review of historical records and data to determine whether the source of each constituent was a listed hazardous waste at its point of generation. If the source is determined to be a listed hazardous waste, the cuttings will be managed as hazardous or mixed waste (depending on the levels of radioactivity). Otherwise, the cuttings will be managed as nonhazardous solid waste or LLW (depending on the levels of radioactivity). Based on the results of previous investigations, the Laboratory expects these wastes to be designated as LLW that will be disposed of at TA-54 or at an off-site LLW disposal facility.

Drain line pipe. The drain-line pipe waste stream will consist of inactive drain lines removed during the site investigation. This waste stream will be collected and containerized at the point of generation (i.e., at the excavation). The drain-line pipe waste stream will be characterized based on field radiation screening, acceptable knowledge of processes associated with the pipes and, if necessary, direct sampling of the waste. The Laboratory expects these wastes to be designated as LLW that will be disposed of at TA-54 or at an off-site LLW disposal facility.

Spent PPE. The spent PPE waste stream will consist of PPE that has potentially "contacted" contaminated environmental media (i.e., core and/or drill cuttings) and that cannot be decontaminated. The bulk of this waste stream will consist of protective clothing such as coveralls, gloves, and shoe covers. Spent PPE will be collected in containers at personnel decontamination stations. Characterization of this waste stream will be performed through acceptable knowledge of the waste materials, the methods of generation, and the analytical results from the sampling of the environmental media with which the materials were in contact. The Laboratory expects these wastes to be designated as LLW that will be disposed of at TA-54 or at an off-site LLW disposal facility.

Disposable sampling supplies. The disposable sampling supplies waste stream will consist of all equipment and materials necessary for collecting samples that come into direct contact with contaminated environmental media and that cannot be decontaminated. This waste stream also includes wastes associated with dry decontamination activities. This waste stream will consist primarily of paper and plastic items collected in bags at the sampling location and transferred to accumulation drums. Characterization of this waste stream will be performed through acceptable knowledge of the waste materials, the methods of generation, and the analytical results from the sampling of the environmental media with which the materials were in contact. The Laboratory expects these wastes to be designated as LLW that will be disposed of at TA-54 or at an off-site LLW disposal facility.

Decontamination fluids. The decontamination fluids waste stream will consist of liquid wastes from decontamination activities (i.e., decontamination solutions and rinse waters). Consistent with waste minimization practices, the Laboratory employs dry decontamination methods to the extent possible. If dry decontamination cannot be performed, liquid decontamination wastes will be collected in containers at the point of generation and characterized with analytical results from direct sampling of the containerized waste. The Laboratory expects these wastes to be designated as liquid LLW that will be sent to the radioactive liquid waste treatment facility at TA-50 for disposal.

The selection of waste containers will be based on appropriate U.S. Department of Transportation requirements, waste types, and estimated volumes of IDW to be generated. Immediately after containerization, each waste container will be individually labeled with a unique identification number and with information regarding waste classification, item(s), radioactivity (if applicable), and date generated. If wastes are awaiting analytical results to make a final characterization determination, the containers will be labeled as such until analytical results are available. The wastes will be contained in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type of IDW and its classification. Container and storage requirements will be detailed in the WCSF and approved before any waste is generated.

Table B-1
Summary of Estimated IDW Generation and Management

Waste Stream	Estimated Volume	On-Site Management
Drill cuttings	60 yd^3	Collection in roll-off containers
Drain line pipe	2 yd^3	Collection in roll-off containers
Spent PPE and disposable sampling supplies	1 yd^3	Accumulation in 55-gal. drums
Decontamination fluids	110 gal.	Accumulation in 55-gal. drums.

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Appendix C

SWMU 10-007 Remedial Technologies Evaluation

C-1.0 INTRODUCTION

Section IV.C.5.c.iv number 9 of the Consent Order requires an evaluation of the removal of the landfill material at SWMU 10-007. To adequately evaluate the removal of SWMU 10-007, a value analysis (VA) of a range of alternatives, including complete removal, was developed to identify, evaluate, and recommend a preferred preliminary alternative. The evaluation process is summarized below in support of the preferred alternative discussed in section 4.3 of the investigation work plan (work plan).

C-2.0 EVALUATION PROCESS

The preliminary evaluation of technologies was accomplished by identifying presumptive remedies that apply to the site, identifying additional technologies that may lead into other presumptive remedies that are possibly applicable, formulating preliminary alternatives using various combinations of those presumptive remedies and associated applicable technologies, and evaluating the alternatives to identify their suitability for corrective action. The elevated levels of strontium-90 at SWMU10-007 were the primary reason for the evaluation process, and consideration was given to building debris, radioactive shrapnel, and chamisa.

C-2.1 Alternatives

The following preliminary (corrective action) alternatives were formulated to represent a range of effectiveness at meeting the requirements and objectives described in section 4.3 of the work plan:

- Preliminary Alternative 1: no action;
- Preliminary Alternative 2: land use restricted to recreational (current and projected future) use with extensive institutional controls (maintain fences, cut vegetation, and monitor frequently);
- Preliminary Alternative 3: subsurface, low-permeability grout barrier; application of herbicide above barrier; extensive institutional controls (maintain fences, cut vegetation, and monitor frequently) plus land use restricted to recreational;
- Preliminary Alternative 4: excavation and disposal to remove elevated strontium-90; land use restricted to recreational with moderate institutional controls (maintain fences and monitor periodically);
- Preliminary Alternative 5: excavation and disposal of debris and elevated strontium-90; land use restricted to industrial (not residential) land use, and limited institutional controls (monitor periodically); and
- Preliminary Alternative 6: engineered cap over the debris area; divert surface water with low barrier; extensive institutional controls (maintain fences, cut vegetation, and monitor frequently) plus land use restricted to recreational.

The U.S. Environmental Protection Agency's (EPA's) presumptive remedy for landfills is containment, which includes capping and control of leachate, gas, local groundwater, and surface water. Capping isolates the contaminated material from direct physical contact by receptors. Capping also impedes the formation of leachate by reducing or preventing the infiltration of surface water. As a result, capping is considered an appropriate alternative for the site. Leachate can be controlled further by diverting local surface water away from the contaminated material. Little potential exists for the formation of gas in the contaminated material since there is not significant organic material or radon-forming material interred. Surface water would require some run-on and runoff control to protect the cover in this valley floor.

Finally, institutional controls would help to further isolate the waste, limit exposure, and protect the remedy.

Removal of potentially contaminated soil and debris (source removal) is an additional technology that was evaluated because an evaluation of removal of SWMU 10-007 was directed in the Consent Order. The relative benefits of removal will be largely determined by the nature and extent of the debris at SWMU 10-007; further characterization recommended in the work plan will further evaluate the nature and extent of the debris. If the results of that additional characterization reveal a significantly smaller SWMU 10-007 volume, removal may prove a more favorable option; conversely, a significant expansion of the extent of SWMU 10-007 would tend to make removal less desirable because of the additional impacts and cost. The dose reduction benefit resulting from the removal of material with elevated levels of strontium-90 is significantly diminished by the depth (greater than 10 ft bgs) at which the strontium-90 has been detected since there is little chance that recreational users would be exposed to material at that depth.

Other alternatives considered included a variety of administrative controls, either alone or coupled with engineered controls to enhance the isolation of the material and to ensure the protection of groundwater through continued internment.

C-2.2 Evaluation Criteria

The following comparison criteria adequately represent the remediation goals for the comparison of preliminary alternatives and are based on the Consent Order (Section VII.D.4) and DOE 5400.5 (presented in order of their relative importance[umh1]):

1. protect human health and the environment;
2. meet standards (including ALARA and site worker exposure);
3. control source term (reduce or eliminate future releases);
4. attain standards for the management of waste removed as part of corrective action;
5. ensure long-term reliability and effectiveness;
6. reduce toxicity and mobility;
7. ensure short-term effectiveness;
8. ensure implementability; and
9. minimize cost (capital and maintenance).

The preliminary alternatives were compared to each other with respect to their ability to satisfy the comparison criteria. The ranking of the preliminary alternatives considered the relative importance of each of the comparison criteria, with protectiveness of human health and the environment, including groundwater, the most important criterion.

C-2.3 Sensitivity Analysis

The evaluation of preliminary alternatives also included a sensitivity analysis. Following this initial analysis, the relative importance of the evaluation criteria identified above was modified to reflect potential variations in corrective action objectives and the various stakeholder requirements. The cumulative evaluation results of these variations were used to determine the most preferred alternative.

C-2.4 Evaluation of Alternatives

The initial evaluation, subsequently validated through the sensitivity analysis, indicated that Preliminary Alternative 6, a cover over the debris area (10-007) coupled with extensive administrative and enhanced stormwater controls, ranked the highest overall. Preliminary Alternative 5, complete removal of debris and material with elevated levels of strontium-90, ranked second. Preliminary Alternative 6 ranked highest for the following reasons:

- Without the excavation of waste, the subsequent management of waste, including transportation and disposal, would not be necessary, and would thereby significantly reduce implementation impacts on the canyon.
- There would be minimal exposure of contaminated material to corrective action workers.
- The existing soil that overlies the elevated levels of strontium-90 at depth is an effective shield against radiation.
- Cover material would be placed in a simple earthwork operation that would disturb a small area over a short period of time, allowing the site to recover quickly.
- The risk of exposure reduces relatively quickly because of the short half-life of strontium-90.
- The cost would be moderate overall and much less than removal and disposal.

Preliminary Alternative 5 ranked second for the following reasons:

- The risk of exposure of contaminated material would be reduced quickly.
- Institutional controls would be simple.
- The corrective action would be very reliable and effective over the long term.

Other preliminary alternatives offered advantages over both capping and removal but were determined to be either less reliable, to rely on uncertain technology, or to be less protective of human health and the environment.

Based on the VA scoring, and verified through the sensitivity analysis, Preliminary Alternative 5, removal of the debris as recommended for evaluation by the Consent Order, does not appear to be the best alternative for several reasons:

- The dose reduction to recreational canyon visitors (current and projected land use) from removal is not significant when compared to the minimal current dose from the interred material and when factoring in the additional dose and physical risk to workers of removing and managing the material
- A greater potential for off-site migration while the material is being removed
- The ecological damage to the canyon
- Property owner concerns
- Minimal additional protection of groundwater
- Additional cost

C-3.0 CONCLUSIONS AND RECOMMENDATIONS

Based on current knowledge of the site, Preliminary Alternative 6 is proposed for implementation as the most cost-effective solution to enhance the protection of human health and the environment at SWMU 10-007.

Appendix D

Response to NMED Comments Dated May 9, 2005

Response to NMED Comments on the RFI Report for Potential Release Sites 10-002(a–b), 10-003(a–o), 10-004(a–b), 10-005, and 10-007 TA-10 Subsurface Field Unit 1 Environmental Restoration Project, Los Alamos National Laboratory NM0890010515, NMED Task LANL 04-099, Dated May 9, 2005

INTRODUCTION

This appendix is the response by Los Alamos National Laboratory (LANL or the Laboratory) to the comments issued by the New Mexico Environment Department (NMED) Hazardous Waste Bureau on May 9, 2005, on the document "RFI Report for Potential Release Sites 10-002(a–b), 10-003(a–o), 10-004(a–b), 10-005, and 10-007 TA-10 Subsurface Field Unit 1 Environmental Restoration Project." The RFI Report, referenced as LA-UR-96-1284, was submitted to the NMED in April 1996 (LANL 1996, 54332).

To facilitate the review of these responses, the NMED's comments are included verbatim in italics. The comments are divided into general and specific categories as presented by NMED. LANL's responses follow each NMED comment.

GENERAL COMMENTS

NMED Comment

1. *Due in part to major QA/QC problems, the objectives of the work plan that included determination of nature and lateral and vertical extent of contamination was not met.*

LANL Response

1. The QA/QC issues identified in the RFI report alone do not invalidate the nature and extent determinations. The data in question were reviewed again and the overall decisions stemming from the data were determined to be valid (Schultz-Paige 2003, 79603; Attachment D-1). The findings of this data review were transmitted to NMED in July 2003 (LANL 2003, 79621; Attachment D-2).

   LANL has again reviewed the existing decision-quality data and the results of previous site evaluations in the development of the Bayo Canyon Aggregate investigation work plan (work plan). Based on this review, LANL has identified additional data to augment the initial characterization of TA-10, as discussed in section 2, and proposed additional sampling and other investigation activities, as discussed throughout section 4.

NMED Comment

2. *Extent of the landfill, 10-007, has not been delineated. Despite the QA/QC problems, volatile organic compounds (VOCs) and high explosive (HE) compounds were detected in locations of reported "clean" fill.*

LANL Response

2. Additional sampling is proposed in section 4 of the work plan to augment existing data used in the characterization of SWMU 10-007, including the full definition of extent. Geophysical investigations using EM-31, EM-61, focused ground penetrating radar, and/or other characterization techniques,

such as potholing and debris sampling, are proposed in sections 4.1.3 and 4.3.3 of the work plan to better define the extent of the landfill and the nature of the contents.

The term "clean fill" as used is not meant to imply any certification of the fill but rather is a term used during the 1963 Decontamination and Decommissioning (D&D) to denote fill material which passed the screening used at the time to differentiate between waste material to be removed from the site and that which could be reused on-site to provide cover material for the interred debris.

NMED Comment

3. The Permittees did not follow the approved work plan and did not collect VOC and HE samples at the approved rate. The Permittees then proceeded to base sampling locations on poor quality data and questionable field screening results.

LANL Response

3. The collection of samples for VOC analysis was initially based on the sampling approach proposed by LANL in the notice of deficiency response provided to the EPA, which required the collection of VOC samples when elevated field screening with a PID indicated the presence of organic vapors. The EPA notified LANL of their requirement to add VOC analysis to the analytical suite for all site samples after drilling and sampling at TA-10 had already been initiated. After receiving the notification from the EPA, LANL collected VOC samples at the rate specified in the EPA approval notification. In addition, 50% of all analytical samples were analyzed for HE.

Organic vapor screening using a PID and radiological screening with a hand-held beta/gamma instrument were used both for health and safety purposes and to guide the collection of additional samples if elevated organic vapor or radiation levels were observed (LANL 1995, 49073, p. 4-10; Attachment D-3). Mobile radiological analytical laboratory (MRAL) and mobile chemical analytical laboratory (MCAL) screening analyses were also performed on samples collected every 5 ft from boreholes. These screening results were used to support drilling and sampling decisions in the field. All formal decisions regarding nature and extent and site risk presented in the RFI report were based on off-site fixed laboratory data. All decision-quality data representative of current site conditions are discussed in section 4, and presented in Appendix B, of the historical investigation report (HIR).

VOC and HE analyses are proposed for all additional sampling proposed in section 4 of the work plan. The additional samples and the expanded analytical suite effectively characterize the nature and extent of any potential VOC or HE contamination at TA-10.

NMED Comment

4. There is no discussion of how field screening or laboratory samples were collected. The Permittees must provide general descriptions of where field screening and laboratory samples were collected. Additionally, the Permittees must provide all field notes, soil boring logs, and calibration notes.

LANL Response

4. Sample collection methodologies are discussed in the document "Subsurface Sampling Field Summary Report" (LANL 1995, 49073, pp. 4-11, -12). Sampling locations are presented in the field summary report as well as in the RFI Report, the HIR, and work plan. Samples were collected

every 5 ft in boreholes and submitted to the MRAL and the MCAL for on-site screening analysis as discussed in section 4.4.6 of the Subsurface Sampling Field Summary Report (LANL 1995, 49073, pp. 4-11, -12). Field personnel screened recovered core for organic vapors using a PID and for beta and gamma radiation using an Eberline ESP-1 at the time of core recovery. Section 4.4.4 of the Subsurface Sampling Field Summary Report presents these screening results (LANL 1995, 49073, p. 4-9). The requested information that could be readily retrieved is included in the HIR reference set of documents and all available information ultimately used for final decision-making will be provided with the aggregate investigation report.

NMED Comment

5. There is no discussion as to the laboratories that conducted the analyses (on-site or off-site). The Permittees must provide copies of the chain-of-custody forms and the raw analytical results from the laboratory conducting the analyses.

LANL Response

5. All of the requested information for data used to support future site decisions will be included in the investigation report. The data used to support the development of the work plan consist only of off-site analysis data from TA-10. These data along with the on-site radiological and chemical analyses are presented in the HIR Appendix B tables.

NMED Comment

6. Photoionization detectors (PIDs) were used to determine if VOCs were above screening action levels (SAL). This would be difficult to do as PIDs are not contaminant specific and individual contaminants do have highly variable SALs. The use of PIDs in the field is only useful as a screening device and NMED does not accept the use of PID field screening to determine regulatory compliance during an investigation. Therefore, the Permittees must conduct additional investigations to adequately delineate the nature and extent of contaminants.

LANL Response

6. PID results indicating the presence of organic vapors were used to guide the collection of additional samples but were not used in place of samples analyzed at off-site fixed laboratories. VOCs were not analyzed in all of the initial investigation samples because they were only required by the sampling approach proposed by LANL in the notice of deficiency response when elevated organic vapors were observed in the field (LANL 1993, 21049). The EPA approved the sampling approach defined in the notice of deficiency response but added the requirement for VOC analysis for all site samples; notification of this additional requirement was not received until after initiating the sampling campaign (LANL 1995, 49073, p. 4-10). Refer to section 4.4.4 through 4.4.7 of the Subsurface Sampling Field Summary Report (LANL 1995, 49073) for further details, including the MRAL and MCAL screening sample results.

   LANL has identified additional data required to augment the characterization of TA-10 in section 2 of this work plan, including the need for additional VOC data. The sample collection activities necessary to supplement the previous TA-10 investigations are proposed in section 4 of the work plan. Note that LANL has specified VOC analysis for every sample proposed.

NMED Comment

7. *The Permittees used three different statistical tests, which we have since denied the use of, to establish whether a contaminant is above background. Many constituents such as Be, Cd, Cu, Pb, Hg, and Zn were obviously (visual observation of the graphs) above the background level used, but were statistically screened out even though they failed one of the statistical tests.*

LANL Response

7. All statistical tests used are appropriate and recommended by EPA. According to the statistical tests, inorganic chemical concentrations in the range of the background concentrations were consistent with background concentrations. Comparisons were made to the soil background data set for all analytes, except total uranium, which was compared to the uranium background value for pumice because of the high percentage of pumice in site samples.

NMED Comment

8. *The Permittees must provide field notes and boring logs for this site that document sampling procedures, locations, PID calibration records, PID instrumentation and lamps utilized during field activities.*

LANL Response

8. Documentation necessary to support decision data will be provided in the investigation report.

NMED Comment

9. *The Permittees must provide all surface and subsurface data collected adjacent to/or down gradient of the areas presented in the report.*

LANL Response

9. Historical data for TA-10 are presented in the RFI report and in Appendix B of the HIR, and will be presented, if appropriate, in the investigation report.

SPECIFIC COMMENTS

NMED Comment

1. ***Section 1.0 Introduction, page 1:*** *This section states that portions of Bayo Canyon are currently open to public recreational use. The Permittees must explain the measures taken to assure that persons utilizing the canyon are not being exposed to contaminants of potential concern.*

LANL Response

1. The historical boundary of TA-10 is fenced and posted with appropriate signs to limit public access to the TA area; other selected areas within Bayo Canyon are also fenced and posted and/or marked with permanent monuments to further reduce potential exposure to the public.

Figures 2.5-3 and 2.5-5 of the work plan depict fenced and/or posted areas and types of fencing. Stormwater control measures, which influence both run-on and runoff, have also been installed to minimize the migration of contaminants outside the fenced areas. In addition, interim actions and voluntary correction actions have been conducted within Bayo Canyon; these actions are discussed in section 3.2.4 of the HIR.

Section 4.3 of the work plan proposes further action which includes limiting the access to, and migration of, contamination and ensuring the protection of human health and the environment.

NMED Comment

2. ***Section 1.3.2 Radiological Surveys, page 6****: This section states that two different radiological surveys were conducted, one before and one after the drilling operations began. The Permittees must define the boundaries covered by each of the surveys.*

LANL Response

2. Pre- and postdrilling radiological surveys were performed as part of the Phase I subsurface sampling performed at TA-10. The surveys were conducted using an Eberline ESP-1 with an HP-260 probe for beta and gamma radiation. The surveys were performed by the Laboratory Radiation Protection Group, ESH-1, prior to setting up at a drilling array to ensure worker safety (LANL 1997, 49073, pp. 4-1, 4-2). Maps of count rates for site characterization were not produced and specific boundaries were not documented. Additional radiation surveys will be conducted to support site characterization, as discussed in section 4.1 of the work plan.

NMED Comment

3. ***Section 2.3.1 Surface water, page 15:*** *It is stated that Bayo Canyon has an ephemeral stream. The Permittees must demonstrate that sampling occurred far enough downstream to assure no contaminants have been carried offsite.*

LANL Response

3. In response to the EPA comment (LANL 1993, 21049) on section 5.1.2.6.2 of the RFI work plan (LANL 1992, 07668), LANL added two transects of sediment samples to the proposed channel sediment sampling approach across the ephemeral stream channel. The transact locations were presented to the EPA in modified figures (5.1-3 and 5.1-4) of the notice of deficiency response (LANL 1993, 21049).

A single sediment sample detected thallium and ten samples detected total uranium at concentrations above BV for sediment. The uranium results, including the maximum observed concentration of 17.8 mg/kg, are less than, or equal to, the BV for Guaje pumice (LANL 1996, 54332, p. 19). A single sediment sample contained nitrotoluene[-3] at a concentration above the detection limit. Strontium-90 was not detected above FV in any sediment samples. Sediment sampling data are discussed in section 4.2.2 of the HIR and presented in the HIR's Appendix B.

NMED Comment

4. ***Table 3.2-2 Summary of Background Screening Values, page 21:*** *The table does not provide the media type. The Permittees shall provide a table with current Background Screening Values and associated media types.*

LANL Response

4. Data are discussed in section 4 of the HIR and presented in Appendix B of the HIR for analytical results above background along with the environmental medium of the sample and appropriate background values and screening levels.

NMED Comment

5. ***Section 4.0 Results of Quality Assurance/Quality Control Activities, page 24:*** *Over 29 percent (29%) of the samples analyzed resulted in a rejection or an estimated undetected quantity. The poor QA/QC results stemmed from low recoveries (biasing samples low), and missed sample holding times (days to over a year) for samples including organics and mercury. The use of this data in assessing risk at this site is unacceptable. The Permittees must include organics and mercury in the additional investigation required by NMED.*

LANL Response

5. Much of the data presented in the RFI report is useful to support site decisions (Schultz-Paige 2003, 79603) and to plan the scope proposed in the work plan. Existing data will be augmented as described in section 4 of the work plan to address the data requirements established in section 2 of the work plan.

NMED Comment

6. ***Section 5.1.2 Description of SWMU 10-002(a), page 41:*** *This section states that all waste items were removed and the pit was excavated to a depth of 15 ft. The Permittees must identify the location of all excavated material and provide the relevant waste characterization forms.*

LANL Response

6. The referenced action was conducted in 1963; as a result, waste characterization and/or disposal forms are not available. The OU 1079 work plan and section 3.1.4 of the HIR summarize the excavation and removal at SWMU 10-002(a). Disposal of the excavated material was not specified in the OU 1079 work plan; however, other D&D materials from TA-10 generated at that time were disposed of at MDA C at TA-50 and MDA G at TA-54 (LANL 1992, 04751; Attachment D-4). LANL archives and records are currently being researched to identify any relevant supporting documentation; if located, disposal documentation will be provided in the investigation report.

NMED Comment

7. ***Section 5.1.4 Field Investigation of SWMU 10-002(a), page 41:*** *This section indicates that the basis for bounding the extent of VOC contamination was established with the use of a PID. NMED does not accept field screening data to determine the nature and extent of contamination. Field screening methods guide field work, but offsite analysis (with proper QA/QC protocols) is necessary*

to determine nature and extent of contamination as well as determine when removal of contaminated media may cease. Additionally, the Permittees have had problems using PIDs (e.g., incorrect lamp for the contaminants of concern and calibration). The Permittees may refer to NMED's "Determination of Extent of Contamination" Position Paper, dated June 17, 1999, for additional information.

LANL Response

7. PID data were not used to establish the nature and extent of VOCs but were used to guide the collection of samples for VOC analysis at a fixed off-site laboratory. This approach was defined in the RFI work plan notice of deficiency response submitted by LANL to the EPA (LANL 1993, 21049). In section 2 of the work plan, LANL has identified additional data required to complete the characterization of TA-10, including additional VOC data. The sample collection activities are proposed in section 4 of the work plan.

NMED Comment

8. ***Section 5.1.4 Field Investigations of SWMU 10-002(a), page 43:*** *It is stated that neither VOC nor HE analyses were requested for samples collected from the boreholes drilled at the subject SWMU. The Permittees shall drill new boreholes and collect the necessary samples to provide an accurate analysis of VOCs and HE at SWMU 10-002(a).*

LANL Response

8. Supplementary sampling to the analytical suite for site samples, including VOC and HE, is described in section 4.2.1 of the work plan.

NMED Comment

9. ***Section 5.2.7.2 Risk Assessment for SWMU 10-002(b), page 58:*** *No risk assessment was performed for SWMU 10-002(b) because there were no chemicals detected above the screening action level. The Permittees must provide the conclusive laboratory results to substantiate this claim. This document shows that 29.3 percent of the samples analyzed were either rejected or an estimated undetected quantity by the analytical laboratory. The Permittees must propose additional sampling in a work plan submitted to NMED for review and written approval.*

LANL Response

9. In section 2 of the work plan, LANL has identified additional data to augment the characterization of TA-10. The sample collection activities are described in section 4 of the work plan. Existing data of the quality necessary to support site decisions are discussed in the HIR and presented in Appendix B of the HIR. Any identified data gaps are discussed in section 2.6.2.2 of the work plan. The previously collected data will be combined with the data produced during the implementation of the Investigation work plan. The combined data set will aid decision-making and will be presented in the investigation report, along with the appropriate supporting documentation.

NMED Comment

10. ***Section 5.3.10 Conclusions and Recommendations for SWMUs 10-003(a-o) and 10-007, page 80:*** *The Permittees recommend that the subject SWMUs be removed from the HSWA Module of LANL's RCRA operating permit. The Permittees shall justify why the subject SWMUs should be removed when radiological sampling results exceeded the background values by as much as 12,000 pCi/g, and the nature and extent has not been delineated as a result of QA/QC issues.*

LANL Response

10. The no further action proposal cited was specifically for RCRA constituents for which the NMED has administrative authority. The proposal was based on RCRA constituents at concentrations greater than SALs. The radiological addendum to the RFI report (LANL 1996, 54617; Attachment D-5) determined that the high concentrations of strontium-90 at depth made the site inappropriate for release under a residential scenario. However, because of the depth and corresponding limited accessibility of the contaminants, TA-10 met the requirements for release under a recreational use scenario (LANL 1996, 54617, pp. 63–64).

    LANL has proposed sample collection and analysis in section 4.2 of the work plan and evaluated potential remedial alternatives for SWMU 10-007 in section 4.3 of the work plan.

NMED Comment

11. ***Section 5.4.1 History of SWMU 10-004(a), page 80:*** *This section states that the sanitary septic system discharged to a pit measuring 8' long by 12' deep. It also states that the system discharged to a drain line and outfall located in a stream channel. The Permittees must clarify the final discharge location for the subject septic system and indicate sampling locations relative to the discharge location.*

LANL Response

11. LANL based the selection of the initial RFI sampling locations for this SWMU on historical information, previously collected data, and engineering drawing ENG-R637. This drawing shows the location and dimensions of the septic system and the discharge pit. Figures in the HIR and the work plan present the locations of samples for this SWMU. LANL has proposed additional characterization activities, including geophysics, in section 4.1 and sample collection in section 4.2 to ensure the identification and full characterization of this SWMU.

NMED Comment

12. ***Figure 5.4.4-1 Locations of SWMU 10-004(a), page 82:*** *This figure does not clearly identify the location of SWMU 10-004(a)'s discharge area with respect to sampling locations. The Permittees must provide a detailed map showing past sampling locations and the discharge area of 10-004(a).*

LANL Response

12. See the response to Comment 11 above.

Attachment D-1

Memo from T. Rust to K. Shultz-Paige, Dated June 18, 2003

Los Alamos
NATIONAL LABORATORY

(2)

#79603

Memorandum

Risk Reduction & Environmental Stewardship (RRES)
Remediation Services (RS), MS M992

To/MS: Terry Rust, RRES-ECR, M992 KSP
From/MS: Karen Schultz Paige, RRES-ECR, M992
Phone/FAX: 5-3527/5-4747
Symbol: ER2003-0425
Date: June 18, 2003

SUBJECT: DATA VALIDATION OF DATA QUALITY OF THE ANALYTICAL DATA USED IN THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) FACILITY INVESTIGATION (RFI) REPORT FOR POTENTIAL RELEASE SITES (PRSs) IN TECHNICAL AREA (TA)-10

I have reviewed the data quality of the analytical data used in the RFI Report for PRSs in TA-10. This report was written in 1996 and all the data were validated in accordance with basic validation protocols that were current at that time. There were some irregularities in the validation, likely due to focused validation by a chemist, which did not negatively affect the decision outcome. In light of the qualifiers placed on the data by the validators, all analytical data were used within the limits of the recorded qualifiers. The conclusions were made based on an awareness of the data quality as indicated by the data validation.

KSP/dv

Cy:
A. Dorries, RRES-ECR, MS M992
D. McInroy, RRES-RS, MS M992
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Associated Document Catalog Number(s)	None
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Document Catalog Number ER2003-0425

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Attachment D-2

Letter from D. McInroy and D. Gregory to J. Bearzi, Dated July 8, 2003

(5) #79621

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Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-7203/FAX (505) 665-4504

Date: July 8, 2003
Refer to: ER2003-0453

Mr. James Bearzi
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505-6303

SUBJECT: SUPPLEMENTAL INFORMATION FOR CORRECTIVE ACTION ORDER CHAPTER IV.C.5

Dear Mr. Bearzi:

During the June 2, 2003 Department of Energy University of California (DOE/UC) meeting with the New Mexico Environmental Department (NMED) to discuss technical aspects of Chapter IV of the Corrective Action Order, NMED staff voiced concerns regarding the ecological risk and data quality presented in the 1996 "Resource Conservation and Recovery Act Facility Investigation (RFI) Report for Potential Release Sites (PRS) 10-002(a-b), 10-003(a-o), 10-004(a-b), 10-005, 10-007 TA-10 Subsurface" which we hope to clarify with the attached information. Dr. Richard Mirenda evaluated the data presented in the RFI Report in the context of ecological risk, his conclusions are attached. Dr. Karen Schultz-Paige evaluated the analytical data set to determine if the data quality issues were sufficient to disqualify the conclusions reached in the RFI Report, her conclusions are also attached. These supplemental reviews reconfirm the conclusion preserved in its RFI Report, that the PRSs in question are appropriate for No further Action.

If you have any further questions regarding this topic please contact Terry Rust at (505) 665-8843.

Sincerely,

David McInroy, Acting Deputy Project Director
Remediation Services
Los Alamos National Laboratory

Sincerely,

Thomas Whitacre for
David Gregory, Project Manager
Department of Energy
Los Alamos Site Operations

DM/DG/TR/am

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Attachment: Memos ER2003-0425 and ER2003-0387

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Los Alamos
NATIONAL LABORATORY

Memorandum

Risk Reduction & Environmental Stewardship (RRES)
Remediation Services (RS), MS M992

To/MS: Terry Rust, RRES-ECR, M992
From/MS: Karen Schultz Paige, RRES-ECR, M992
Phone/FAX: 5-3527/5-4747
Symbol: ER2003-0425
Date: July 22, 2003

SUBJECT: DATA VALIDATION OF DATA QUALITY OF THE ANALYTICAL DATA USED IN THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) FACILITY INVESTIGATION (RFI) REPORT FOR POTENTIAL RELEASE SITES (PRSs) IN TECHNICAL AREA (TA)-10

I have reviewed the data quality of the analytical data used in the RFI Report for PRSs in TA-10. This report was written in 1996 and all the data were validated in accordance with basic validation protocols that were current at that time. There were some irregularities in the validation, likely due to focused validation by a chemist, which did not negatively affect the decision outcome. In light of the qualifiers placed on the data by the validators, all analytical data were used within the limits of the recorded qualifiers. The conclusions were made based on an awareness of the data quality as indicated by the data validation.

KSP/dv

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RPF, MS M707

Los Alamos
NATIONAL LABORATORY

Memorandum

Risk Reduction & Environmental Stewardship (RRES) - Remediation Services (RS), MS M992

To/MS: Terry Rust, RRES-ECR, MS M992
From/MS: Rich Mirenda, RRES-ECR, MS M992
Phone/FAX: 5-6953 / 5-4747
Symbol: ER2003-0387
Date: July 22, 2003

SUBJECT: ECOLOGICAL RISK SCREENING FOR POTENTIAL RELEASE SITES (PRSs) 10-003 (A-O) and 10-007

The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) report for PRSs 10-003 (a-o) and 10-007 identified several non-radiological chemicals of potential concern (COPCs). These included silver, several semi-volatile organic chemicals (e.g., phthalates, naphthalene), several volatile organic chemicals (e.g., trimethylbenzenes, xylenes, ethylbenzene, and dichloroethene), and some high explosives (e.g., HMX, dinitrotoluene, nitrotoluene). All of the COPCs were detected in the subsurface (approximately 4 ft to 42 ft below ground surface [bgs]). Most of the COPCs were detected at depths greater than 5 ft bgs, thereby resulting in no complete pathways to ecological receptors. Although bis (2-ethyhexyl) phthalate and naphthalene exceeded the ecological screening levels (ESLs) for the robin (the receptor with the lowest ESLs) by less than a factor of 10, the detected concentrations were at approximately 42 ft and 12 ft, respectively, and are therefore not available to the robin.

The COPCs detected at less than 5 ft included diethyl phthalate, 2,4-dinitrotoluene, 2,6-dinitrotoluene, HMX, and m-nitrotoluene; detected in only one sample each. A comparison of these COPCs with their respective ESLs found that the detected concentrations were less than the minimum ESL by a factor of three to more than an order of magnitude (there are no ESLs for the minimum ESL for diethyl phthalate, so the ESLs for dimethyl phthalate were used as surrogates). Silver, which was detected above background in samples collected from approximately 8 ft to 39 ft bgs, has the plant as its most sensitive receptor (i.e., has the minimum ESL). Visual observations of the vegetation in and around the PRSs found a healthy and thriving plant community and therefore do not indicate any potential adverse effects from subsurface silver (all other ESLs were greater than the maximum detected silver concentration).

Based on an assessment of the RFI data, there are no potential adverse ecological effects from the COPCs present at PRSs 10-003 (a-o) and 10-007 because either there are no complete pathways to receptors or the detected concentrations are less than ESLs.

RM/dv

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Attachment Notes	Attachments Memos ER2003-0425 and ER2003-0387
Status/Comments	Mr. Bearzi, During recent discussion pertaining to Chapter IV.C.5 of the Corrective Action Order two issues were raised by your

Reviewer Signatures: (By signing, the reviewer indicates that he/she **reviewed** and **approves** the document.)

Reviewer (Print reviewer's name under title)	Signature	Date
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Document Catalog Number ER2003-0453

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Attachment D-3

TA-10 Subsurface Sampling Field Summary Report

313

Technical Area - 10

Bayo Canyon

Subsurface Sampling Field Summary Report

7 February 1995

Prepared for:

Los Alamos National Laboratory
Environmental Restoration Project
Los Alamos, New Mexico

Prepared by:

ERM Program Management Company
and
Golder Federal Services
555 Oppenheimer Drive, Suite 100
Los Alamos, New Mexico 87544

EXECUTIVE SUMMARY

The TA-10 Bayo Canyon Subsurface Sampling Field Summary Report describes the site characterization activities conducted to address potential contaminant releases from Solid Waste Management Units (SWMUs) 10-002(a-b), 10-003 (a-o), 10-004(a-b), 10-005, and 10-007. This report will be submitted to the Los Alamos National Laboratory (LANL) Environmental Restoration (ER) Project.

The former TA-10 is located in eastern Los Alamos County within a portion of Bayo Canyon, approximately 1/2 mile west of the Los Alamos County Sewage Treatment Plant. TA-10 was constructed to test assemblies containing conventional high explosives that included components fashioned from depleted or natural uranium. The assemblies were loaded with a lanthanum-140 "source," which was contaminated with a small amount of strontium-90, for blast diagnostics.

TA-10 was used as a firing site from approximately 1944 through 1963. Decontamination and decommissioning activities at the Bayo Site started in 1960 with the demolition and burning of several buildings. Explosives testing at TA-10 ceased altogether in 1961. Site-wide decommissioning was completed in 1963.

The investigation was initiated by identifying the appropriate locations for placement of the planned four-armed drilling arrays and boreholes. These arrays were generally centered on the locations of former structures or areas of known or suspected contamination as identified in previous investigations. A total of 85 boreholes was initially anticipated. A total of 93 boreholes was eventually drilled and sampled.

A minimum of four soil samples was collected from each borehole for laboratory analysis of selected radiological and non-radiological constituents. Additional samples were collected when field screening indicated the presence of elevated concentrations of radiological or non-radiological constituents. Soil samples were also collected at 5-foot intervals for on-site anaysis of gross radioactivity by CST-9's Mobile Radiochemical Analytical Laboratory (MRAL) and off-site analyses of selected non-radiological constituents by CST-9's Mobile Chemical Analytical Laboratory (MCAL).

MCAL analyses of Target Analyte List (TAL) metals and semi-volatile organic compounds (SVOCs) indicated that neither metals nor SVOCs were detected above Screening Action Levels (SALs) in any of the 93 boreholes. MRAL data indicated that no radioactivity was detected above background levels in boreholes targeting SWMU 10-005, former disposal pit TA-10-44, former septic tank TA-10-40, or Drilling Arrays #4, 5, 6, and 7. MRAL results did indicate the presence of radioactivity above background levels in boreholes in Drilling Arrays# 1, 2, and 3, and the second array targeting TA-10-48. The contamination was detected in soil samples collected from depths ranging from a minimum of 5 feet below ground surface (bgs) in Borehole #10-1210A (new FIMAD identification number in #10-2210) to a maximum depth of 32 feet bgs in Borehole #10-1215. Both boreholes were located in Drilling Array #2. On an average, contamination was detected in the various boreholes in depths ranging from approximately 14 feet bgs to 22 feet bgs.

Laboratory results (not discussed in this report) of soil samples collected during the investigation can be used in a risk assessment to assess the need for a Phase II investigation, for initiation of a long-term monitoring program, or for remediation of the locations of former waste pits TA-10-41, -42, and -43, and -48 in the central area of former TA-10.

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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	Below ground surface
cpm	Counts per minute
CST	Chemical Science, and Technology
CWDR	Chemical Waste Disposal Request Form
DOE	Department of Energy
DOT	Department of Transportation
EPA	Environmental Protection Agency
ER	Environmental Restoration
ERM/Golder	ERM/Golder Los Alamos Project Team
FIP	Field Implementation Plan
HE	High Explosives
HST	Health and Safety Technician
HP	Health Physicist
^{140}La	Lanthanum-140
LANL	Los Alamos National Laboratory
MCAL	Mobile Chemical Analytical Laboratory or chem van
MDA	Minimum Detectable Activity
MRAL	Mobile Radiochemical Analytical Laboratory or rad van
NOD	Notice of Deficiency
PCOC	Potential Contaminants of Concern
ppm	Parts per million
QA/QC	Quality Assurance/Quality Control
RCA	Radiological Controlled Area
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RFI	RCRA Facility Investigation
RMMA	Radiological Materials Management Area
RPF	Records Processing Facility
RSP	Radiological Survey Personnel
RSWDR	Radioactive Solid Waste Disposal Record
RWP	Radiation Work Permit
SALs	Screening Action Levels
SCF	Sample Coordination Facility
SMF	Sample Management Facility
SOP	Standard Operating Procedure
^{90}Sr	Strontium-90
SSO	Site Safety Officer
SVOCs	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TA-10	Technical Area 10
TAL	Target Analyte List
U	Uranium
VOCs	Volatile Organic Compounds
WMP	Waste Management Plan
WPF	Waste Profile Forms

1.0 INTRODUCTION

ERM/Golder Los Alamos Project Team (ERM/Golder) was contracted by Los Alamos National Laboratory (LANL) to conduct a Resource Conservation and Recovery Act (RCRA) Facility Investigation at former Technical Area 10 (TA-10). The RCRA investigation was to be completed in partial fulfillment of requirements of the Hazardous and Solid Waste Amendments (HSWA) Module VIII and in support of the LANL RCRA Facility Permit (LANL 1992, 0783).

The RCRA Facility Investigation (RFI) included subsurface characterization of Solid Waste Management Units (SWMUs) 10-002 (a and b), 10-003 (a-o), 10-004 (a and b), 10-005 and 10-007. Detailed descriptions of individual SWMUs and SWMU Aggregates, as well as descriptions of historical operations, previous SWMU investigations and remediation operations are provided in the RFI Workplan (LANL 1992, 0783).

A discussion of site conditions and history, project objectives and approach, field operations, health and safety, and waste management procedures that were followed during the RFI activities at TA-10 are presented in Sections 2, 3, 4, 5, and 6, respectively, of this report. Mobile laboratory screening results are summarized in Section 7. Conclusions and recommendations are presented in Section 8. References are presented in Section 9. Field borehole logs, graphs depicting subsurface contamination, well construction details, and a copy of the field diagram depicting construction of the neutron access tube are provided as appendices to the report. All field documentation has been submitted to the Environmental Restoration Program Records Processing Facility (RPF) with a copy retained by ERM/Golder. This documentation is identified in the exhibits of this report.

Core sample logs are included in Appendix A. Graphical presentations of contaminated boreholes are included in Appendix B. Monitoring well and neutron access tube construction diagrams are included in Appendix C. Mobile laboratory screening results and a list of boreholes with elevated radioactivity are included in Appendix D.

2.0 SITE DESCRIPTION

2.1 Location

The former TA-10 (also referred to as "Bayo Site") is located in eastern Los Alamos County within a portion of Bayo Canyon (Figure 2-1), approximately 1/2 mile west of the Los Alamos County Sewage Treatment Plant. Vehicular access to the TA-10 is controlled by a locked gate at the eastern end of an access road at the intersection with Highway 502. Additional site security was provided during the course of the investigation by a temporary barbed-wire fence surrounding the investigation site and an access gate guarded by security personnel.

2.2 Site History

TA-10 was used as a firing site from approximately 1944 through 1963. The area consisted of four shot pads at two firing sites and a radiochemistry laboratory to facilitate preparation of the shots. The firing sites were located at the west end of TA-10. The radiochemistry lab and associated structures were located at the east end. Site facilities are depicted in Figure 2-2.

TA-10 was constructed to test assemblies containing conventional high explosives (HE) that included components fashioned from depleted or natural uranium. The assemblies were loaded with a lanthanum-140 (^{140}La) "source" of several hundred to several thousand curies for blast diagnostics. The ^{140}La was separated from its host material and prepared as a source in the radiochemistry building. The ^{140}La (half-life 40.3 hours) was contaminated with a small amount of strontium-90 (^{90}Sr) (half-life 28.8 years) (LANL 1992, 0783). Liquid and solid wastes generated at the radiochemistry laboratory were placed in waste pits resulting in some subsurface contamination. Brass monuments were installed in concrete in 1983 to delineate an area of subsurface contamination where excavation is prohibited until 2142 A.D.

Decontamination and decommissioning activities at the Bayo Site started in 1960 with the demolition and burning of several buildings. Explosives testing at TA-10 ceased altogether in 1961. Site-wide decommissioning of both the firing sites and the radiochemistry laboratory and associated structures was completed in 1963 (LANL 1992, 0783).

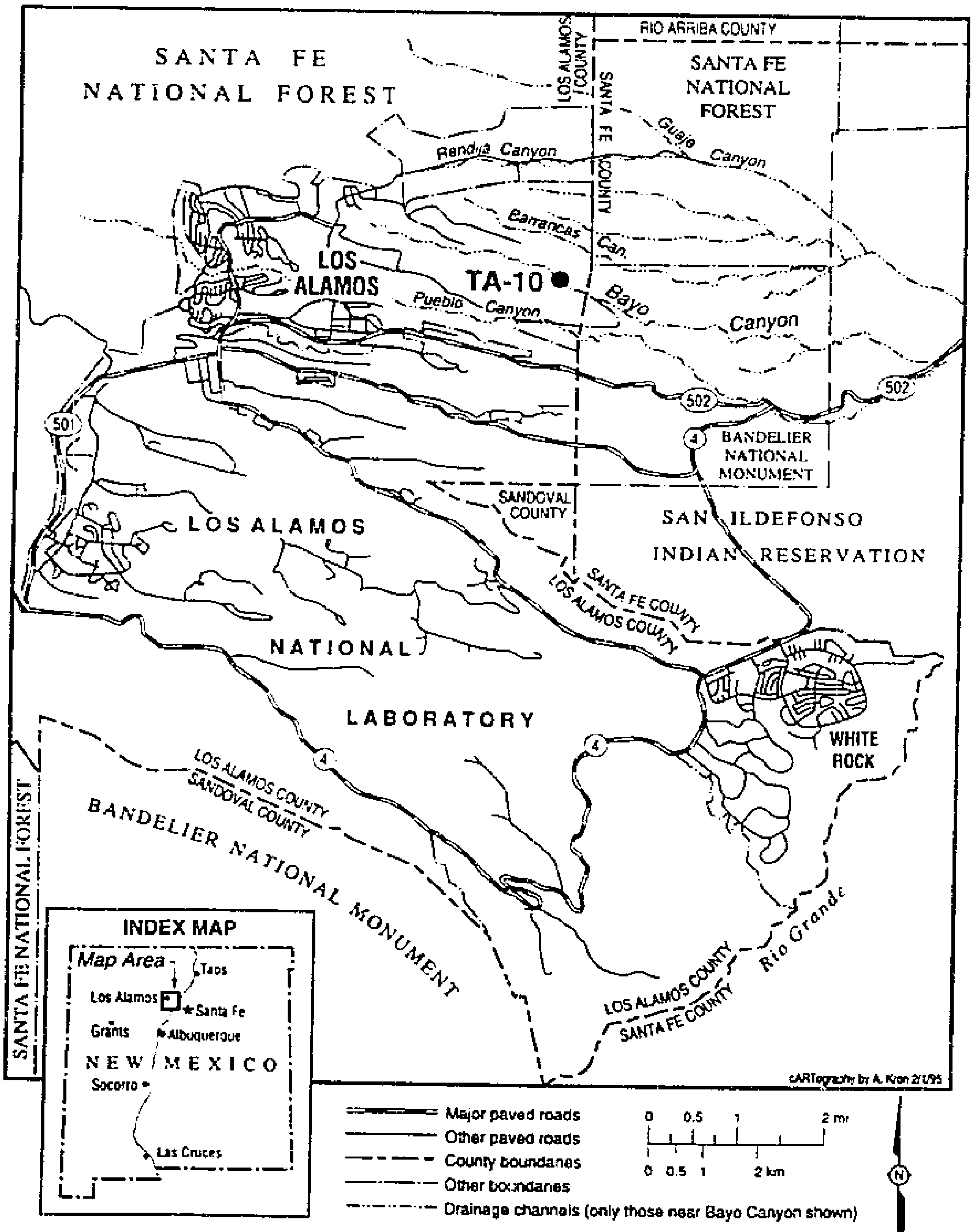


Fig. 2-1. Regional site map.

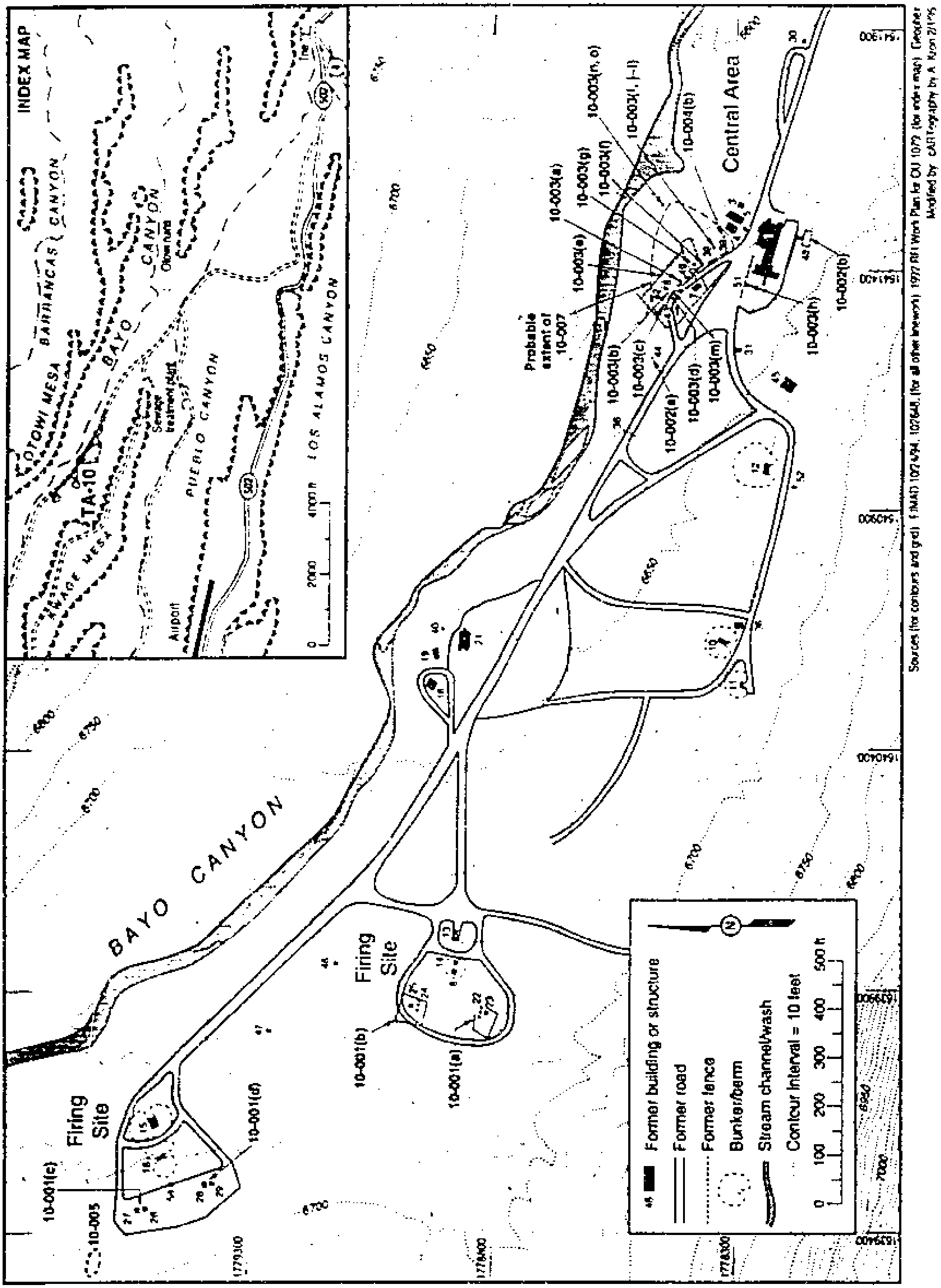


Fig. 2-2. TA-10 site location map.

3.0 OBJECTIVES AND APPROACH

3.1 Previous Investigations

Several investigations and studies conducted over the years have contributed data on the distribution and transport of contaminants at TA-10 and the surrounding area. Because of the wide dispersal of debris by the tests and continuing natural erosion processes, it was recognized at the time of decommissioning that there was a reasonable probability that potentially radioactive materials remained in the canyon. Therefore, periodic surface surveys and searches were conducted in 1966, 1967, 1969, 1971, 1973, 1975, and 1976. During these surveys, additional surface debris was located, some of which was contaminated with ^{90}Sr and uranium. The most recent investigations, which involved test hole drilling and soil sampling in 1973 and 1974, and the 1977 FUSRAP radiological survey were the basis for determining site conditions prior to this investigation. Details and results of these studies are provided in the RFI Workplan (LANL 1992, 0783).

3.2 Objectives

Despite extensive remedial efforts during site decontamination and decommissioning from 1960 through 1963, the subsurface investigations noted above indicated that five areas in TA-10 have residual subsurface contamination from ^{90}Sr. According to the RFI Workplan, these investigations suggested that there were no unacceptable health risks from this radiological contamination (assuming no intruder excavation scenario). However, the extent of the contamination had not been determined and there had been no evaluation of the effects of possible non-radiological constituents (LANL 1992, 0783).

Based on historical information, knowledge of process, and results of previous investigations, the following Potential Contaminants of Concern (PCOCs) were identified for this site: Strontium-90, High Explosives, Total Uranium, Isotopic Uranium, TAL Metals, Mercury, Semi-Volatile Organics, and Volatile Organics.

The primary objective of the subsurface field investigation at TA-10 is to characterize the nature, concentrations, and lateral and vertical extent of potential subsurface contamination related to historical activities at the site. Results of the investigation will be used in a risk assessment to determine if future action is necessary at this site. Results may also be used for the possible development of a Phase II investigation, initiation of a long-term monitoring program (if necessary), and the determination of possible remedial alternatives.

3.3 Approach

An outlined approach to the TA-10 subsurface investigation is provided in the RFI Workplan (LANL 1992, 0783) and the Revised TA-10 Subsurface Sampling Plan (Notice of Deficiency [NOD] Response) (DOE, 1993). This approach is summarized as follows:

- Positions of all former buildings and ancillary facilities, including all subsurface structures, were located.
- Four-armed drilling arrays and borehole locations were established. These arrays were generally centered on the locations of former structures or areas of known or suspected contamination as identified in previous investigations. Drilling arrays were oriented based on the expected distribution and concentration of subsurface contaminants. Borehole spacing within each array ranged from 5 to 15 feet. A total of 85 boreholes was initially anticipated. A total of 93 boreholes was eventually drilled and sampled.
- Boreholes were advanced to a minimum depth of 50 feet below ground surface (bgs). The workplan also required boreholes to be drilled to a depth 10 feet below the last

detected field screening measurement above background or to a maximum depth of 100 feet bgs.

- A minimum of four soil samples was collected from each borehole for laboratory analysis of selected radiological and non-radiological constituents. Additional samples were collected when field screening indicated the presence of elevated concentrations of radiological or non-radiological constituents. Soil samples were also collected at 5-foot intervals for screening of gross radioactivity by CST-9's Mobile Radiochemical Analytical Laboratory (MRAL or rad van) and selected non-radiological constituents by CST-9's Mobile Chemical Analytical Laboratory (MCAL or chem van).

- Arrays were advanced laterally in the direction needed in order to adequately bound the zones of contamination based on field screening and mobile laboratory analytical data.

All TA-10 RFI activities were performed in accordance with the RFI Workplan (LANL 1992, 0783), NOD Response (DOE, 1993), DOE and LANL directives and policies, ERM/Golder's Field Implementation Plan (FIP), and LANL Environmental Restoration Program Standard Operating Procedures (SOPs).

4.0 FIELD OPERATIONS

4.1 Field Team Members

Two ERM/Golder field crews, supervised by a Field Operations Manager and a Field Team Manager and each consisting of a Field Team Leader and three field team members, provided on-site management, borehole geologic logging, subsurface materials sampling, sample control, site safety and radiation protection, and waste management support during the investigation. Field analytical services were provided by LANL CST-9 for sample radioactivity screening and waste characterization. These services included an on-site MRAL and an off-site MCAL.

Site surveying services were completed by SURV-TEK, Inc. of Albuquerque, New Mexico, a subcontractor to ERM/Golder. Drilling services were provided by a LANL contractor, Stewart Brothers Drilling Company of Grants, New Mexico. Site security personnel were provided by TEG Security and North Central Security, both subcontracted to ERM/Golder.

4.2 Mobilization

Mobilization involved improving the existing road into the site, building foundation pads on which to install the office trailers, building drum storage areas, constructing the barbed wire fence, and installing electricity to three of the office trailers. Johnson Controls, Inc. (JCI), who improved the road, built the fence and drum storage areas, and installed the temporary power lines, began site improvement activities in May 1994. Office trailers, the MRAL, a core curation trailer, and a core storage trailer were installed in early June after the road was improved and trailer pads constructed. JCI wired three office trailers and the MRAL for electricity by installing a low-voltage, temporary line from a DOE-owned, high voltage power line that crossed the site.

During this time, ERM/Golder and Stewart Brothers Drilling mobilized field equipment and supplies to the site including drilling rigs, augers, a fork lift, the decontamination pad, monitoring and sampling equipment, and office furniture and equipment. Field mobilization was completed by mid-June 1994.

4.3 Surveys

4.3.1 Geodetic Surveys

A geodetic survey was performed to identify the locations of former buildings and other structures associated with TA-10 operations. All points were recorded in the New Mexico State Planar Coordinate System. SURV-TEK completed the initial surveying of planned borehole locations on 5 May 1994. SURV-TEK completed the final surveying of as-built borehole locations on 16 December 1994. Data provided by SURV-TEK can be accessed through FIMAD.

4.3.2 Radiological Surveys

A pre-drilling radiological survey of the site was performed by LANL ESH-1 personnel on 18 May 1994. ERM/Golder also performed a pre-job radiological survey of the drilling area. Additionally, more detailed surveys were performed prior to mobilizing to each drilling array. The ground surface and vegetation in the areas in and around the drilling arrays and support areas were surveyed with an Eberline ESP-1/HP-260 for the presence of beta and gamma radiation. Any areas found to contain elevated levels were cordoned off with yellow polypropylene rope and/or caution tape. Appropriate radiological control signs were posted on the rope or tape.

Radiological surveys performed by ESH-1 and ERM/Golder revealed native chamisa plants exhibiting elevated levels of beta radiation in Drilling Arrays #1, 2, 3, and 4. Beta radiation ranged from approximately 190 counts per minute (cpm) up to approximately 10,000 cpm, as measured with an ESP-1. The vegetation exhibiting elevated beta radiation within drilling arrays was cut at ground level and containerized in lined, 55-gallon drums. Outside of the drilling arrays, the area surrounding the radioactive chamisa plants was delineated with yellow caution tape.

Post-job radiological surveys were performed by ERM/Golder to assess the presence of residual surface contamination. The area encompassing Arrays 1, 2, and 3 was determined to contain vegetation with radioactivity above background levels. This area remains delineated and posted with appropriate radiological control signs. No surface contamination was detected that may have been caused by the spread of contaminated soil as a result of the subsurface investigation.

4.3.3 Geophysical Surveys

SWMU 10-005 is a former solid waste surface disposal pit. The original dimensions and precise location of the center of the pit are unknown. Therefore, a magnetometer survey was performed in and around the area suspected to be SWMU 10-005 in order to assess the presence of metallic debris in the subsurface. The survey was conducted by Geophex, Ltd. personnel engaged in the shrapnel removal task of the Bayo Canyon field work. The survey was conducted on 13 October 1994. No large, metallic anomalies were detected in the subsurface during the survey.

4.4 Drilling and Subsurface Sampling

4.4.1 Equipment

Stewart Brothers Drilling Company, a LANL contractor, provided all drilling and subsurface soil sampling equipment, drilling personnel, and support services for the TA-10 drilling effort. All boreholes were advanced using two Failing F-10 drill rigs with 8.25-inch outside diameter (OD) and 4-inch inside diameter (ID) hollow-stem augers. Continuous subsurface core samples were collected as the augers were advanced using 3.125-inch OD, 5-foot long, stainless-steel, split-barrel samplers that were retrieved on a wireline system. Stewart Brothers provided two rigs and crews to facilitate rapid completion of the large number of boreholes.

Plastic sheeting was placed under the drilling rigs and surrounding area prior to setting up on each borehole to help prevent surface soil contamination in the event of leaks or spills from the drill rigs. The edges of the plastic were bermed to prevent the runoff of rig fluids or captured rain water. Drill cuttings were retrieved in a metal cuttings box that was placed over the borehole. The box helped recover the cuttings and, thus, prevented the spread of potentially contaminated soil over the ground surface. A hole was cut into the bottom of the cuttings box through which the augers passed to core into the subsurface. Cuttings were recovered from the box and placed in clear, 4-mil plastic bags. The bags were then labeled and stored on plastic sheeting within the exclusion zones pending MCAL and MRAL analysis. If the cuttings were determined to contain elevated radiological levels (based on field screening with hand-held instruments), the bags were containerized in lined, DOT-approved, 55-gallon drums.

4.4.2 Borehole Locations

Boreholes were located in 11, four-armed drilling arrays, which were generally centered on or near former waste pits, drain line manholes, septic tanks, or known areas of subsurface beta contamination as determined from previous studies. Most of the arrays consisted of five or nine boreholes. Two arrays each consisteid of 10 boreholes while one array contained six boreholes. Nine arrays were located in the vicinity of the location of the former radiochemistry laboratory, support buildings, and several waste pits. One array targeted the site of a septic system and overflow tank (TA-10-40) that serviced the personnel building (TA-10-21). The last array, targeting SWMU 10-005, was located near a firing site approximately 1/4 mile west of the laboratory area (Figures 4-1 and 4-2).

Boreholes were spaced 5 to 15 feet apart along the arms of the arrays. The arms of some arrays were oriented along former drain lines, trenches, surface depressions, or the long axis of suspected areas of contamination. The arms of other arrays were oriented in the four cardinal directions. Drilling arrays and borehole identification numbers are identified in Table 4-1. Additional details regarding borehole and array placement may be found in the FIP and the Revised TA-10 Subsurface Sampling Plan (DOE, 1993).

4.4.3 Deviations From Workplan

Several deviations were made to the original workplan regarding borehole placement. Additional deviations made included the installation of a groundwater monitoring well and a neutron access tube, which were not required by the workplan. The well and access tube were completed in boreholes drilled and sampled in accordance with the workplan.

Borehole #10-1294 was added to the north arm of Drilling Array #3 (Figure 4-1) in order to bound an area of subsurface beta contamination.

Borehole #10-1295 was added during the course of the field program when three former employees of TA-10 identified an area of the site suspected to be the location of an undocumented laboratory waste pit. Mr. Garry Allen, Field Project Leader, requested that a borehole be drilled at the location identified by the three former employees to assess the presence of subsurface radiological or non-radiological constituents. The location of the borehole is shown in Figure 4-1.

An additional nine-borehole array was added to assess the presence of beta contamination previously detected in the area of TA-10-48, a former waste pit. Prior to the start of the field sampling program, SURV-TEK identified inconsistencies in the NOD Response and RFI Workplan regarding the location of the drilling array. The inconsistencies were found between the figures showing the location of the waste pit and array, the written descriptions of the array, and the survey coordinates of the array.

In meetings between Derek Faulk (Field Team Manager), SURV-TEK, and Scott Baldridge, a geologist with EES-1 and one of the authors of the NOD Response, it was decided that the survey coordinates would likely be the most accurate description of the array location.

During the course of drilling the original nine-hole array, additional questions were raised regarding the location of the array in reference to the location of the waste pit and previously detected beta contamination. The array appeared to be too far west of the location of the former waste pit and previously detected beta contamination. After discussing the situation with Garry Allen, he determined that the survey coordinates were, in fact, incorrect and that the center of the array should have been located 50 feet to the east of the original surveyed location. On 1 September 1994, SURV-TEK surveyed and placed the new drilling array 50 feet east of the center of the original array. Both arrays are shown in Figure 4-1.

Nine boreholes in Arrays #1, 2, and 3 were relocated due to drilling refusal generally attributed to concrete or rebar debris encountered at depths between 5 and 15 feet bgs. After experiencing refusal, each abandoned borehole was backfilled with its drill cuttings and another drilling attempt was made within a few feet of the previous boring. Cuttings were screened with hand-held instruments for radioactivity and volatile organic compounds (VOCs) prior to backfilling each borehole. Each new borehole attempt was initially labeled with the original FIMAD identification number plus a letter of the alphabet , i.e., #10-1219A, B, etc. Eventually, new FIMAD identification numbers were assigned. The new FIMAD identification numbers are listed in Table 4-2.

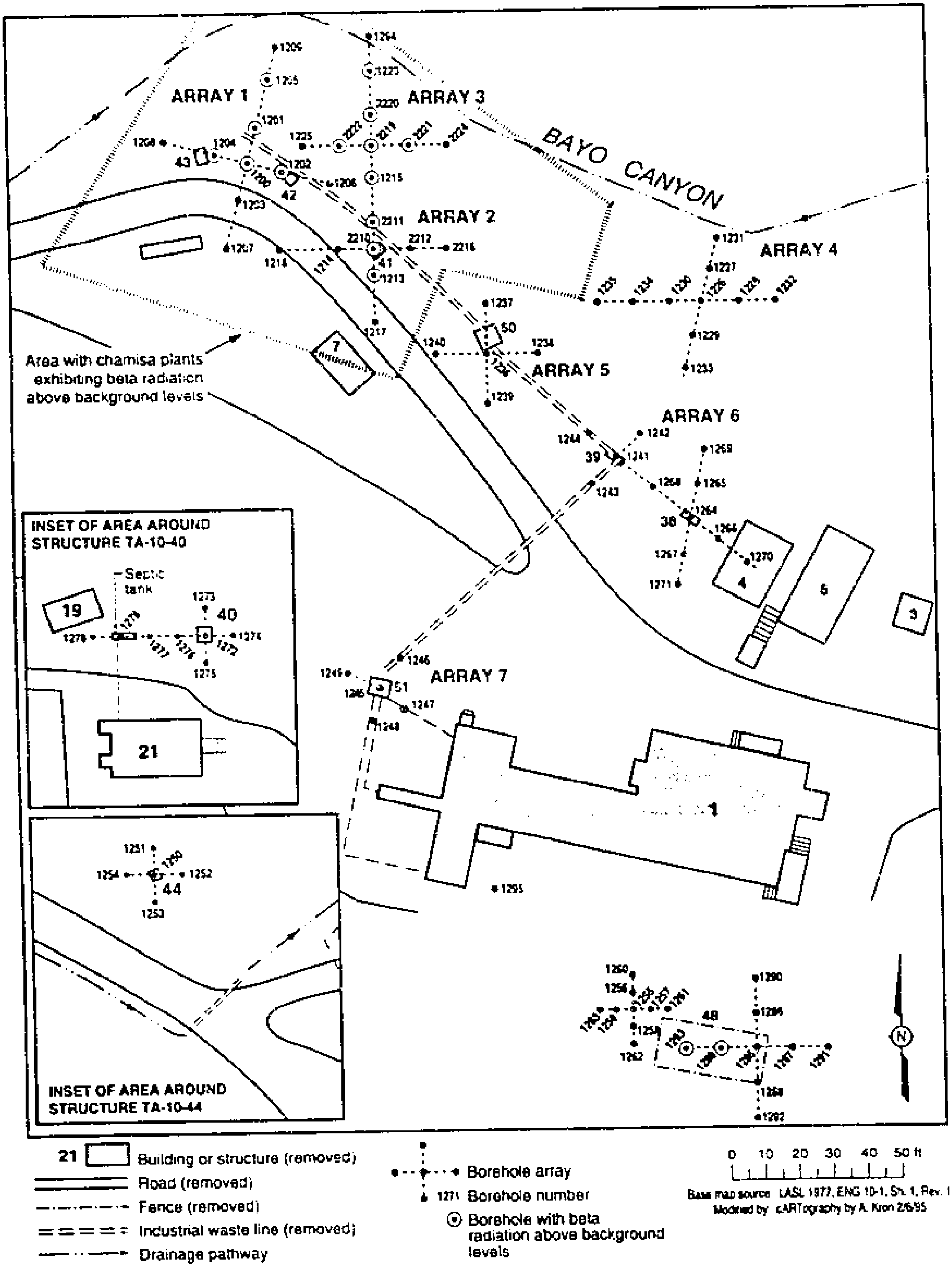


Fig. 4-1. Borehole locations—Central Area, TA-10-40 and TA-10-44.

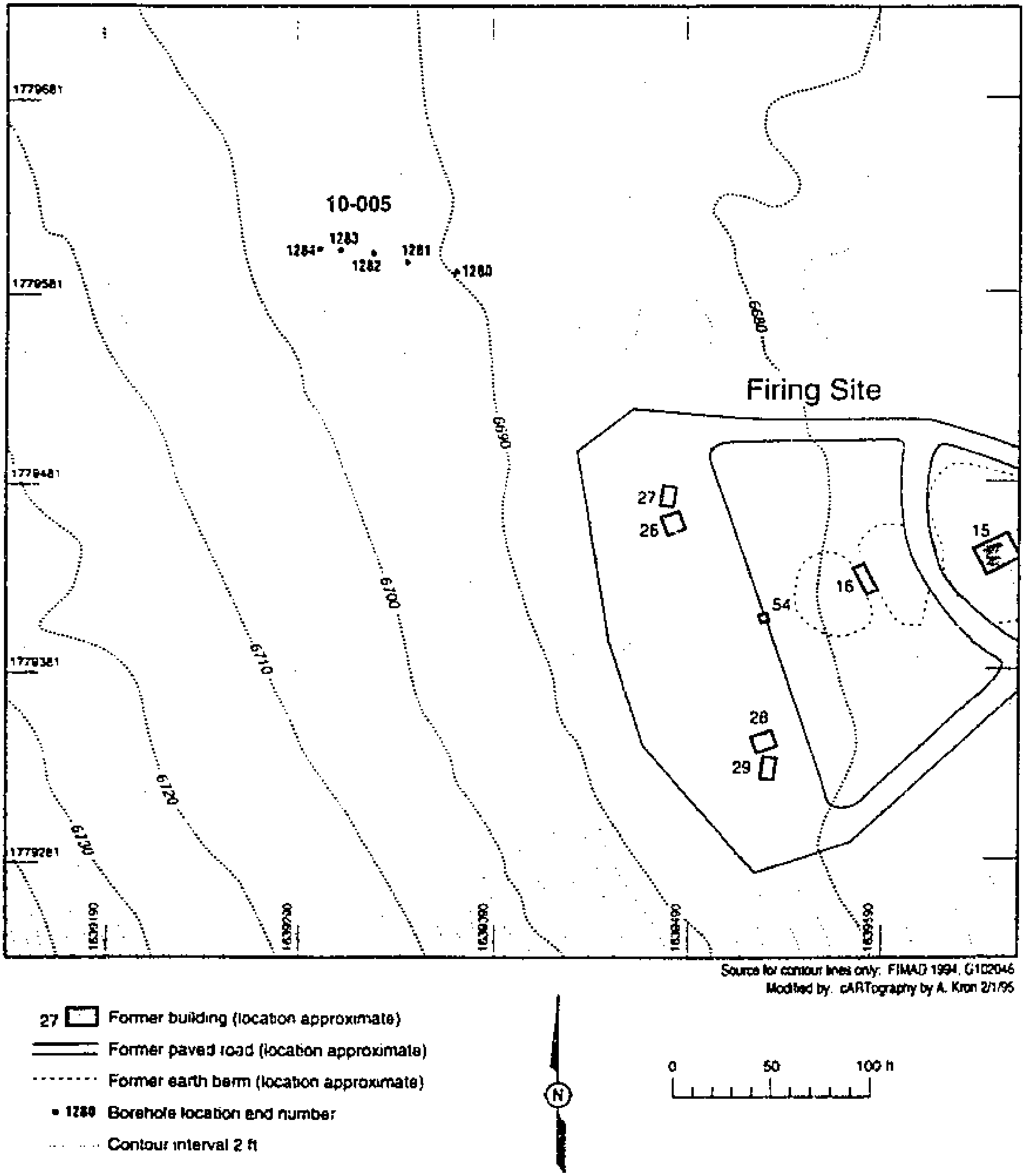


Fig. 4-2. Location of boreholes at SWMU 10-005.

TABLE 4-1

TA-10
BOREHOLE LOCATION IDs

PRS No.	Aggregate Name	Borehole Location IDs	
10-002(a)	Waste Disposal Pit TA-10-44	10-1250 10-1251 10-1252 10-1253 10-1254	
10-002(b)	Waste Disposal Pit TA-10-48	Original Drilling Array 10-1255 10-1256 10-1257 10-1258 10-1259 10-1260 10-1261 10-1262 10-1263	Additional Drilling Array 10-1285 10-1286 10-1287 10-1288 10-1289 10-1290 10-1291 10-1292 10-1293
10-003(a-o) and 10-007	TA-10 Central Area Drilling Array #1	10-1200 10-1201 10-1202 10-1203 10-1204 10-1205 10-1206 10-1207 10-1208 10-1209	
10-003(a-o) and 10-007	TA-10 Central Area Drilling Array #2	10-1210 10-1211 10-1212 10-1213 10-1214 10-1215 10-1216 10-1217 10-1218 10-1219	
10-003(a-o) and 10-007	TA-10 Central Area Drilling Array #3	10-1220 10-1221 10-1223 10-1224 10-1225 10-1294	

TABLE 4-1 (continued)

PRS No.	Aggregate Name	Borehole Location IDs
10-003(a-o) and 10-007	TA-10 Central Area Drilling Array #4	10-1226 10-1227 10-1228 10-1229 10-1230 10-1231 10-1232 10-1233 10-1234 10-1235
10-003(a-o) and 10-007	TA-10 Central Area Drilling Array #5	10-1236 10-1237 10-1238 10-1239 10-1240
10-003(a-o) and 10-007	TA-10 Central Area Drilling Array #6	10-1241 10-1242 10-1243 10-1244
10-003(a-o)	TA-10 Central Area Drilling Array #7	10-1245 10-1246 10-1247 10-1248 10-1249
10-004(a)	TA-10-40, Septic Tank for Personnel Building (TA-10-21)	10-1272 10-1273 10-1274 10-1275 10-1276 10-1277 10-1278 10-1279
10-004(b)	TA-10-38, Septic Tank for Radiochemistry Laboratory	10-1264 10-1265 10-1266 10-1267 10-1268 10-1269 10-1270 10-1271
10-005	Solid Waste Surface Disposal Pit	10-1280 10-1281 10-1282 10-1283 10-1284
Not Applicable	Suspected Laboratory Waste Disposal Pit for Radiochemistry Laboratory	10-1295

TABLE 4-2
NEW BOREHOLE LOCATION IDs

Original Borehole ID	New Field Borehole ID	New FIMAD Borehole ID	Location of Borehole	Comments
10-1210	10-1210A	10-2210	2 feet east of 10-1210	
10-1211	10-1211A	10-2211	2 feet west of 10-1211	
10-1212	10-1212A	10-2212	2 feet east of 10-1212	
10-1216	10-1216A		2 feet east of 10-1216	Refusal
	10-1216B	10-2216	2 feet south of 10-1216	
10-1219	10-1219A		2 feet east of 10-1219	Refusal
	10-1219B	10-2219	4 feet east of 10-1219	
10-1220	10-1220A		2 feet west of 10-1220	Refusal
	10-1220B	10-2220	2 feet east of 10-1220	
10-1221	10-1221A	10-2221	2 feet east of 10-1221	
10-1222	10-1222A		1 foot north, 1 foot east of 10-1222	Refusal
	10-1222B		3 feet north, 1 foot east of 10-1222	Refusal
	10-1222C		3 feet north, 3 feet east of 10-1222	Refusal
	10-1222D		4 feet north, 3 feet east of 10-1222	Refusal
	10-1222E		3 feet south of 10-1222	Refusal
	10-1222F	10-2222	5 feet south of 10-1222	
10-1224	10-1224A		2 feet south of 10-1224	Refusal
	10-1224B		4 feet east of 10-1224	Refusal
	10-1224C	10-2224	2 feet south of 10-1224	

Three boreholes were not drilled as planned. Borehole #10-1267, in Drilling Array #6, was not drilled because radiological and non-radiological constituents were not detected in other boreholes in the array above background or Screening Action Levels (SALs), based on field screening, MRAL results, and MCAL results. Furthermore, #10-1267 was located on a steep slope that prevented the safe operation of the drill rig in the designated location.

Borehole #10-1260 was in the original array targeting the previously detected beta contamination associated with TA-10-48. The array was moved before the borehole was drilled. Borehole #10-1292 was included in the new drilling array targeting TA-10-48 but was not drilled. No radiological and non-radiological constituents were detected in other boreholes in the new array above background or SALs, based on field screening, MRAL results, and MCAL results. In addition, #10-1292 was located on steep terrain and adjacent to a large tree that prevented the operation of the drilling rig.

SWMU 10-005 was a surface disposal pit associated with the firing pads. It was suspected to be a shallow, linear surface depression located west of the firing sites. However, the original dimensions and precise location of the center of the disposal pit are unknown. Due to the large dimensions of the existing depression and the lack of information regarding the location of the original pit, a four-armed drilling array centered on the existing depression was deemed impractical. Therefore, the array was replaced with a series of boreholes aligned along the center of the depression. The first borehole (#10-1284) was drilled at the western end of the linear depression with the succeeding four boreholes (#10-1283 through #10-1280) spaced approximately 15 feet apart and extending down slope in an easterly direction. A four-armed array was to be extended in north and south directions if radiological or non-radiological constituents were detected by field screening in any of the five boreholes. However, no radiological or non-radiological constituents were detected above background levels in the SWMU 10-005 boreholes. The boreholes targeting SWMU 10-005 are shown in Figure 4-2.

Borehole #10-1277 was drilled and sampled to a total depth of approximately 68 feet bgs. It was then reamed to a 10.75-inch diameter and completed as a groundwater monitoring well. Although completed as a dry hole, it will be used for long-term monitoring by ESH-18. The monitoring well was completed with 4-inch, Schedule 40, PVC casing and #20 slot screen. The gravel pack was composed of 10/20 Colorado Silica Sand (CSS). A 3-foot bentonite seal was installed above the gravel pack and the remainder of the annular space was filled with a concrete/bentonite slurry to the surface. The surface completion included a 2.5-foot by 2.5-foot by 6-inch deep concrete pad and a locking, steel protective casing. A Well Completion Information Form and Well Construction Field Data Log are included in Appendix C.

Borehole #10-1276 was originally drilled and sampled to a total depth of 50 feet bgs. It was extended to a depth of 67 feet bgs and completed as a neutron access tube. The neutron tube is a 2.5-inch OD aluminum tube that will be used by ESH-18 for long-term monitoring of the subsurface soil moisture. A copy of the field diagram as completed by ESH-18 is included in Appendix C. The locations of boreholes #10-1276 and #10-1277 are shown in Figure 4-1.

4.4.4 Field Screening

Recovered core was field-screened for radioactivity (gross beta and gamma) and VOCs. Core barrels and borehole cuttings were initially screened for gross beta/gamma as they were retrieved from the borehole. Each borehole was screened for VOCs and combustible gases. Gross beta/gamma and VOC screening was also performed immediately after the core barrel was opened and prior to core logging and sampling.

4.4.5 Borehole Logging and Core Curation Procedures

All core extracted from each borehole was logged, or described, by an ERM/Golder geologist within the exclusion zone. Field Borehole Sample Logs were completed describing the core in each 5-foot run. Recovered core was placed in core boxes with the following information recorded: top and bottom of core run, samples removed, core loss locations, and depth intervals. Each box was then labeled with the borehole identification number, depth interval, and box number. Details of core logging and curation are described in the FIP.

Recovered core with radioactive constituents detected at levels below the EES-4 Sample Management Facility (SMF) acceptance criteria was stored in core boxes, placed in a locked trailer on-site, and then transported to the SMF for permanent storage. Recovered core in which radiological constituents were detected at levels that exceeded the SMF acceptance criteria was stored in a second, locked, on-site storage shed until permanent storage or disposal can be arranged. The storage shed holding the contaminated core is posted as both a Radiological Controlled Area (RCA) and a Radioactive Materials Management Area (RMMA).

4.4.6 Subsurface Sampling Strategies

Sample containers, sample labels, and QA/QC samples were prepared in accordance with the information contained in the sample matrices provided in Appendix A of the FIP. At least four sample suites were collected for laboratory analyses (full suites) under the following criteria:

I. One full sample suite from the midpoint of the first 10-foot interval,
II. One full sample suite from the bottom of the borehole,
III. One full sample suite per borehole from the interval exhibiting the highest field screening levels for radionuclides or VOCs, and

IV. One full sample suite selected at random from core runs retrieved from depths below 10 feet. The randomly selected sample depth interval was selected by the geologist based on the following criteria:
   A. immediately underlying previously existing structures,
   B. change in color or obvious staining of the core,
   C. significant changes in lithology, and
   D. contact with the fill/tuff interface.

Full sample suites initially included sample aliquots for laboratory analysis of semi-volatile organic compounds, Target Analyte List metals, total uranium, ^{90}Sr, and MRAL analyses for moisture and gross alpha, beta, and gamma. If field screening revealed elevated gross radioactive levels, the lab analysis request included isotopic uranium and gamma spectroscopy. In accordance with the NOD Response (DOE, 1993), 50 percent of the total number of full sample suites also included HE.

Initially, the RFI Workplan (LANL 1992) and the NOD Response (DOE, 1993) called for the collection of VOC samples only if field screening suggested the presence of VOCs. However, the US EPA Region VI approval of the NOD Response (DOE, 1993) stipulated that samples for VOC analysis must be collected regardless of field screening results. Notification of this EPA Region VI approval requirement was not received by the field team until the middle of September, 1994. As a result, VOC samples were not collected from approximately one-half of the boreholes.

Sample suites were collected for analysis by the MRAL and MCAL every 5 feet from each borehole (Rad Van Suites). Samples were collected from that portion of the core run showing the highest radioactivity based on field screening or from an interval selected at random. Rad Van suites included MRAL analyses of moisture and gross alpha, beta, and gamma radiation and MCAL analyses of SVOCs and X-ray Fluorescence (XRF) Metals.

Soil and QA/QC water samples were submitted for MRAL, MCAL, and laboratory analysis for a variety of radiological and non-radiological PCOCs as outlined in the FIP and the RFI Workplan (LANL 1992). The PCOCs, analytical methods, sample containers used, preservation and sample storage requirements is presented in Table 4-3.

4.4.7 QA/QC Sample Collection

QA/QC samples are used as a planned check of a measurement system operation to obtain a measure of the quality of the data generated (LANL-ER-SOP 01.05). QA/QC samples, including duplicates, field blanks and rinsate blanks were collected during subsurface soil sampling activities at TA-10.

Duplicate soil samples are two separate, independent samples collected in such a manner that they are equally representative of the sampled soil matrix at a given depth and time. Duplicate samples are utilized as a quality control check of the analytical methods used at the laboratory. Ten percent duplicates were collected during the course of the investigation.

Field blanks are collected to determine if any external sources of sample contamination are present at the time of sample collection. Field blanks were in a controlled area prior to entering the exclusion zone and initiating sampling operations. Field blanks were prepared by pouring deionized water into appropriate sample containers and adding the proper preservative as necessary. The blanks were then transported to the sampling area inside the exclusion zone and opened as a soil sample was collected from the core barrel. Field blank containers were sealed, labeled, stored and documented as described in the FIP upon collection of the specified soil sample. Five percent field blanks were collected.

Rinsate blanks are collected to determine if field equipment decontamination procedures are being adequately followed. The rinsate blank consists of deionized water that is poured over and through the decontaminated equipment and captured in appropriate sample containers. The containers are then properly labeled, processed, and shipped to the laboratory for analysis. Five percent rinsate blanks were collected.

4.5 Equipment Decontamination Procedures

The drill rigs, augers, and core barrels were surveyed for fixed and removable radioactive contamination by an RCT upon arrival at the site. Surveys were performed by collecting and counting smear samples and large area swipes and direct read surveys. Similar surveys were performed prior to moving the rigs and equipment between drilling arrays and demobilization from the site. A more limited survey of the working area of the rigs was performed prior to moving between boreholes within an array.

A "dry decontamination" procedure consisting of the removal of all soil particles with stiff nylon brushes and cleaning with Fantastik® spray cleaner and paper towels was performed if removable radioactive contamination was detected on any equipment. Smear samples were collected and direct read surveys performed following the dry decontamination procedure. If necessary, the procedure would be repeated until the equipment could be released by the Radiation Control Technician (RCT). All dry decontamination wastes were drummed in accordance with the approved Waste Management Plan (WMP).

Following any necessary dry decontamination, drill rigs and equipment released by the RCT were steam cleaned prior to re-use. Whether contamination was detected by field screening or not, augers were steam-cleaned prior to re-use in boreholes and drill rigs were steam-cleaned prior to mobilization to a new drilling array. Drill rigs and equipment were also steam cleaned prior to demobilization from the site. A portable decontamination pad provided by Stewart Brothers was set up in a designated area for the decontamination of the downhole equipment. Waste water and soil generated from the steam cleaning operation were drummed and stored in accordance with the approved WMP.

The individual components of the split spoon core barrels and the stainless steel sampling bowls were decontaminated between samples at a small decontamination pad set up within each exclusion zone. Sampling equipment which was not suspected to be radiologically contaminated based on field screening was subjected to a decontamination regimen which included an Alconox®/potable water wash, followed with a potable water rinse, a methanol rinse, and a final deionized water rinse. Decontamination fluids were captured in plastic buckets and later transferred to 55-gallon drums for storage. The core barrel components were then wiped dry using a clean paper towel. Following reassembly, core barrels were temporarily wrapped and stored in clean plastic. Decontaminated sample bowls were wiped dry with paper towels and lined with aluminum foil.

4.6 Backfilling of Boreholes

Boreholes were backfilled with either a cement/bentonite slurry or drill cuttings based on field screening data, MCAL results, and MRAL results. Boreholes were backfilled with drill cuttings if 1) neither VOCs nor elevated radioactivity were detected in recovered core using hand-held screening instruments, 2) MCAL results indicated that metals and SVOCs were not present above SALs, and 3) MRAL results indicated that gross alpha, beta, and gamma levels were below background levels. Upon returning drill cuttings to their respective boreholes, each boring was completed with a 2-foot thick concrete cap.

Boreholes were backfilled with a concrete/bentonite slurry when field screening, MRAL results, or MCAL results indicated the presence of radioactivity or chemical contamination above background or SALs, respectively. A grout pump was used to inject the slurry into the borehole through a tremie pipe. The tremie pipe was extended to the bottom of the borehole so that each boring was backfilled from the bottom up to the surface. Each backfilled borehole was identified with a wooden stake set in the boring's concrete cap.

TABLE 4-3

TA-10 SAMPLES AND ANALYSES

VOLUME	CONSTITUENTS	ANALYTICAL METHOD	MATRIX	CONTAINER TYPE	PRESERVATION	HOLDING TIME
125 ml	Total Uranium Isotopic Uranium ^{90}Sr Gamma Scan	KPA ICP/MS GFPC GAMMA SPEC	Soil	Poly	Store at 4°C	6 Months
2 Liters	Total Uranium Isotopic Uranium ^{90}Sr Gamma Scan	KPA ICP/MS GFPC GAMMA SPEC	Water	Poly	HNO_3 to pH <2 Store at 4°C	6 Months
250 ml	TAL Metals[1,2]	US EPA SW-846 EPA Method 6010 (Mercury - EPA Method 7471)	Soil	Poly	Store at 4°C	6 Months (Hg 28 days)
500 ml	TAL Metals	US EPA SW-846 EPA Method 6010 (Mercury - EPA Method 7471)	Water	Poly	HNO_3 to pH <2 Store at 4°C	6 Months (Hg 28 days)
250 ml	Semi-Volatiles	US EPA SW-846 Method 8270	Soil	Amber Glass w/ Teflon-Lined Caps	Store at 4°C	7 days until extraction, 30 days thereafter
1 Liter	Semi-Volatiles	US EPA SW-846 Method 8270	Water	Amber Glass w/ Teflon-Lined Caps	Store at 4°C	7 days until extraction, 30 days thereafter
40 ml	Semi-Volatiles Screen	MCAL	Soil	Amber Glass w/ Teflon-Lined Caps	Store at 4°C	
125 ml	Volatiles	US EPA SW-846 Method 8240	Soil	Amber Glass w/ Teflon-Lined Caps	Store at 4°C	14 days
125 ml	High Explosives	HPLC	Soil	Amber Glass	Store at 4°C	7 days until extraction, 30 days thereafter

TABLE 4-3 (continued)

1 Liter	High Explosives	HPLC	Water	Amber Glass	Store at 4°C	7 days until extraction, 30 days thereafter
150 g	Gross Alpha, Beta, and Gamma	MRAL	Soil	Ziploc Bag	None	N/A
500 ml	Gross Alpha, Beta, and Gamma	MRAL	Water	Poly	HNO_3 to pH < 2 Store at 4°C	N/A

1 - TCLP analyses will be run for any metal constituent detected at a concentration greater than 20X the TCLP thresholds

2 - TAL Metals Include:

Mercury	Antimony
Nickel	Arsenic
Selenium	Barium
Silver	Beryllium
Thallium	Cadmium
Vanadium	Chromium
Zinc	Lead

4.7 Stratigraphy

Surface soils within Bayo Canyon are located in the upper 5 to 10 centimeters of the soil column and consist of poorly developed, well drained soils of the Totavi Series (LANL 1992, 0783). The soils are underlain by fan deposits near the valley floor which are primarily discontinuous Quaternary alluvial and colluvial units. These units are well- to poorly-sorted, clay-rich to sandy alluvium and gravels. The gravels consist of pumice (likely Tsankawi Pumice), angular to subrounded welded tuff (likely Tshirege Tuff), Otowi Tuff, and dacite (likely reworked Tschicoma dacite weathered from the Cerro Toledo and Otowi Tuff) (Drake and Inoué, September 1993).

The thickness of the alluvium at TA-10, based on ERM/Golder findings as a result of the drilling operation, ranges from approximately 30 to 45 feet bgs. In many areas, the upper 5 to 15 feet of alluvium has been reworked, displaced, filled and mixed with construction debris during the construction, decontamination, and decommissioning activities that took place while the site was operational.

The MRAL data collected during the investigation indicated that subsurface beta contamination is present in the shallow alluvial sediment ranging from a depth of 5 feet bgs to a maximum depth of 32 feet bgs (Sections 7 and 8).

Detailed descriptions of site geology, hydrology, and soils of the Bayo Canyon site are provided in the RFI Workplan (LANL 1992, 0783) and the 1991 Installation Workplan for Environmental Restoration (LANL 1991, 0553).

5.0 HEALTH AND SAFETY

5.1 Health and Safety Plan Overview

Work was performed in accordance with the requirements set forth in the Site-Specific Health and Safety Plan (SSHASP). The SSHASP identified site hazards, roles and responsibilities of site personnel, personnel protection measures, and requirements for Industrial Hygiene/Health Physics monitoring.

Initially, separate Site Safety Officers (SSOs) and Radiation Screening Personnel (RSPs) were assigned to monitor each drilling area. Following the departure of one SSO, a primary SSO was designated to oversee monitoring actions performed by Health and Safety Technicians (HSTs) assigned to each drill crew. ESH-1 and ESH-5 provided technical support. Industrial Hygiene and Health Physics technical oversight was provided by ERM/Golder staff. Individual assignments are delineated in the SSHASP.

Several change orders to the SSHASP were issued. The majority of these either added personnel to the project or reassigned tasks. Change orders to the SSHASP were also used to designate a site visitor area, modify rig decontamination protocol, and alter radiological monitoring requirements.

A Radiological Work Permit (LANL RWP# 94TOS-510) was issued by ESH-1 specifying radiological monitoring and PPE requirements based on radioactive contamination levels present during site operations.

5.2 Health and Safety Briefings

All workers assigned to duties on site were briefed by the SSO on SSHASP requirements and personal health and safety responsibilities. Site personnel were required to read the SSHASP and LANL RWP. Individual understanding of personal health and safety responsibilities delineated in the SSHASP and LANL RWP was acknowledged by worker signature. Visitors to the site received an abbreviated health and safety briefing from either the SSO or the FTM prior to touring site facilities.

Health and Safety briefings (Tailgate Meetings) were conducted by the SSO each day work was performed on-site. These daily briefings generally consisted of a pre-job discussion of health and safety concerns identified during site operations, site hazards produced by changing environmental conditions, and a review of previously identified health and safety concerns requiring specific attention.

5.3 Personal Protective Equipment (PPE)

Level "D" PPE was required for work in exclusion zones. Disposable "Kleengard" coveralls were used in areas in which radioactive contamination had been detected. This requirement was occasionally increased to double gloves and coveralls when contamination levels addressed in the RWP were encountered. Reusable LANL issue coveralls were used in zones in which field screening of samples and work areas failed to detect radioactive contamination. Rubberized steel toe work boots were provided to site personnel to be used in contaminated zones as corrective action for an on-site radiological incident involving contamination of personal work boots.

Respiratory protection (full-face, air-purifying respirators) was required during the mixing of grout to backfill boreholes and the wipedown of augers during removal from contaminated borings.

5.4 Industrial Hygiene Monitoring

Photoionization Detectors (PIDs) were used to monitor for VOCs immediately after opening core barrels. Low concentrations of VOCs were occasionally encountered because of plant root decomposition in the core interval. No sustained indication of VOCs in the workers breathing zone was encountered during operations.

Combustible gas indicators were used to monitor each borehole for gases. No combustible gases were detected during drilling operations.

Dust monitoring was conducted using portable aerosol monitors to determine dust levels at each drill rig, sampling table, and dry decontamination area. No levels exceeding the SSHASP action levels were encountered. Respiratory protection during grouting operations and contaminated auger wipedown was deemed necessary due to the high amount of visual dust generated during performance of these tasks. Personal monitoring of worker breathing zone for silica was attempted and abandoned due to insufficient task duration to obtain required sample volume.

5.5 Radiological Monitoring

Strontium-90 was the anticipated radiological PCOC during site operations. Radiological monitoring efforts were consequently directed toward the detection of beta/gamma radiation. Eberline ESP-1/HP-260 and Ludlum Model 12/44-40 shielded probe ratemeters were used for direct monitoring of personnel and equipment. These instruments were also used in field monitoring of large area Maslin wipes used for screening equipment for contamination.

Ludlum Model 12 air proportional probe ratemeters were used for direct monitoring of personnel and equipment for alpha contamination during initial site operations. Failure to detect alpha contamination during this period prompted ESH-1 to reduce alpha monitoring to only those instances when beta/gamma contamination was determined to be present. No alpha contamination was detected during field operations.

Radiological monitoring for loose surface contamination was performed by use of smears and large area wipes. Only smears were used for tests in which quantitative activity levels were required. Large area wipes were used in situations requiring a pass/fail indication of removable contamination prior to movement of equipment and materials between controlled areas on site. Smears were counted using a Ludlum 2221 scalar with tray counter apparatus.

5.6 Radiological Incident

A personnel contamination event, designated a "radiological incident" by LANL ESH-1 personnel, occurred on 26 July 1994. Contaminated soil from a wetted surface adhered to two drill crew members' personal work boots. This contamination was detected during routine personnel monitoring prior to exiting an exclusion zone. Decontamination of the boots was easily accomplished in the exclusion zone. No contamination was spread to uncontrolled areas.

Rubberized work boots were provided to site workers as corrective action for this incident. These work boots were maintained on-site and mandated for use in any work zone in which radioactive contamination had been detected. Subsequent to this corrective action, no radioactive contamination of boots or coveralls was detected during exit monitoring.

6.0 WASTE MANAGEMENT

6.1 Waste Management Overview

The on-site waste manager maintained bound logbooks documenting the generation, collection, placement, and removal of site wastes in accordance with the approved WMP. The WMP identified roles and responsibilities of site personnel, waste minimization procedures, decontamination procedures, waste materials anticipated to be generated, and proper waste handling procedures.

Three temporary drum staging areas were constructed at the site. Each pad was constructed of 4 inches of asphalt bermed on all sides. The storage pads were surrounded by temporary fencing. One storage area was posted as both an RCA and RMMA for potentially radiologically-contaminated waste.

Solid waste generated included drill cuttings, plastic sheeting; PPE; sampling materials such as plastic scoops, paper towels, plastic ziploc bags, and aluminum foil; and empty bags of cement, bentonite, and sand. Liquid waste generated included steam-cleaning rinsate, potable water/Alconox* mix, deionized water containing trace amounts of methanol, and rain water collected from the decontamination pad. All materials were screened in the field for radioactive and organic contamination either by direct measurement or by screening of the core, augers, or split spoons.

A total of 248 drums of solid waste and 114 drums of liquid waste were generated during the subsurface sampling field operations.

6.2 Segregation

Materials were segregated according to waste type and potential for contamination (based on field screening data), borehole or drilling array, and date. Segregated wastes were placed in clear plastic bags and labeled prior to placing the bags in 55-gallon drums, which were also labeled. Waste generated from contaminated boreholes was drummed separately from waste generated from non-contaminated boreholes.

Printed labels were affixed to the drums in clear, plastic ziploc bags, in accordance with the approved WMP. Label information included the site identification, i.e., OU and TA, borehole identification number and depth interval, generation date, and waste type. Each drum was assigned a unique identification number which was written on each drum with a paint pen as well as printed on the label.

6.3 Disposal

Analytical results of soil samples will be used to characterize the waste and to assist in assessing the appropriate disposal option. Non-contaminated waste will be segregated from contaminated waste if analytical results indicate the presence of radioactivity or RCRA hazardous waste constituents. Drill cuttings shown to be non-contaminated based on analytical results, and not previously returned to respective boreholes, will be spread on the surface of the site.

Waste Profile Forms will be completed upon receipt of analytical results. Chemical Waste Disposal Request Forms and Radioactive Solid Waste Disposal Record Forms will be completed after receipt of approved Waste Profile Forms. Prior to waste shipment, Hazardous Material Transportation Forms will be approved by BUS-6. All waste will be transported with appropriate placarding, labeling, packaging, and shipping papers as required by DOT.

7.0 DATA ASSESSMENT AND ANALYSIS

Analytical results from samples submitted to off-site laboratories are not yet available. Therefore, only field screening, MRAL, and MCAL data are presented here. MRAL and MCAL data will be inputted into FIMAD by CST-3

Volatile organics were detected with a PID in concentrations greater than 2.0 ppm in 15 boreholes. However, the organics detected in the core from 11 of those boreholes appeared to be a result of ponderosa pine roots that were present in the core. Elevated VOC concentrations that appeared to be the result of moisture in the core and in the air were detected in core from two boreholes. Moisture can fog a PID lamp and cause anomalous measurements. No soil staining or odor was observed in any core in which elevated VOCs were detected. Soil samples were collected for laboratory analyses of VOCs by EPA Method 8240 from those intervals in which VOCs were detected in elevated concentrations.

MCAL analyses of TAL metals and SVOCs indicated that neither metals nor SVOCs were detected above SALs in any of the 93 boreholes. Metals results are shown in Table 7-1 while SVOC results are summarized in Table 7-2. MRAL and radioactive field screening data indicated that no radioactivity was detected above background levels in boreholes targeting SWMU 10-005, former disposal pit TA-10-44, former septic tank TA-10-40, or Drilling Arrays #4, 5, 6, and 7. However, field screening and MRAL results did indicate the presence of radioactivity above background levels in boreholes in Drilling Arrays 1, 2, and 3, and the second array targeting TA-10-48. Table 7-3 summarizes all of the MRAL results. Table 7-4 shows those boreholes from which samples were collected exhibiting above background levels of radioactivity and the associated MRAL results. Tables 7-1 through 7-4 are included in Appendix D.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Preliminary conclusions are based on MCAL and MRAL analytical results. These results indicate the presence of beta contamination in boreholes in Drilling Arrays #1, 2, 3, and the second array targeting TA-10-48. The contamination was detected in soil samples collected from depths ranging from a minimum of 5 feet bgs in Borehole #10-1210A (new FIMAD identification number in #10-2210) to a maximum depth of 32 feet bgs in Borehole #10-1215. Both boreholes were located in Drilling Array #2. On an average, contamination was detected in the various boreholes in depths ranging from approximately 14 feet bgs to 22 feet bgs.

Based on data collected and evaluated, ERM/Golder recommends that the results of the investigation be used to evaluate whether the contamination present at the site represents a risk. Laboratory results (not discussed in this report) of soil samples collected during the investigation can be used in a risk assessment to assess the need for a Phase II investigation, for initiation of a long-term monitoring program, or for remediation of the locations of former waste pits TA-10-41, -42, and -43, and -48 in the central area of former TA-10.

9.0 REFERENCES

Department of Energy, March 1993. "TA-10 Revised Sampling Plan," Los Alamos, New Mexico. (DOE, 1993).

Drake, P. and C. Inoué, September 1993. "Geomorphic Characterization of Operable Unit 1079 (OU 1079), Formerly Technical Area 10, Los Alamos National Laboratory, Los Alamos, New Mexico." Glorieta Geoscience, Inc., Santa Fe, New Mexico.

Los Alamos National Laboratory, November 1991. "Installation Workplan for Environmental Restoration," Revision 1, Los Alamos National Laboratory Report LA-UR-91-3310, Los Alamos, New Mexico. (LANL, 1991, 0553).

Los Alamos National Laboratory, May 1992. "RFI Workplan for Operable Unit 1079," Los Alamos National Laboratory Report LA-UR-92-850, Los Alamos, New Mexico. (LANL 1992, 0783).

10.0 EXHIBITS

The following exhibits are not included with this report but have been submitted to the LANL Records Processing Facility.

FTL Field Logbooks
Field Photographs and Video Tape
Daily Drilling Summaries
Borehole Sample Matrices
Sample Chain of Custody Documentation
Sample Collection Logs
Sample Master Collection Logs
Site-Specific Health and Safety Plan
Waste Management Plan
Site-Specific Spill Prevention and Control Plan
Radiological, VOC, and Dust Monitoring Documentation
Daily Activity Reports
Tailgate Health and Safety Meeting Forms
Health Physics Equipment Release Form

APPENDIX A

CORE SAMPLE LOGS

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30.0 Page 1 of 3

Driller [illegible] Box #(s) 1-3 Start Date/Time 28 Sep 94 [illegible] End Date/Time 28 Sep 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12.5					No Recovery [illegible] Bit [illegible]			
12.5	Run 1 2.5/2.5	NONE	Bkgnd 100cpm βγ		12.5-14.0: Very unconsolidated dry coarse grained SAND 14.0-15.0: Dry moist, consolidated moderate to cohesive, moderate brown 5YR 3/4 SILT.		ALLUVIAL	28 Sep 94, Began drilling at 1000 hours. Sky clear, winds 5 mph WSW [illegible]
15	Run 2 2.5/2.5	AAB9323 Full suite [illegible]	0 cpm 100 cpm βγ	Box 1 12.5-19.0	Very fine, homogeneous SILT. Grayish orange 10YR 7/4 with large 5cm gray pumice fragment at 17.5 feet. Fragment has 3mm biotite phenocryst			
17.5	Run 3 2.5/2.5	NONE	0 cpm 150 cpm βγ		Coarsening downwards becoming a SANDY SILT with med grained angular quartz crystals. SILT is very fine with very few pumice fragments			
20	Run 4 2.5/2.5	AAB9324 Rad [illegible]	0 cpm 100 cpm βγ	Box 2 19.0-25.0	SAA with large 2cm-3cm pink TUFF fragments			
22.5	Run 5 2.5/2.5	None	0 cpm 100 cpm βγ		22.5-24.0: Very coarse grained angular SAND with quartz and feldspar pebbles present 24.0-25.0: Moist, consolidated CLAY, very fine grained. Contains [illegible] vesicular pumice fragments			
25	Run 6 2.5/2.5	AAB9325 Full suite [illegible]	0 cpm 100 cpm βγ	Box 3 25.0-30.0	~~29.0 [illegible]~~ - 30.0 as depth. Very fine grained unconsolidated, SILT. Moist homogeneous with 10% SAND present.			
27.5	Run 7 2.5/2.5	None	0 cpm 100 cpm βγ		Very fine grained homogeneous ASH. Contains a [illegible] texture with few to no lithics or pumice fragments		ASH	

Prepared by [signature] Date 29 Sep 94 Checked By [signature] Date 12 Oct 94

- Samples:
- Full - Gross alpha, beta, gamma spec, moisture, total uranium, strontium, TAL metals, semi-volatiles, volatiles, and high explosives
- Rad - Gross alpha, beta, gamma spec, moisture, semi-volatiles [illegible] metals

SILT · SAND · CLAY · ASH · TUFF · Rhyolite, Dacite, and Pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50' Page [illegible] of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 29 Apr 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	Run 8 2.5/2.5	[illegible] RAD [illegible]	0 cpm [illegible]		SAA.		ALLUVIUM	
	Run 9 2.5/2.5	NONE	0 cpm [illegible]		34.5-34.7 SAA 34.7-35.0 - [illegible]			Drilling ended at 1140 hours for the day
	Run 10 2.5/2.5	[illegible]	0 cpm [illegible]		Moderately consolidated nonwelded TUFF [illegible]		OTOWI MEMBER of the BANDELIER TUFF	29 Apr 94 Began drilling at 0730 hours [illegible]
	Run 11 2.5/2.5	NONE	0 cpm [illegible]		SAA, [illegible]			
	Run 12 2.5/2.5	[illegible] RAD [illegible]	0 cpm [illegible]		SAA			
	Run 13 2.5/2.5	NONE	0 cpm [illegible]		SAA			
	Run 14 2.5/2.5	[illegible] RAD [illegible]	0 cpm [illegible]		SAA			Drilling ended at 0920 hours at total depth of 50 feet
	Run 15 2.5/2.5	[illegible]	0 cpm [illegible]		SAA			

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 Oct 94

ASH

Rhyolite, Dacite, and Pumice Fragments

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible] / 1045

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–10					No Recovery		[illegible]	[illegible]
10	Run 1 2.5/2.5	AAB[illegible]	0 CPM [illegible]	[illegible]	Medium to coarse brown unconsolidated [illegible] SILTY SAND [illegible]			[illegible] 1420 Begin drilling [illegible]
	Run 2 2.5/2.5	[illegible]	0 CPM [illegible]	[illegible]	Silt [illegible] fragment at 13.5 ft			[illegible] 1455
15	Run 3 2.5/2.5	[illegible]	0 CPM [illegible]	[illegible]	Silt [illegible] fragments [illegible]			[illegible]
	Run 4 2.5/2.5	[illegible]	0 CPM [illegible]	[illegible]	Medium [illegible] (5YR 3/4) Sandy SILT [illegible] fragments			2 Nov 94 - 0755 - Begin drilling [illegible]
20	Run 5 2.5/2.5	[illegible]	0 CPM [illegible]	[illegible]	[illegible] SAND [illegible] silt [illegible]			[illegible] Begin drilling [illegible]
	Run 6 2.5/2.5	[illegible]	0 CPM [illegible]	[illegible]	[illegible] SAND, some silt			[illegible] - R. [illegible] logging, [illegible]
25	Run 7 2.5/2.5	[illegible]	0 CPM [illegible]	[illegible]	Medium brown fine grained SILTY SAND, some tuff fragments [illegible]			
30	Run 8 2.5/2.5	None	0 CPM [illegible]	[illegible]	Grayish orange (10YR 7/4) SILT, [illegible] tuff [illegible] fragments			

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

[illegible]

[illegible]

Silt

Sand

Clay

Ash

Tuff / [illegible] fragments [illegible]

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]		[illegible]			
35	[illegible]	None	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]		[illegible]			
40	[illegible]	None	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]		[illegible]			
45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			Drilling stopped at 1245 4 Nov 94
50					Boring TD at 50 ft			

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-3 Start Date/Time 29 Aug 94 1302 End Date/Time 29 Aug 94 1435

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12.5					No Recovery			
12.5–15	Run 1 2.5/2.5	NONE	Ø cpm 100 cpm βγ	Box 1 12.5–[illegible]	12.5–14.0 - unconsolidated, coarse grained, moderate brown 5YR 4/4 SAND. 14.0–15.0 unconsolidated, cohesive, very light grey TUFF. Large pumice fragments [illegible]		ALLUVIUM	29 Aug 94 drilling began 1302 hours. [illegible]
15–17.5	Run 2 2.5/2.5	AAE9237 Full 15.5-16.5	Ø cpm 100 cpm βγ		Moderately consolidated TUFF composed of 40% pumice fragments. Fragments [illegible] and have 1-3 magnetite phenocrysts.			
17.5–20	Run 3 2.0/2.5	NONE	Ø cpm 100 cpm βγ	Box 2 17.5–23.5	Fine to medium grained unconsolidated, noncohesive SANDY SILT. Moderate yellowish brown 10YR 5/4.			
20–22.5	Run 4 2.5/2.5	AAE9236 Rad 21.5-22.5	Ø cpm 100 cpm βγ		20.0–21.0 - fine - coarse grained unconsolidated angular SAND. 21.0–22.5 - Moist, moderately consolidated, SANDY SILT. Sand comprises approximately 30% of total			
22.5–25	Run 5 1.5/2.5	NONE	Ø cpm 100 cpm βγ		Fining downwards to form a moist consolidated CLAY by 23.5 feet. Very fine grained with few 5mm pumice fragments present.			
25–27.5	Run 6 1.9/2.5	AAE9251 Full 25.5-26.5	Ø cpm 100 cpm βγ	Box 3 23.5–30.0'	DAA			
27.5–30	Run 7 2.5/2.5	NONE	Ø cpm 100 cpm βγ		Very fine grained, soft, homogeneous ASH. No pumice or lithics present			Tools out at 1435 hours

Prepared by [signature] Date 30 Aug 94 Checked By [signature] Date 17 Oct 94

Samples

- Full - Gross alpha, beta, gamma spec, moisture, total uranium, strontium, TAL metals, semi-volatiles, volatiles.
- Rad - Gross alpha, beta, gamma spec, moisture, semi-volatiles, XRF metals

Legend: SILT, SAND, CLAY, ASH, Rhyolite or Pumice frags, TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 4-6 Start Date/Time 29 Apr 94 1530 End Date/Time 29 Apr 94 1625

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–32.5	Run 8 2.0/2.5	AAB4210 AAB4211 AAB4212 [illegible]	0 ppm background	Box 4 30.0–35.0	DAA		OTOWI MEMBER of BANDALIER TUFF	Returned and started drilling at 1530 hours.
32.5–35	Run 9 2.5/2.5	NONE	0 ppm background		32.5-34.0 Becomes med-grained compact SANDY ASH. 34.0-35.0 Unconsolidated, becomes TUFF [illegible]			
35–37.5	Run 10 2.5/2.5	AAB4293 [illegible]	0 ppm background	Box 5 35.0–42.5	Unconsolidated [illegible] TUFF in a fine-grained ASH matrix. [illegible] moderately abundant. 35.0 [illegible]			
37.5–40	Run 11 2.5/2.5	NONE	0 ppm background		DAA [illegible] 10-30mm.			
40–42.5	Run 12 2.5/2.5	AAB4294 Rad [illegible]	0 ppm background		DAA			
42.5–45	Run 13 2.5/2.5	NONE	0 ppm background	Box 6 42.5–50.0	DAA			
45–47.5	Run 14 2.5/2.5	AAB4295 Rad [illegible]	0 ppm background		DAA			
47.5–50	Run 15 2.5/2.5	AAB4296 Gas 413495	0 ppm background		DAA			Drilling ended at 1625 at a total depth 50 feet

Prepared by [illegible] Date 30 Apr 94 Checked By [illegible] Date 12 Oct 94

ASH
SAND
Rhyolite, Andesite, or Pumice fragments
TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1303 TA/OU 10-1079 Drill Depth From 0' To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-2 Start Date/Time 13 Oct 94 0730 End Date/Time 14 Oct 94 0730

Drilling Equip./Method [illegible] Stem Auger Sampling Equip./Method [illegible] Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0–12.5					Center Bit Used No Recovery Center Bit used to drill through, cement, rebar, rubble and other obstructions			
12.5	Run 1 2.4/2.5	AAB1385 Full 13.6-14.8	7 ucm 10 cpm/ dt		Unconsolidated noncohesive, moist, with abundant [illegible] SAND. Grains angular and fine-medium grained. 20% SILT present		ALLUVIUM	17 Oct 94. Crew entered zone at 0740 hours. Days clear, winds calm, temp 45°
15	Run 2 1.4/2.5	NONE	2.00 cm 50 cpm/ dt	Box 1 16.5' 12.5'	Fining downwards to form a fine grained noncohesive SILT. Run contains approx. 10% sand. Moist and Moderate Yellowish Brown 10YR 5/4			
17.5	Run 3 1.7/2.5	AAB1384 RAD 15.5-17.0	7.0 cm 50 cpm/ dt		Very fine grained moderately consolidated SILT with abundant white [illegible] altered pumice and gray [illegible] fragments present			
20	Run 4 1.2/2.5	AAB1385 Volatile [illegible] 20.5-20.8	4.0 cm 50 cpm/ dt		ditto, with a darker Moderate Brown 5YR 3/4 color, and contains 10% SAND.			
22.5	Run 5 3.0/2.5	AAB1387 RAD 23.5-23.3	1.0 cm 50 cpm/ dt	Box 2 27.5' 22.5'	22.5-23.5 - Unconsolidated, fine to med grained SAND. 23.5-24.5 - Moderately cohesive, unconsolidated [illegible] with 5-20mm white pumice fragments.			
25	Run 6 1.0/2.5	NONE	0.0 cm 60 cpm/ dt		Fine grained, moist, unconsolidated CLAY, moderately cohesive with few small pumice fragments			
27.5–30	Run 7 1.2/2.5	AAB1389 Full 27.5-28.3	0 cm 60 cpm/ dt	Box 2 30' 27.5'	Consolidated, moist, noncohesive ASHEY SILT. Lightening back to Dark Yellowish Orange 10YR 6/6. Few [illegible] on pumice fragments?			0950 Took a break.

Prepared by [signature] Date 14 Oct 94 Checked By [signature] Date 11/1/94

Samples

- Full - Gross alpha, beta, gamma spec, moisture, total uranium, Strontium-90, semi-volatiles, volatiles, and XRF metals
- Rad - Gross alpha, beta, gamma spec, moisture, semi-volatiles, TAL metals

SILT
SAND
CLAY
Rhyolitic Andesite or Pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50' Page 2 of 2

Driller [illegible] Box #(s) 3 - 5 Start Date/Time [illegible] End Date/Time 14Oct94 0930

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	Run 8 1.2 / 2.5	NONE	3.00uR 90cpm αβ	Box 3 30'-35.0'	Dry fine, moderately consolidated, moist, homogeneous ASH. Contains fewer [illegible] and has light [illegible] texture		[illegible]	Recovered [illegible] at 1030 hours winds have increased to 20mph gusts and 5 mph sustained JD
32.5	Run 9 2.5 / 2.5	AAB7391 Radiological [illegible]	4.00uR 90cpm αβ		32.5-34.0 - SAA; 34.0-35.0 - Moderately consolidated, unwelded TUFF composed of 80% pumice [illegible]			
35	Run 10 2.5 / 2.5	NONE	Ø uR 80cpm αβ	Box 4 [illegible]	SAA, with less oxidation staining present		[illegible]	1110 hours winds too strong to continue, crew on standby
37.5	Run 11 2.5 / 2.5	AAB4375 Fine AAB4393 Dup 37.5-39.5	Ø uR 100cpm αβ		SAA unconsolidated and no oxidation staining			0800, 14Oct94 Began drilling. Skys cloudy winds 2-5mph WSW 52°
40	Run 12 2.5 / 2.5	NONE	Ø uR 100cpm αβ		SAA			
42.5	Run 13 2.5 / 2.5	AAB5393 RAD [illegible]	Ø uR 80cpm αβ		SAA			
45	Run 14 5.0 / 5.0	AAB3397 Full 45.0-50.0	Ø uR 90cpm αβ	Box 5 45.0'-50.0'	SAA			Drilling ended at 0930 hours at a total depth 50 feet JD
50								

Prepared by [illegible] Date 14Oct94 Checked By [illegible] Date [illegible]

Ash

Rhyolite, Andesite or Pumice fragments

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
					No Recovery [illegible]			
15	Run 1 2.5/2.5	AAB5347 Fail the 15.2 14.7	20cpm [illegible]		15.0 - 16.5 Very consolidated, cohesive, moist Moderate Brown 5YR 3/4 CLAY with 10% SILT. 16.5 - 17.5 Grayish Orange 10YR 7/4 very cohesive TUFF with small pumice fragments		↑	0810 Oct 5, 94. Drilling began with skies partly cloudy and calm winds.
	Run 2 2.5/2.5	AAB9341 RAD 17.5-19.0	0cpm [illegible]		17.5 - 19.0 Consolidated TUFF with 1-3mm pumice phenocrysts. 19.0 - 20.0 Unconsolidated, noncohesive Moderate Brown 5YR 3/4 SILT with 10% SAND			Due to high radiation levels, drilling ended and then re-began at 0745 hours.
20	Run 3 2.5/2.5	AAB9342 RAD 20.0-21.4	0cpm 1800cpm [illegible]		Coarsening downwards becoming a SANDY SILT by 21 feet. Sand grains coarse and angular [illegible] in size. Color lightening to a Dark Yellowish Orange 10YR 6/6. Pumice and tuff fragments [illegible]			
	Run 4 2.1/2.5	NONE	0cpm 225-240 [illegible]		Very coarse angular, unconsolidated SAND with 15% silt and clay. 24.0 - 25.0 Very consolidated, cohesive, moist CLAY with numerous 5-20mm vesicular pumice		W...	
25	Run 5 1.5/2.5	AAB9343 Fail the 25.9 [illegible]	0cpm [illegible]	20.0	Unconsolidated to moderately consolidated SAND/ASH with pumice nodules present. 26.8 Consolidated, cohesive ASHEY CLAY very moist with [illegible] pumice fragments		↓	Drilling ended at 1140 hours for lunch, winds [illegible]
27.5	Run 6 1.4/2.5	NONE	0cpm 500cpm [illegible]		Moist consolidated, noncohesive Moderate Brown 5YR 3/4 ASHEY SILT. Ash adds a light [illegible] texture		↑	Drilling began 6 Oct 94 at 1000 hours. Skies clear, winds moderately gusty DD

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 Oct 94

Key:

Gross alpha, beta, gamma [illegible]

Field Screening:

Gross alpha, beta, gamma [illegible]

SILT

SAND

CLAY

Rhyolite, Pumice or Dacite fragments

ASH

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 1 1.3/2.5	AAA[illegible] RAD [illegible]	0 cpm [illegible]	[illegible]	Moist unconsolidated nonCemented ASH. [illegible] Orange 10 YR 7/4			
32.5	Run 2 1.3/2.5	NONE	0 cpm [illegible]		SAA			
35	Run 3 2.0/2.5	AA0[illegible] [illegible] 35[illegible]	0 cpm [illegible]		SAA [illegible] pumice [illegible] fragments			
37.5	Run [illegible] 1.7/2.5	NONE	0 cpm [illegible]	[illegible]	[illegible] ASH, [illegible] pumice [illegible]			
40	Run [illegible] 2.0/2.5	[illegible] RAD 40[illegible]	0 cpm [illegible]		40.0 - 42.5 [illegible] moist unconsolidated ASH with some [illegible] pumice fragments 42.5 - 4[illegible] SAA			
42.5	Run [illegible] 0.0/2.5	NONE			No Recovery			
45	Run [illegible] [illegible]/2.5	NONE	0 cpm [illegible]	[illegible]	SAA, 30% pumice fragments [illegible] pumice [illegible]			
47.5	Run [illegible] 2.0/2.5	AA0[illegible] [illegible] 4[illegible]	0 cpm [illegible]		SAA			Drilling [illegible] 1210 [illegible] depth 50 [illegible]
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 Oct 94

ASH

[illegible] pumice frags

Tuff

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) 3 Start Date/Time [illegible] End Date/Time 11 Nov 94 1015

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
					Center Bit Used No Recovery Center Bit Used No Recovery			
0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] SILTY SAND, [illegible]	[illegible]	ALLUVIUM	[illegible]
	2.5	[illegible]	[illegible]		[illegible] SAND [illegible]			[illegible]
	2.5	[illegible]	[illegible]		[illegible] AAA [illegible] SILTY SAND [illegible]			
	2.5	[illegible]	[illegible]		Moist, [illegible] SILTY SAND. [illegible]			
	2.5	AAB[illegible]	[illegible]	[illegible]	[illegible] SAND [illegible]			
	2.5	None	[illegible]		22.5-24.0 [illegible] SAND with [illegible] moist, consolidated, [illegible] SILTY CLAY [illegible]			[illegible] at 1130 hours [illegible]
	2.5	AAB[illegible] Rad	[illegible]		[illegible] moist, [illegible] SILTY ASH. Contains [illegible] and tuff fragments [illegible] present at 27.5 feet			[illegible] 1230 hours [illegible] 11 Nov [illegible] 0835 hours [illegible] 1030 hours [illegible]
	2.5	NONE	[illegible]	[illegible]	27.5-28.5 AAA 28.5-30.0 - [illegible] SAND [illegible] ash. 2.5 cm [illegible] and tuff fragments present [illegible]			

Prepared by [illegible] Date 11 Nov 94 Checked By [illegible] Date 11/10/94

- Samples -

Full - Gross alpha, beta, gamma spec, moisture, total uranium, strontium, TAL metals, semi-volatiles, volatiles

Rad - Gross alpha, beta, gamma spec, moisture, semi-volatiles, XRF metals

SILT

SAND

CLAY

ASH

Rhyolite, Andesite or pumice fragments

Tuff

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page [illegible] of 2

Driller [illegible] Box #(s) 4-6 Start Date/Time 10 Nov 94 0540 End Date/Time 11 Nov 94 1045

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
30	Run 9 2.5/2.5	AAB9340 Rad 30.5-32.2	ØDIM 100cpm/ ab	[illegible]	Fining to [illegible] moderately consolidated ASH. Light brown 5YR 5/6 and somewhat homogenous by 32.0 feet. Rhyolite and andesite fragments abundant at top of run.		ASH + ALLUVIUM	
32.5	Run 10 2.5/2.5	NONE	ØDIM 100cpm/ BL	32.5-40.0	unconsolidated, noncalcareous, medium - coarse grained SAND. Few 25mm - 200mm rhyolite fragments present			
35	Run 11 2.5/2.5	AAB9342 Rad 36.1-36.5	ØDIM 50cpm/ BL		35.0-36.5 - DAA 36.5-37.5 - Banded orange very fine-grained ASH. Homogeneous with no apparent [illegible] fragments			
37.5	Run 12 2.5/2.5	AAB9345 Full [illegible] Dup	ØDIM 100cpm/ BG		37.5-39.0 Fine to medium-grained [illegible] ASHEY SAND 39.0-40.0 very [illegible], consolidated, moist CLAY with abundant white vesicular pumice [illegible].			
40	Run 13 2.5/2.5	NONE	ØDIM 100cpm/ BG	40.0-45.0	Very consolidated, [illegible] Tuff with moist Clay matrix. Pumice fragments altered 30%, vesicular, and [illegible]		OTOWI MEMBER of BANDELIER TUFF	
42.5	Run 14 2.5/2.5	AAB9335 Rad 43.2-44.1	ØDIM 80cpm/ BL		DAA			
45	Run 15 2.5/2.5	NONE	ØDIM 80cpm/ BL	45.0-50.0	DAA			
47.5	Run 16 2.5/2.5	AAB9399 Full 49.3-50.0	ØDIM 80cpm/ BL		DAA Total Depth			11 Nov 94 Drilling ended at 1045 hours at total depth 50 feet
50								

Prepared by [illegible] Date 11 Nov 94 Checked By [illegible] Date 11/16/94

Legend: SAND; Clay; ASH; Rhyolite Andesite or Pumice fragments; Tuff.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12.5					Center Bit Used No Recovery			
12.5	Run 1 2.5/2.5	NONE	0 cpm screen		12.5-14.5 - [illegible] SAND [illegible] 14.5-15.0 [illegible]		ALLUVIUM	3 Oct 94 Drilling began 1130 hours. [illegible] winds 5-20 mph
15	Run 2 2.5/2.5	[illegible]	0 cpm screen Bt	Box 1	DAA [illegible]			
17.5	Run 3 2.5/2.5	NONE	0 cpm screen Bt		17.5-19.2 - [illegible] SAND [illegible] ASH [illegible]			
20	Run 4 2.5/2.5	[illegible]	0 cpm screen Bt	Box 2	Coarsening downwards to form [illegible] SILTY SAND.			
22.5	Run 5 2.5/2.5	NONE	0 cpm screen Bt		22.5-24.3 - Very unconsolidated med-coarse grained angular SAND 24.3-25.0 - Very fine, consolidated, cohesive CLAY with small [illegible]			Terminated at 1600 hours.
25	Run 6 2.5/2.5	[illegible]	0 cpm screen Bt	Box 3	Very fine grained, moderately consolidated moist ASH with white [illegible] pumice fragments present between 25.0 - 25.5 feet		Tsh	4 Oct 94 Began drilling at 0700 hours. [illegible] mostly cloudy, winds from [illegible]
27.5	Run 7 2.5/2.5	NONE	0 cpm screen Bt		DAA			
30								

Prepared by [illegible] Date 4 Oct 94 Checked By [illegible] Date 12 Oct 94

- Full Suite -
[illegible] gross gamma, spec, moisture, [illegible] semi-volatiles, volatiles, [illegible] and TAL metals

- Random -
Gross alpha, beta, gamma, spec, moisture, semi-volatiles, TAL metals

SILT
SAND
CLAY
SILT
Rhyolite, Dacite, Andesite or Pumice fragments
[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 4-6 Start Date/Time [illegible] End Date/Time 4Oct94 0955

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 8 2.5 / 2.5	AA15205 RAD 30-32.5	ØDUM 50CPM BZ		SAA		ME [illegible]	
32.5	Run 9 2.5 / 2.5	NONE	ØDUM 50CPM BZ	Box 4 [illegible] 30.0-37.5	32.5-33.0 - SAA 33.0-35.0 [illegible] Ash [illegible] to [illegible] pumice rich tuff [illegible]			
35	Run 10 2.5 / 2.5	AAB9100 AAB9[illegible] [illegible] 35-37.5	ØDUM 50CPM BZ		Noncohesive unconsolidated, pumice rich tuff. Composed of 20% [illegible] altered, [illegible] pumice fragments. [illegible] Ash and pumice [illegible]			
37.5	Run 11 2.5 / 2.5	NONE	ØDUM 50CPM BZ		SAA [illegible]		SAME	
40	Run 12 2.5 / 2.5	AAY[illegible] RAD 41-41.5	ØDUM 50CPM BZ	Box 5 [illegible] 37.5-45	SAA		MEMBER	
42.5	Run 13 2.5 / 2.5	[illegible]	ØDUM 50CPM BZ		SAA			
45	Run 14 5.0 / 5.0	AA37204 RAD 45.5-46.4 AAB[illegible] [illegible] 46-45.3	ØDUM 50CPM BZ	Box 6 45-50	SAA			Drilling ended 0955 hours at a total depth 50 feet.
47.5								
50								

Prepared by [illegible] Date 4Oct94 Checked By [illegible] Date 12Oct94

Ash

Tuff

Andesite Rhyolite on pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-3 Start Date/Time 31 Oct 94 1400 End Date/Time 1545 Nov 1 94

Drilling Equip./Method Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–10'					No Recovery Cuttings Discarded			
10'–12.5'	Run 1 2.0/2.5	AA89327 Full Suite 10.5-11.5	0 CPM 80 cpm BG	10.0-17.5 Box 1	Moist fine to medium grained, moderately organic SILTY SAND. Quartz grains angular and [illegible] unconsol., dated and nonreactive		ALLUVIUM	31 Oct 94 Began drilling 1400 hours. Skys clear winds gusty 5-15 mph NW.
12.5'–15'	Run 2 2.5/2.5	NONE	0 CPM 80 cpm BG		SAA Pale Yellowish Brown 10YR 6/4 with 5-33mm [illegible] altered pumice fragments present			
15'–17.5'	Run 3 2.5/2.5	AA89328 Rad Suite 16.2-16.7	0 CPM 80 cpm BG		15.0-16.5 SAA 16.5-17.5 Moderately consolidated, mildly cohesive fine grained SILT with 15% fine sand grains			
17.5'–20'	Run 4 2.5/2.5	NONE	0 CPM 80 CPM BG	17.5-25.0 Box 2	Very fine grained Sandy SILT coarsening downwards to become very fine grained SILTY SAND.			
20'–22.5'	Run 5 2.5/2.5	AA89329 Rad Suite 21.0-21.4	0 CPM 80 cpm BG		Fine to medium grained, unconsolidated, angular SAND with 15% fine Silt present			
22.5'–25'	Run 6 2.5/2.5	NONE	0 CPM 80 cpm BG		SAA, with Clay becoming moderately abundant by 23.5 feet. Color darkening to [illegible] brown 5YR [illegible]. Rhyolite and pumice [illegible]			
25'–27.5'	Run 7 2.0/2.5	AA89330 Full Suite 25.5-26	0 CPM 80 cpm BG	25.0-30.0 Box 3	SAA with clay fraction decreasing to fine grained Silt			
27.5'–30'	Run 8 2.5/2.5	NONE	0 CPM 80 cpm BG		Moderately consolidated, cohesive homogeneous ASH. No apparent lithics or fragments. Color is light Brown 5YR 6/4			Drilling ended for the day at 1555 hours.

Prepared by [illegible] Date 01 Nov 94 Checked By [illegible] Date 11/4/94

- Full Suite -
Gross Alpha, beta, gamma Spec, moisture, total uranium, strontium-90, TAL metals, semi-volatiles, volatiles

- Rad Suite -
Gross alpha, beta, gamma Spec, [illegible] TAL metals

SILT
SAND
CLAY
ASH
Rhyolite, Andesite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50' Page 2 of 2

Driller [illegible] Box #(s) 4-6 Start Date/Time 31 Oct 94 1400 End Date/Time 1 Nov 94 0915

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 9 2.0/2.5	AAB5310 AAB5307 AAB7312 [illegible]	0 ppm 50 cpm BD	30.5 - 37.5 [illegible]	DAA			1 Nov 94. Began drilling 0700 hours. Sky clear, winds calm
32.5	Run 10 2.5/2.5	NONE	0 ppm 50 cpm BD		32.5 - 34.5 DAA. 34.5 - 35.0 Compacted [illegible] sand/ash [illegible]			
35.0	Run [illegible] 2.5/2.5	AAB5311 [illegible]	0 ppm 120 cpm BD		35.0 - 36.5 DAA. 36.5 - 37.5 [illegible] Pale Orange [illegible] [illegible]			
37.5	Run 12 2.5/2.5	NONE	0 ppm [illegible] BD	37.5 - 44.5 [illegible]	DAA, with banded iron oxide staining throughout [illegible]. Dark [illegible] [illegible]			
40	Run 13 2.5/2.5	AAB5311 RAD [illegible]	7 ppm 100 cpm BD		DAA			
42.5	Run 14 2.5/2.5	NONE	0 ppm 100 cpm BD		DAA with no iron oxide staining			
45	Run 15 2.5/2.5	[illegible] RAD 450-464	0 ppm 70 cpm BD	44.5 - 50.0 [illegible]	DAA			
47.5	Run 16 2.5/2.5	AAB5336 Full [illegible]	0 ppm 100 cpm BD		DAA			Drilling ended at 0915 hours at a total depth of 50 feet.
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

ASH

Angular Andesite or Pumice fragments

TUFF

SAND

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 30' Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
					No Recovery			
22.5	[illegible] 2.5/2.5	NONE	0 cpm screen [illegible]	[illegible]	[illegible] SILTY SAND [illegible] SILT [illegible] 10% [illegible] fragments present			11 Oct 94 Begin drilling at [illegible]
20	[illegible] 2.5/2.5	[illegible]	0 cpm screen [illegible]	[illegible]	Continuing to fine [illegible] SILT [illegible] SAND [illegible] fragments [illegible] moist and [illegible]			
	[illegible] 2.5/2.5	NONE	0 cpm screen [illegible]		[illegible] SILT [illegible]			
	[illegible] 2.5/2.5	146954 [illegible]	0 cpm screen [illegible]	[illegible]	Fine to medium grained [illegible] SAND [illegible] SILT [illegible] ASH [illegible]			
22.5	[illegible] 2.5/2.5	NONE	0 cpm screen [illegible]	[illegible]	Coarsens slightly to fine [illegible] coarse grained SAND			
25	[illegible] 2.5/2.5	440/33R [illegible]	0 cpm screen [illegible]	[illegible]	ASH [illegible] SILT [illegible]			
27.5	[illegible] 2.5/2.5	NONE	0 cpm screen [illegible]	[illegible]	[illegible] by very fine grained ASH [illegible] forming a CLAYEY ASH			Took a break at 1025 hours
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 Oct 94

Samples

Field - [illegible] alpha beta gamma [illegible] TAL metals [illegible]

Rad - [illegible] alpha beta gamma [illegible]

SILT
SAND
CLAY
ASH
Rhyolite or Pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page [illegible] of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] ASH [illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	20 cm [illegible]		SAA [illegible]			
[illegible]	[illegible]	[illegible]	20 cm [illegible]	[illegible]	[illegible] ASHED SAND [illegible]			
[illegible]	[illegible]	[illegible]	20 cm [illegible]		[illegible] SAND [illegible]			
[illegible]	[illegible]	[illegible]	20 cm [illegible]	[illegible]	[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	20 cm [illegible]		SAA [illegible]			
45	[illegible]	[illegible]	20 cm [illegible]	[illegible]	SAA		[illegible]	Drilling ended at 1240 hours at a depth of 50 feet PD
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 Oct 94

ASH
SAND
Rhyolite Ash [illegible] [illegible] fragments
TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Brothers Box #(s) [illegible] Start Date/Time 11-8-94 1440 End Date/Time 11-9-94 1135

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–15					Cuttings used No Recovery / Cuttings used No Recovery			
15	Run 1 1.5/1.5	None	0 cpm [illegible] BZ		Pale brown (10YR 6/3) [illegible] (10YR 4/4) fine SILTY SAND, [illegible] fine-grained [illegible] subangular [illegible]			08 Nov 94 [illegible] hours begin drilling at 1440 hours
17.5	Run 2 2.5/2.5	[illegible] Full [illegible]	5 cpm [illegible] BZ	10.5' [illegible]	Fine-grained SAND with 10% silt. Trace fine-grained [illegible] tuff fragments [illegible] subangular [illegible]			
20	Run 3 2.5/2.5	None	0 cpm [illegible] BZ		15.0–16.3 – AAA / 16.3–17.5 – Medium yellowish brown (10YR 5/4) [illegible] SILTY SAND with [illegible] tuff fragments			
22.5	Run 4 2.5/2.5	[illegible] Red [illegible]	0 cpm [illegible] BZ		17.5–19.5 – AAA [illegible] tuff fragments [illegible] TUFF / 19.5–[illegible] – Pale brown (5YR 5/2) [illegible] / [illegible] – [illegible] brown (10YR 5/4) [illegible] SILTY SAND		ALLUVIUM	
25	Run 5 2.5/2.5	None	0 cpm [illegible] BZ	[illegible]	20.0–21.5 – AAA [illegible] medium to coarse grained SAND @ 21.5 feet [illegible] tuff fragments / 21.5–22.5 – [illegible] SILTY SAND with 10% tuff fragments [illegible]			
27.5	Run 6 2.5/2.5	[illegible] Full [illegible]	0 cpm [illegible] BZ		22.5–23.7 – AAA, [illegible] slightly / 23.7–25.0 – Pale brown (5YR 5/2) [illegible] SANDY SILT [illegible]			08 Nov 94 Stop drilling for the day at 25 feet
30	Run 7 2.5/2.5	None	0 cpm [illegible] BZ	[illegible]	AAA with [illegible] fine ASH [illegible] [illegible]			9 Nov 94 Begin drilling [illegible] hours. [illegible]
	Run 8 2.5/2.5	[illegible] Full [illegible]	0 cpm [illegible] BZ	[illegible]	27.5–28.5 – [illegible] fine grained [illegible] (10YR 7/4) ASH with 10% [illegible] pumice fragments / 28.5–30.0 – [illegible] fine grained SAND with [illegible] fine grained ASH [illegible]			

Prepared by [illegible] Date 09 Nov 94 Checked By [illegible] Date 11/10/94

Samples –

Full suite – Gross alpha, beta, gamma spec, moisture, total uranium, strontium-90, TAL metals, semi-volatiles and volatiles

Radiation – Gross alpha, beta, gamma spec, moisture, XRF metals and semi-volatiles

SILT

SAND

ASH

[illegible] Pumice fragments

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 35' To [illegible] Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time 11-5-94 [illegible] End Date/Time [illegible] 1150 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
35	Run [illegible] 2/2.5	NONE	[illegible]	[illegible]	[illegible]		Alluvium	
37.5	Run [illegible]	[illegible]	[illegible]	[illegible]	[illegible] SAND [illegible]			
40	Run [illegible]	NONE	[illegible]		[illegible] SAND [illegible]			
42.5	Run [illegible]	[illegible]	[illegible]	[illegible]	[illegible]		Ash	[illegible]
45	Run [illegible]	NONE	[illegible]		SAA, [illegible] SAND [illegible]			[illegible]
47.5	Run [illegible]	[illegible]	[illegible]		SAA [illegible]			
50	Run [illegible]	NONE	[illegible]	[illegible]	[illegible] TUFF [illegible]		[illegible]	
52.5	Run [illegible]	[illegible]	[illegible]	[illegible]	SAA			Drilling [illegible] 1150 [illegible]
55					[illegible]			

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

SAND

Ash

Rhyolite, Andesite or Pumice Fragments

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 1

Driller [illegible] Box #(s) 1 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology Soil	Graphic Log	Lithologic Unit	Notes
0 – 2.5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.5 – 5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 29 July 94

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time [illegible] End Date/Time 25 1[illegible] 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Steel Split [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–2.5	0/[illegible]						ALLUVIUM	[illegible]
2.5–3.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] SAND [illegible]			
3.5–4.5	2/2.5	[illegible]			[illegible]			Ext zone [illegible]
4.5–5.5	2.5/2.5	[illegible]	[illegible] 0 ppm		SAA, [illegible]			
5.5–6.5	0/2.5				[illegible]			
6.5–7.5	2/2.5	[illegible]	[illegible] 0 ppm		SAA [illegible]			
7.5–8.5	[illegible]	[illegible]	[illegible] 0 ppm		SAA [illegible] SILT [illegible] clay [illegible] SAND [illegible]			Ext zone break [illegible] Back in 1050
8.5–9.5	2/2.5		[illegible] 0 ppm					
9.5–10.5	2.5/2.5	[illegible]	[illegible] 0 ppm		SAA to 33 [illegible] SILT [illegible]			Ext zone [illegible]
10.5–11.5	2/2.5		[illegible] 0 ppm		SAA			Ext zone 1335
11.5–12.5	2/2.5	[illegible]	[illegible] 0 ppm		SAA			

Prepared by D. [illegible] Date 20 Jul 94 Checked By [illegible] Date 29 July 94

[illegible] Silt

[illegible] Sand

[illegible] Gravel

[illegible] Non-welded [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
13	2.3/2.5		2 cpm [illegible] 0 ppm	[illegible]	SAA		Alluvium	[illegible]
14	[illegible]/2.5	[illegible]	[illegible] 0 ppm	[illegible]	[illegible] SAA [illegible]			[illegible] 0730
15	2.3/2.5	none	[illegible] 0 ppm	[illegible]	SAA [illegible]			
16	2.5/2.5	[illegible]	[illegible]	[illegible]	SAA			bulk at [illegible]
17	2.1/2.5	[illegible]	[illegible] 0 ppm	[illegible]	SAA			[illegible]
18	2.5/2.5	[illegible]	[illegible]	[illegible]	[illegible] pumice [illegible]			
19	2.0/2.5	none	[illegible] 0 ppm	[illegible]	SAA			
20	2.5/2.5	[illegible]	[illegible]	[illegible]	SAA Bottom of Borehole [illegible]			

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 29 Jul 94

Soil

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-4 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12.5								Used [illegible] to drill 10-12[illegible]A to 12.5 ft [illegible] 4 August 94. 10-12[illegible]A [illegible] feet [illegible] of surveyed 10-12[illegible] [illegible] 4 August 94 because of obstructions in the hole
12.5–15	2.3/2.5	[illegible]	[illegible] 0 ppm		[illegible] SAND [illegible]		Alluvium	[illegible] Drilling 0736
15–17.5	2.4/2.5	[illegible]	[illegible] 0 ppm		[illegible] SAND [illegible]			
17.5–20	2.5/2.5	[illegible]	[illegible] 0 ppm		17.5 to 19.5 [illegible]			
20–22.5	1.3/2.5		[illegible] 0 ppm		[illegible] SAND [illegible]			
22.5–25	2.5/2	[illegible]	[illegible] 0 ppm		[illegible]			Break 0913 Back 0955
25–27.5	2.5/2.5		[illegible] 0 ppm		[illegible]			
27.5–30	2.5/2.5	[illegible]	[illegible] 0 ppm		[illegible]			

Prepared by [illegible] Date 2 [illegible] 94 Checked By [illegible] Date 17 Aug 94

Silt

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] 11A TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	2.5/2.5	[illegible]	<2SC [illegible]		[illegible] to 32 [illegible]		Alluvium	
	2.5/2.5	[illegible]	<2SC [illegible]		[illegible]			
	5.0/5.0	[illegible]	[illegible]		[illegible]		Lower Bandelier Tuff	
	5.0/5.0	[illegible]	[illegible]		[illegible]			
	5.0/5.0	[illegible]	[illegible]		SAA			TD. [illegible]

Prepared by D. Foss Date [illegible] Checked By [illegible] Date 17 Aug 94

Silt

Sand

Gravel

Non-welded [illegible]

Boulder - large cobble

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 3.5 Page 1 of 1

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip /Method [illegible] Stem Auger Sampling Equip /Method [illegible] Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Anaytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0 – 2.5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible] 0802 [illegible] 0835
2.5 – 3.5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible] recovery [illegible] off on rock? 0925 - [illegible] bit hit concrete and rebar moved rig back 2 feet to start a new hole
5								
7.5								
10								
12.5								
15								
17.5								
20								
22.5								
25								
27.5								
30								

Prepared by [illegible] Date 29 [illegible] 94 Checked By [illegible] Date [illegible]

Drum # [illegible]

S.[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 30 Page [illegible] of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time 29 [illegible] 94 1108 End Date/Time 1 August 94 1212

Drilling Equip./Method [illegible] Stem Auger Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2/2.5		2 [illegible] 0 ppm	Box 1	medium to brown, 5YR [illegible] fine to medium grained Sandy SILT with increasing [illegible] with depth [illegible]			Entered [illegible] 1100 Drilling 1108 [illegible]
2.5	2/2.5	AAB[illegible] [illegible]	2 [illegible] 0 ppm		moderate brown, 5YR [illegible] fine grained Sandy SILT [illegible]			
5	2/2.5	AAB[illegible] [illegible]	2 [illegible] 0 ppm		SAA			
7.5	2/2.5		2 [illegible] 0 ppm		moderate [illegible] 5YR medium to coarse [illegible] Sandy SILT [illegible]			
10	1.8/2.5	AAB[illegible] [illegible]	2 [illegible] 0 ppm		medium to [illegible] 5YR [illegible] to medium grained silty SAND [illegible]			
12.5	2/2.5		2 [illegible] 0 ppm		SAA			
15	1.6/2.5	AAB[illegible] [illegible]	2 [illegible] 0 ppm		SAA with [illegible] -20% medium to coarse [illegible] plagioclase [illegible]			Break 1300 [illegible] End of drilling for day [illegible] Enter [illegible] 0855 1 August 94 Begin Drilling 0903
17.5	2/2.5		2 [illegible] 0 ppm		SAA to ~18 feet [illegible] SILT [illegible]			
20	2/2.5	AAB[illegible] [illegible]	2 [illegible] 0 ppm		SAA - several layers of coarse-grained sand alternating with silt as described above			
22.5	2.3/2.5	AAB[illegible] [illegible]	2 [illegible] 0 ppm		22.5 - 23 [illegible] coarse-grained Silty SAND quartz [illegible] 23 - 25 [illegible] fine-grained sandy clay with SILT [illegible]			Large - Cobble [illegible]
25	2/2.5	AAB[illegible] [illegible]	2 [illegible] 0 ppm		SAA			
27.5	2/2.5		2 [illegible] 0 ppm	Box 6	SAA - [illegible] through cobble [illegible] at 29 [illegible]		All [illegible]	
30								

Prepared by [illegible] Date 29 [illegible] 94 Checked By [illegible] Date [illegible]

[illegible] Silt

[illegible] Boulder - large cobble

[illegible] Sand

[illegible] Gravel

[illegible] Non [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page 2 of 2

Driller [illegible] Box #(s) 6-9 Start Date/Time [illegible] End Date/Time 1 Aug 94 1212

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	2.5/2.5	[illegible]	[illegible] ppm	[illegible]	SAA to 30 ... [illegible]		[illegible]	Break 1040
35	2.5/2.5		220 ppm	[illegible]	31.9 – [illegible]		[illegible]	Back in 1111 [illegible]
35	5/5	[illegible]	240 ppm	[illegible]	SAA to 36 ft – [illegible]			37.2 to 37.9 ft 320 ppm
37.5		[illegible] 37.2–37.9 [illegible]						
40	5/5	[illegible]	250 ppm	[illegible]	SAA – [illegible]			
45	5/5	[illegible]	240 ppm	[illegible]	SAA			TD 1212 1 Aug 94 [illegible] 1240
50								

Prepared by [illegible] Date 1 Aug 94 Checked By [illegible] Date [illegible]

Silt
Boulder – large cobble
Sand
Gravel
Non-welded [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0								[illegible]
1	2.5/2.5	[illegible]	[illegible]		[illegible]			
2	2.4/2.5		[illegible]		[illegible]			
3	2.4/2.5	[illegible]	[illegible]		[illegible]			
4	2.4/2.5		[illegible]		SAA			[illegible]
5	2.3/2.5	[illegible]	[illegible]		[illegible]			
6	2.5/2.5	[illegible]	[illegible]		SAA [illegible]			
7	2.5/2.5	[illegible]	[illegible]		[illegible]			
8	2.1/2.5		[illegible]		SAA to [illegible]			[illegible]
9	2.5/2.5	[illegible]	[illegible]		SAA			
10	2/2		[illegible]		SAA		Alluvium	

Prepared by [illegible] Date [illegible] Checked By [signature] Date 22 Aug 94

Soil

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of ____

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	TD [illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 22 Aug 94

Soil

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top-Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0								[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
3	[illegible]			[illegible]	[illegible]			
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		ALLUVIUM	
5	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
7	[illegible]		[illegible]	[illegible]	[illegible]			
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

Prepared by [illegible] Date [illegible] Checked By [signature] Date 21 Aug 94

[illegible]

[illegible]

[illegible]

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
16	[illegible]	[illegible]	[illegible]	[illegible]				TD 12??

Prepared by [illegible] Date [illegible] Checked By [illegible signature] Date 21 Aug 94

Silt

Sand

Gravel

Nonwelded [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From ____ To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0					[illegible]			[illegible]
10	[illegible]	[illegible]	[illegible]		[illegible]			[illegible]
15	[illegible]	[illegible]	[illegible]		[illegible]			[illegible]
20	[illegible]	[illegible]	[illegible]		SAA			[illegible]
25	[illegible]	[illegible]	[illegible]		SAA [illegible]			AAB6590 [illegible]
30	[illegible]	[illegible]	[illegible]		SAA			[illegible]

Prepared by ________ Date [illegible] Checked By [illegible] Date 25 Aug 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ________ TA/OU ________ Drill Depth From ____ To ____ Page ____ of ____

Driller ________ Box #(s) ________ Start Date/Time ________ End Date/Time ________

Drilling Equip./Method ________ Sampling Equip./Method ________

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
15								TD

Prepared by ________ Date ________ Checked By ________ Date 25 Aug 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 3.0 Page 1 of 1

Driller [illegible] Box #(s) N/A Start Date/Time [illegible] End Date/Time 2 August [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.0/2		[illegible] 0 ppm		[illegible]		Alluvium	[illegible] 0732, 2 August 94 Drilling [illegible]
2.5	[illegible]		[illegible]		SAA [illegible]			[illegible]
5								
7.5								
10								
12.5								
15								
17.5								
20								
22.5								
25								
27.5								
30								

Prepared by [illegible] Date 2 August 94 Checked By [illegible] Date [illegible]

Silt

Sand

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 3.5 Page 1 of 1

Driller [illegible] Box #(s) N/A Start Date/Time [illegible] End Date/Time [illegible] 1040

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Barrel

Run #	Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
1	0	[illegible]		[illegible]		[illegible]		Alluvium	[illegible] 0955 [illegible] 1005
2	2.5	[illegible]		[illegible]		[illegible]			[illegible]

Prepared by D. [illegible] Date 2 [illegible] 94 Checked By [illegible] Date [illegible]

Silt

Sand

Gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 30 Page 1 of 2

Driller [illegible] Box #(s) 1–5 Start Date/Time 3 Aug 94, 0700 End Date/Time 3 Aug 94, 1155

Drilling Equip /Method [illegible] Sampling Equip /Method [illegible] Split Barrel

Run #	Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	0–7.5				0.0–7.5				Hand augered – used auger to get through roots and rubble 10-12163 – 3 feet south of 10-12116
1	7.5–10	1.9/2.5	AAB6321 7.5-9.5 [illegible] AAB6322 Duplicate	250 [illegible] 0 ppm	Box 1 7.5 to 20.0	Reddish brown 5YR 3/4 [illegible] sandy SILT [illegible] clay and moisture [illegible] very cohesive with depth		Alluvium	Start 0700 3 Aug 94 Drilling 0712
2	10–12.5	1.9/2.5	AAB6323 10.0-[illegible] AAB6324 Duplicate	250 [illegible] 0 ppm		SAA, with small angular gravel dark gray to red dacite and rhyolite			
3	12.5–15	2.2/2.5		250 [illegible] 0.0 ppm	Box 2 20.0 to 13.3	SAA, increasing coarse-grained sand and medium-grained gravel			
4	15–17.5	2.0/2.5	AAB6325 15.0-[illegible] Field [illegible]	250 [illegible] 0 ppm		SAA			
5	17.5–20	2.2/2.5	[illegible] 17.5-[illegible]	250 [illegible] 0.0 ppm	Box 3 23.3 to [illegible]	SAA to 18.4 ft grading to fine-grained sandy SILT, moderate moisture – very cohesive 20–25% [illegible] silt and clay			
6	20–22.5	2.2/2.5	AAB6326 20.0-20.3 Field [illegible] AAB6328 [illegible]	250 [illegible] 0.0 ppm		moderate brown 5YR 4/4, coarse to medium-grained sandy SILT moderate moisture and cohesion [illegible] clay			
7	22.5–25	2.5/2.5		250 [illegible] 0 ppm	Box 4 [illegible] to 23.3	SAA to 23.8 ft grade to fine-[illegible] sandy SILT 20–30% fine-grained silty clay moderate moisture sticky texture very cohesive			
8	25–27.5	2.5/2.5	AAB6[illegible] 25.0-25.3 [illegible]	250 [illegible] 0 ppm		SAA with light gray fragments of [illegible] welded [illegible] [illegible]			Break 0925 Back in 10[illegible]
9	27.5–30	1.4/2.5	AAB6330 27.5-28.0 [illegible]	250 [illegible] 0 ppm	Box 5 [illegible]	SAA alternating silt/clay with lt. gray [illegible] fragments cobble-size			

Prepared by D. Foss Date 2-3 Aug 94 Checked By [illegible] Date [illegible]

Silt

Sand

Gravel

Non-welded [illegible]

Boulder – large cobble

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 5-4 Start Date/Time 3 August 94, [illegible] End Date/Time 3 August 94, 1135

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Steel Split Barrel

Run #	Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
									← Alluvium
									← Soil - tuff transition zone
10	30 / 32.5	5.0 / 5.0	AAB6331 30.0-30 [illegible] Fieldscreen	<25 cps 0 ppm	[illegible]	SAA to 30.4 ft. 30.4 to 31.5 ft Soil - tuff transition zone intermixed silt, clay and pumice fragments - moderate [illegible] 31.5 to 35.0 ft [illegible] non-welded - ignimbrite [illegible] 10 to 40% pumice fragments 10 - 20% [illegible] [illegible]		Tuff	
11	35 / 37.5	5.0 / 5.0	AAB6332 35.0-35.0 Fieldscreen	<25 cps 0 ppm	[illegible]	SAA, little to no clay present, low moisture and cohesion		Bandelier	Dave [illegible] 11:00 R. Brown logging
12	40 / 42.5	5.0 / 5.0	AAB6333 40.0-40.5 Fieldscreen	<25 cps 0 ppm	[illegible]	SAA slightly [illegible] very white pumice fragments [illegible] phenocrysts mostly quartz, some feldspars, [illegible], [illegible] coarse grained			
13	45 / 47.5	5.0 / 5.0	AAB6334 45.0-45.3 Fieldscreen; AAB6335 47.5-47.9 [illegible]	<25 cps [illegible] Screen [illegible] 47.5-47.9 0 cpm	[illegible]	SAA		Lower	Boring TD at 3 Aug 94 1135
	50					Boring TD at 50.0 ft			

Prepared by D. Foss / R. Brown Date 3 August 94 Checked By [illegible] Date [illegible]

Silt

Sand

Gravel

Non-welded Ignimbrite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-4 Start Date/Time [illegible] End Date/Time [illegible] August 1994

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0							ALLUVIUM	[illegible]
5	2.5/2.5	[illegible]	[illegible] ppm	[illegible]	[illegible]			[illegible] 1007 [illegible] 1111
	1.0/2.5	[illegible]	0 ppm [illegible]	[illegible]	[illegible] SAND [illegible]			[illegible] 1150 [illegible] 1312
10	1.0/2.5	None	0 ppm [illegible]	[illegible]	SAA			
	2.5/2.5	[illegible]	[illegible]	[illegible]	SAA			
15	2.3/2.5	[illegible]	[illegible] ppm	[illegible]	SAA [illegible] clay [illegible]			
	2.5/2.5	[illegible] Field Scr	[illegible] ppm	[illegible]	SAA to 17 [illegible] change to fine-grained sandy SILT with clay			[illegible] 1420
20	1.3/2.5	None	<25 BG 0.0 ppm	[illegible]	Fine grained - med grained angular SANDY SILT. Coarsening downwards. Light Brown 5 YR 5/6. Medium Brown 5 YR [illegible]			12 Aug 94 Begin drilling 0715
22.5	2.1/2.5	[illegible] (R90) 24.0-24.3	0 ppm ≤ [illegible] ppm [illegible]	[illegible]	22.5-24.0 SAA becoming sandy SILT [illegible]. 24.0-25.0 [illegible] fine consolidated moist CLAY with small pumice fragments			
25	2.5/2.5	None	0 ppm ≤ [illegible] ppm [illegible]	[illegible]	Dark yellowish orange 10 YR 6/6 CLAYEY SILT. Fine clay fine moist moderately consolidated. 27.3-27.5 Tuff grey angular very consolidated		AFTERS [illegible]	
27.5	1.5/2.5	[illegible] (R90) 27.[illegible]-27.9	0 ppm ≤ [illegible] ppm [illegible]	[illegible]	Med-coarse angular SILTY SAND. 15mm-25mm Pumice and Obsidian fragments with small [illegible]			
30								

Prepared by [illegible] Date [illegible] Checked By [illegible signature] Date 21 Aug 94

SILT
SAND
CLAY
TUFF
Angular Pumice and Obsidian Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50' Page 2 of 2

Driller [illegible] Box #(s) 5-8 Start Date/Time 11 Aug 94 1111 End Date/Time 12 Aug 94 0900

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2.3/2.5	None	0 cpm 25 cpm [illegible]	Box #5 35.0 / 40.0	Very Pale Orange (10YR 8/2) Tuff. Small to medium pebble fragments in a very fine orange [illegible] matrix. Some pumice [illegible]		TUFF	[illegible]
	2.5/2.5	[illegible]	0 cpm 25 cpm		SAA - [illegible]			
35	5.0/5.0	[illegible]	0 cpm 25 cpm [illegible]	Box #7 40.0 / 45.0	SAA			
40	5.0/5.0	[illegible]	0 cpm 25 cpm	Box #7 48.0 / 45.0	SAA [illegible]			
45	5.0/5.0	[illegible]	0 cpm 25 cpm	Box #8 55.0 / 50.0	SAA			Stopped drilling at 0900 at depth of 50'
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 21 Aug 94

SILT

SAND

CLAY

TUFF

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0					[illegible]			[illegible] 1425 [illegible]
1	[illegible]	[illegible]	[illegible]		[illegible]			
2	[illegible]	[illegible]	[illegible]		[illegible]			
3	[illegible]		[illegible]		[illegible]			
4	[illegible]	[illegible]	[illegible]		[illegible]			
5	[illegible]		[illegible]		[illegible]			
6	2.2/2.5	[illegible]	[illegible]		[illegible]			[illegible] Drilling 0703
7	2.5/2.5	[illegible]	[illegible]		SAA			
8	2.1/2.5	[illegible]	[illegible]		[illegible]			
9	[illegible]		[illegible]		SAA			
10	2.5/2.5	[illegible]	[illegible]					

Prepared by [illegible] Date [illegible] Checked By [signature] Date 21 Aug 94

Soil

Sand

Gravel

Nonwelded tuff

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
10	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
13	[illegible]		[illegible]	[illegible]	[illegible]			
14								
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
16	[illegible]	[illegible]	[illegible]	[illegible]	Soil			[illegible]

Prepared by [illegible] Date [illegible] Checked By [signature] Date 21 Aug 94

Soil

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-12195 TA/OU 10/1079 Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-2 Start Date/Time [illegible] End Date/Time 30 Aug [illegible]

Drilling Equip./Method [illegible] F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0					[illegible]			1011 to 1037 hours 26 August
10								
15	2.5/5	[illegible]	[illegible]	Box 1	[illegible] 5YR 4/4 [illegible]		Alluvium	[illegible] 1207 [illegible]
	2.5/2.5	[illegible]	[illegible]		SAA [illegible]			Field Screen Sample [illegible]
20	1.0/2.5	[illegible]	[illegible]		[illegible] 10YR [illegible]			[illegible] 1230, 27 Aug
	2.5/2.5		[illegible]	Box 2	SAA to 23.8 [illegible]			[illegible] 0930 Break 0950 Back in 1010 Drilling @ 1026
25	1.9/2.5	[illegible]	[illegible]		SAA			
	2.5/2.5	[illegible]	[illegible]	Box 2	SAA [illegible]			

Prepared by D. [illegible] Date 26-30 Aug Checked By [illegible] Date 31 Aug 94

Soil

Sand

Gravel

Non-welded Ignimbrite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]		[illegible]	[illegible]	SAND [illegible] SAND [illegible]			[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]		[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]		[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			TD [illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 31 Aug 94

Silt

Sand

Gravel

Non welded Ignimbrite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1220 B TA/OU 10 / 1079 Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Bros Box #(s) 1-4 Start Date/Time 7 Sept 94/1345hr End Date/Time 8 Sept 94/1220hr

Drilling Equip./Method Failing F-10/ Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number AA6##	Field Screening Results OVM, CPM β γ	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12.5	No Recovery				0-12.5' No Recovery Drilling w/ the center bit thru rubble zone (soil, concrete, rebar etc.)			BH 10-1220: drilled to ≈12' bit concrete. Moved ≈2' west to BH 10-1220A. 1220A stalled at ≈10'. Moved ≈4' east to start 10-1220B. Start drilling 10-1220B at 1345hr.
12.5–15	Run 1 2.5/2.5	AA66[illegible] 12.5-15 [illegible] RAD	0.0 OVM [illegible] β γ	[illegible]	12.5-15.0' Sand [illegible] 5% gravel clasts, trace clay, moist, dk brown, [illegible]. Increase in clay with depth (orangish brown [illegible])		Alluvium	Stop drilling 1500hr
15–17.5	Run 2 2.5/2.5	AA66[illegible] [illegible]-17.5 [illegible], HE	0 OVM 18 [illegible] [illegible] β γ	[illegible]	15-16' SAA 16-17.5' SAA No gravel clasts, coarse sand, 10-15% [illegible]. 16.6' 18,000 CPM β γ clay zone 17.5' [illegible] CPM β γ clay zone			Core was left in barrel overnight 8 Sept 94/0740hr
17.5–20	Run 3 1.5/2.5	AA6657[illegible] 17.5-17.8 RAD [illegible]	0.0 OVM [illegible] 5[illegible] 17.5 [illegible]	[illegible]	17.5-18.5' Sand, fine grained, trace clay, moist, brown 18.5-19.5' Sand, coarse grained, trace silt, moist, dk brown, 5% gravel clasts. 17.5-20 0.5' Core loss			
20–22.5	Run 4 2.5/2.5	AA6657[illegible] 20-20.3 RAD	0 OVM [illegible] 20' [illegible] 22.5 β γ	Box 2 [illegible]	20-22' Sand coarse grained, moist, 5% [illegible] gravel, increasing [illegible] with depth 22-22.5' Silty [illegible] brown, sandy, moist, 10% [illegible], 10-15% sand, 5-10% gravel clasts ([illegible])			
22.5–25	Run 5 2.5/2.5	AA6657[illegible] 24.7-25 RAD	0 OVM [illegible] β γ	[illegible]	22.5-25' SAA			Break 0930hr Drilling 1030hr
25–27.5	Run 6 2.5/2.5	Not Sampled	0 OVM [illegible] β γ	Box 3 25-27.5	~~22.5-27.5 SAA~~ 25-27.5' SAA			
27.5–30	Run 7 1.5/2.5	AA6657[illegible] 27.5-27.8 RAD	0 OVM [illegible] β γ	Box 4 27.5-30	27.5-29' SAA 29-30' Core loss	Core loss		

Prepared by [illegible signature] Date 8 Sept 94 Checked By [illegible signature] Date 9/27/94

Sand

Silt/clay

Gravel

Pumice

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50' Page 2 of 2

Driller [illegible] Box #(s) 4-7 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless Split Spoon Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number AAB #	Field Screening Results OVM, CPM βγ	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	Run 8 2.5/2.5	Not Sampled	0 OVM ≤250 βγ	[illegible]	30-31.5' SAA 31.5-32.5' Fine grained silty sand, tan 10YR 7/4, moist, [illegible]		Alluvium	
	Run 9 2.0/2.5	AAB6197 33-33.5' RAC	0 OVM ≤250 βγ	[illegible]	32.5-33' 0.5' Caliche 33-34.2' SAA 34.2-35' Coarse grained sand [illegible]			
35	Run 10 2.5/2.5	AAB6600 37-37.5' Full HE	0 OVM ≤250 βγ	[illegible]	35-38.5' medium grained silty sand, small [illegible] fragments [illegible] slightly [illegible]			
	Run 11 2.5/2.5	AAB6601 38-38.5' RAC	0 OVM ≤250 βγ	[illegible]	38.5-40' Pumice bed contact [illegible]		[illegible]	
40	Run 12 5.0/5.0	AAB6602 [illegible] RAC	0 OVM ≤250 βγ	[illegible]	40-45' [illegible] pumice [illegible] damp, [illegible]		Pumice bed	
45	Run 13 5.0/5.0	AAB6603 45-50 Full HE	0 OVM ≤250 βγ	43.5-50' TO [illegible]	45-50 SAA			Completed drilling at [illegible]
50					Total Depth = 50'			

Prepared by [illegible] Date 8 Oct 94 Checked By [illegible] Date 9 27 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1221-1 TA/OU 10/1079 Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Bro. Box #(s) 1-4 Start Date/Time 15 Sept 94/1500 End Date/Time 19 Sept 94/0930

Drilling Equip./Method Failing F-10/Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0–12.5	No Recovery				0-12.5' No recovery. Drilling w/ the center bit through rubble zone (soil concrete, rebar, etc.)			In zone at 1500 hr; Drilling at 1510 hr
12.5–15	Full 2/2.5	AAB 9712, 12.5-15, FA	0 ppm; 0 BY	Box 1 of 4 12.5-17.5	12.5-15 med to coarse grain sand, dk brown 5YR 4/4, moist, 15% clay nodules, trace small gravel		Alluvium	
15–17.5	Full 1.5/2.5		0 ppm; BY		15-16.5 SAA; 16.5-17.5 Fine grain silty sand, 15% clay, brown 5YR 5/4 moist			
17.5–20	Full 2/2.5	AAB 9713, 17.5-20, FAC	0 ppm; BY	Box 2 of 4 17.5-22.5	17.5-22' Fine to med grain sand, 5% clay nodules, dk brown 5YR 4/4 moist, trace small gravel clasts			
20–22.5	Full 1.5/2.5		0 ppm; BY		20-21.5 SAA; 21.5-22.5 Coreless			
22.5–25	Full 1.5/2.5	AAB 9714, 22.5-24, FAC	0 ppm; BY	Box 3 of 4 22.5-27.5	22.5-23.7 SAA; 23.7-24' Fine silt zone, 20% pumice sand; 24-25 Coreless			End of day 1610 hr; 19 Sept 94 In zone 0715 Drilling 0730
25–27.5	Full 2/2.5		0 ppm; BY		25-26.5 med grain sand (5YR 4/4) trace silt, moist; 26.5-27 Silt/Clay zone, brown (5YR 5/4) moist; 27-27.5 Coreless			
27.5–30	Full 2/2.5	AAB 9722, 27.5-29.5, Full	0 ppm; BY	Box 4 of 4 27.5-30	27.5-29.5 Fine grain sand, trace silt, moist; 29.5-30 coreless			

Prepared by Jeff Walterscheid Date 19 Sept 94 Checked By [illegible] Date 9.27.94

Legend: Fine to coarse grain Sand; Clay/Silt; Pumice

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page [illegible] of [illegible]

Driller [illegible] Box #(s) 4-7 Start Date/Time [illegible] / 1500 End Date/Time 19 Sept 94 / 0930

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number AAB #	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2.5/2.5		Ø OVM ≤ 250 βγ		30-32.5 SAA			Swapped out drillers
	2/2.5	AAB9423 34-34.5 RAD	Ø OVM ≤ 250 βγ		32.5-33.0 Gravel zone. Fine sand to coarse sand, moist. 33-34.5 medium sand, trace clay, moist, brown [illegible] 34.5-35 Core loss			
35	2.5/2.5	AAB9424 35.3-36 Full	Ø OVM ≤ 250 βγ		35-35.3 SAA 35.3-36 Pumice/Sand trace [illegible] weathered pumice, [illegible] moist, clay 36-38 Pumice bed weathered [illegible] friable, [illegible] moist.			
	2.5/2.5	AAB9425 37.5-40 RAD	Ø OVM ≤ 250 βγ		38-50' Pumice crystals [illegible]			
40	2/2.5		Ø OVM ≤ 250 βγ		Pumice bed cont. wet, well weathered. 40-42.5 Core loss			
	2.5/2.5	AAB9426 44.5-45 RAD	Ø OVM ≤ 250 βγ		SAA trace FeOx, consolidated, friable.			
45	2.5/2.5		Ø OVM ≤ 250 βγ		SAA			
	2.5/2.5	AAB9427 49.5-50 Full	Ø OVM ≤ 250 βγ		SAA Slight increase in FeOx [illegible]			End Drilling 0930 19 Sept 94
50					SOTD.			

Prepared by [illegible signature] Date 19 Sept 94 Checked By [illegible signature] Date 9 27 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-3 Start Date/Time 22 Aug 94 0745 End Date/Time 22 Aug 94 1055

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12.5					Used a Center bit			
12.5	Run 1 1.1/2.5	NONE	0 cpm		Moist, heterogeneous mixtures of SILTY SAND coarsening downwards to medium grained SAND. 13.9-15.0 - Cuttings		ALLUVIUM	22 Aug 94, Drilling began at 0745 hours at a depth 12.5 feet
15	Run 2 2.0/2.5	AAB9245 Fusilic 15.2-[illegible]	0 cpm 100 cpm B2	12.5-20.0 Box 1	Dusky brown 5 YR 2/2, homogeneous SAND comprised of 90% SAND and 10% SILT			
17.5	Run 3 2.5/2.5	NONE	0 cpm 100 cpm B1		17.5-19.3 SAA. 19.3-20.0 - Fining downwards, brown gravelly moist sandy CLAY, w. small very light gray tuff fragments encountered at 20 feet.			
20	Run 4 2.5/2.5	AAB9249 Rad 21.0-21.5	0 cpm 100 cpm B2	20.0-25.0 Box 2	20.0-21.3 - Very moist, Light Olive Gray 5Y 5/2 Clay, unconsolidated and cohesive. 21.3-22.5 - Very consolidated, cohesive Tuff, common [illegible] vesicular pumice fragments.			
22.5	Run 5 2.1/2.5	NONE	0 cpm 100 cpm B2		SAA-24.1. 24.1-24.6 - Very wet Light Brown 5 YR 5/6 CLAY. 5mm pumice and feldspar gravel present			Took a break at 0909 hours
25	Run 6 2.0/2.5	AAB9257 Fusilic 25.4-26.1	0 cpm 100 cpm B2	25.0-31.[illegible] Box 3	Changing back to SILTY SAND, unconsolidated, very moist, fine to med grained, moderately cohesive CLAY. 26.5-27.0 - Consolidated, Possible light orange ASH influence present.			Resumed coring at 1000 hours
27.5	Run 7 1.8/2.5	NONE	0 cpm 100 cpm B1		Very fine grained, unconsolidated, homogeneous Brown Orange 10YR 7/4 ASH.			
30								

Prepared by [signature] Date 22 Aug 94 Checked By [signature] Date 9/6/94

Fullsuite:
Gross alpha, beta, gamma spec, moisture, total uranium, strontium, semi-volatiles, volatiles, high explosives, TAL metals

Radium:
Gross alpha, beta, gamma spec, moisture, [illegible] metals [illegible]

SILT
SAND
CLAY
ASH
TUFF
Rhyolite [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 4-6 Start Date/Time 22 Apr 94 0945 End Date/Time 22 Apr 94 1155

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 7 2.0/2.5	AAB9250 Reel 30-31.5	0 cpm 100 cpm ßr		DAA		OTOWI MEMBER	
32.5	Run 9 2.1/2.5	None	0 cpm 100 cpm ßr	32.5 Box 4/6	DAA, with 20-30mm [illegible] pumice			
35	Run 10 2.3/2.5	AAB9252 Reel 35-36.7	0 cpm 100 cpm ßr	35	DAA becoming more [illegible] down to 37 feet with [illegible] pale [illegible] 10YR 8/2 Ash and pumice [illegible]			
37.5	Run 11 2.2/2.5	None	0 cpm 100 cpm ßr		[illegible] nodules [illegible] first .5 feet [illegible] 20-50mm [illegible] fragments [illegible] glassed ASH [illegible]			
40	Run 12	AAB9253 AAB9254 AAB9255	0 cpm 100 cpm ßr	42.5 Box 5/6	DAA, with pumice fragments becoming more [illegible] 42.5 [illegible]		BANDALIER TUFF	Fire [illegible] from 40.0-45.0
42.5	4.9/5.0	40.0-45.0 [illegible]						
45	Run 15 2.0/2.5	None	0 cpm 100 cpm ßr	47.5	DAA			
47.5	Run 17 2.1/2.5	AAB9256 [illegible] 47.5-49.2	0 cpm 100 cpm ßr	Box 6/6	DAA			Drilling [illegible] 1155 [illegible] 50 feet
50								

Prepared by [signature] Date 22 Apr 94 Checked By [signature] Date [illegible]

ASH

TUFF

Rhyolite [illegible] and Pumice Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Drill Depth From 0 To 30 Page 1 of 2

Borehole ID 10-1223 TA/OU 10/1079 End Date/Time 12 Sept 94/1500hr

Driller Stewart Bros Box #(s) 1-3 Start Date/Time 9 Sept 94/0930

Drilling Equip./Method Failing F-10/Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number AABA	Field Screening Results OVM, CAMBY	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12.5	No Recovery				0-12.5' No Recovery Drilled thru rubble zone w/ the center bit			9 Sept 94 Completed cementing 10-1220, moved and set up over 10-1223. Began to drill using center bit to pass thru the rubble (concrete, rebar, soil, etc.) zone. Drilled to ≈10.5' hole is caving/undercutting. Tore down rig and moved over 2 inches to ream hole on Monday. 12 Sept 94 Reaming hole at 0700hr, 1st sample run at 0800hr
12.5–15	Run 1 0/2.5				12.5-15.0 No Recovery	Core loss	Alluvium	Out of zone 0840hr In zone 0920 double PPE
15–17.5	Run 2 1.5/2.5	AA86??? 15-16.5 ... AA86615 ... RAD	ØOVM 1200 CPM 16.5'	Box 1 of 6 12.5-20'	15-16' Sand dk brown med grain, 5YR 3/4, moist 5-10% gravel; 16-16.5' Silty sand ... clay, moist, 5% gravel; 16.5-17.5 Core loss	Core loss		
17.5–20	Run 3 2.5/2.5	15.5-16 AA86607 17.5-17.8 RAD	ØOVM 500-610 cpm		17.5-20 Sand, dk brown med to coarse grained 5-10% clay increasing with depth, no gravel, moist			
20–22.5	Run 4 2.0/2.5	Not Sampled	ØOVM 535 CPM		20-22.0' SAA, slight color change 10YR 5/4; 22-22.5' Core loss			
22.5–25	Run 5 1.7/2.5	AA86618 22.5-22.8 RAD	ØOVM 535 CPM	Box 2 of 6 20-25'	22.5-24.2 SAA; 24.2-25.0' Core loss	Core loss		
25–27.5	Run 6 2.5/2.5	Not Sampled	ØOVM 535 CPM	Box 3 of 6 25-30'	25-25.8' SAA; 25.8-26.4' Silty sand with 50% small granules/tite sticky, moist; 26.4-27.5 fine grain sand lite tan 10YR 7/4, trace clay, moist			
27.5–30	Run 7 1.5/2.5	AA86609 28-28.3 RAD	ØOVM 535 CPM		27.5-28 SAA; 28-28.5' med grain sand, moist; 28.5-29' fine grained silty sand, <5% clay 5YR 5/6; 29-30' Core loss	Core loss		Lunch 1130 hr

Prepared by [signature] Date 12 Sept 94 Checked By Derek Faulk Date 9-27-94

Fine to coarse grain sand

clay

Pumice

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 12 Sept 94/1500

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless steel Splitspoon / Core Barrel [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Pedology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 5 1.5/2.5	AAC [illegible] 30-32.5 [illegible]	[illegible]		30-31.5 [illegible] sand [illegible] 31.5-32.5 [illegible] sand [illegible] 5YR [illegible]		Alluvium	[illegible] at 1337 ([illegible])
	Run 7 [illegible]/2.5	AAB [illegible] 32.5-35 [illegible]	[illegible]	[illegible]	32.5-33.5 SAA 33.5-35 [illegible]			
35	Run 10 1.5/2.5	[illegible]	[illegible]		35-36.5 SAA 36.5-37.5 Core loss	Core loss		
	Run 11 2.5/2.5	AAB [illegible] 37.5-38 [illegible]	[illegible]	[illegible]	37.5-40 Pumice bed [illegible]			
40	Run 12 4/5		[illegible]	[illegible]	40-[illegible] SAA [illegible] [illegible]			
		AAB [illegible] [illegible] KAC			44-45 Core loss [illegible]	Core loss	Pumice Bed	
45	Run 13 [illegible]/5	AA [illegible] 45-47 [illegible]	[illegible]	[illegible]	45-47 SAA 47-50 Core loss [illegible]	Core loss		Completed Hole at 1500hr and 50 ft.
50					50 TD			

Prepared by [illegible] Date 12 Sept 94 Checked By [illegible] Date 9-27-94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] 8 TA/OU [illegible] Drill Depth From [illegible] To 30 Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 14 Sept 94 / 11:30

Drilling Equip /Method [illegible] Sampling Equip /Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0					0-12.5' No Recovery [illegible]			
5	No Recovery							
10								Drilling - 1010
	Run 1 2.5/2.5	AAB[illegible] 12.5-15 Fill, HE	0 OVM ≤250 βγ		12.5-15 med to coarse grained sand, moist, dk brown 5YR 3/4, unconsolidated, sticky			
15	Run 2 2.5/2.5		0 OVM ≤250 βγ		~~15~~ 15-16.2 SAA 16.2-17.5 fine grained silty sand, moist, brown, consolidated, 5YR 5/6 trace small gravel			
	Run 3 2.5/2.5	AAB[illegible] 17.5-20 RAD	0 OVM ≤250 βγ		17.5-20 med to coarse grained sand, dk brown 5YR 5/6 trace small gravel, 5% [illegible] nodules			
20	Run 4 2.5/2.5		0 OVM ≤250 βγ		20-22 SAA 22-22.5' [illegible]			
	Run 5 2.5/2.5	AAB[illegible] 22.5-25 HE Fill [illegible] 22.5-25 [illegible]	0 OVM ≤250 βγ		22.5-23.5 SAA large gravel [illegible] 23.5-25 fine grained [illegible] silty sand, [illegible], moist large gravel clasts continue, 5YR 4/4		Alluvium	
25	Run 6 2.5/2.5		0 OVM ≤250 βγ		25-26.2 SAA 26.2-27 [illegible] black, well [illegible] pumice fragments, [illegible] 27-27.5 fine grained silty sand, trace gravel, moist			
	Run 7 2.5/2.5	AAB[illegible] 27.5-30 RAD AAB[illegible] [illegible] AAB[illegible] [illegible]	0 OVM ≤250 βγ		27.5- SAA with some med grain sand, slight increase in clay with depth			Lunch - 1130
30								

Prepared by [illegible] Date 14 Sept 94 Checked By [illegible] Date 9/27/94

Fine to coarse grain sand

clay

Pumice

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time 13 Sept 94/1300 End Date/Time 14 Sept 94/1630

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless Steel Split Spoon Core Barrel [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 8 2.5/2.5		Ø ơm [illegible]	[illegible]	30-32.5 SAA		Alluvium	In at 1310 hr out at 1333 hr Due to thunder Back at 1500
	Run 9 1.7/2.5	AAB[illegible] 32.5-[illegible] RAC	Ø ơm [illegible]	[illegible]	32.5-34.2 [illegible] 10YR5/4 [illegible] 5-15% [illegible] clasts 34.2-35 Core loss			
35	Run 10 2.5/2.5		Ø ơm [illegible]	[illegible] 37.5	35-37 SAA 37-37.5 [illegible] large clasts [illegible]		Contact	
	Run 11 0.8/2.5	AAB[illegible]3 37.5-38.3 Full ht	Ø ơm [illegible]		37.5-38.3 Pumice [illegible] damp [illegible] on pumice 10YR 8/2 [illegible] 38.3-40 Core loss	Core loss		
40	Run 12 2.5/2.5		Ø ơm [illegible]		40-42.5 Pumice [illegible] damp [illegible]			
	Run 13 2.5/2.5	AAB[illegible] 44.7-45 RAC	Ø ơm [illegible]	Box [illegible]	42.5-45 SAA [illegible]			
45	Run 14 2.5/2.5		Ø ơm [illegible]		45-47.5 SAA		Pumice Bed	
	Run 15 2.5/2.5	~~[illegible]~~ [illegible] 47.5-50	Ø ơm [illegible]	Box [illegible]	47.5-50 SAA			Completed 1620
50		Full ht			50 TD			

Prepared by [illegible] Date 14 Sept 94 Checked By [illegible] Date 9.27.94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-2385 TA/OU 10-1079 Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-3 Start Date/Time 23 Aug 94 0730 End Date/Time 23 Aug 94 1150

Drilling Equip /Method F-10 Hollow Stem Auger Sampling Equip /Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0 – 12.5								
12.5 – 15	Run 1 2.5/2.5	None	0 ppm 14 cpm βΓ	12.5-17.5 Box 1	Core unsaturated [illegible] Dry moist, unconsolidated SILT/SAND and [illegible] grained and coarsening downwards [illegible] coarse angular grained SAND. Large clasts present 5-8cm		ALLUVIUM	23 Aug 94. Begin drilling 0740 hours. Sky clear, wind calm, temp 28°
15 – 17.5	Run 2 2.5/2.5	AAB9257 Full [illegible]	0 ppm 120 cpm βΓ		DAA, coarse unconsolidated SAND			
17.5 – 20	Run 3 2.5/2.5	[illegible] None	0 ppm 100 cpm βΓ	18.5-24.5 Box 2	DAA.			
20 – 22.5	Run 4 2.5/2.5	AAB9208 Rad AAB9259 [illegible]	0 ppm 100 cpm βΓ		DAA becoming very coarse grained, angular SAND very moist. Moderate brown 5YR 3/4 25cm pink Tuff present at 22 feet [illegible]			
22.5 – 25	Run 5 2.5/2.5	[illegible] None	0 ppm 100 cpm βΓ		22.5-24.5 - DAA with large tuff fragments 24.5-25.0 - Very cohesive CLAY with numerous small pumice fragments imbedded. Dry moist			
25 – 27.5	Run 6 2.5/2.5	AAB9210 Full [illegible]	0 ppm 100 cpm βΓ	24.5-30.0 Box 3	Moderately consolidated, cohesive, homogeneous CLAY with fewer pumice inclusions than above			Took a break at 0920
27.5 – 30	Run 7 2.5/2.5	None	0 ppm 100 cpm βΓ		27.5-28.0 - DAA 28.0-30.0 - Continuing to fine downwards into a pale yellowish orange ASH. Homogeneous, unconsolidated with few to no lithics			

Prepared by [signature] Date 23 Aug 94 Checked By [signature] Date 9/26/94

- Full suites -
Gross alpha, beta, gamma spec, moisture, total uranium, strontium-90, semi-volatiles, volatiles, TAL metals.

- Reduced -
Gross alpha, beta, gamma spec, [illegible]

Sand
Silt
Clay
Ash
Tuff
Rhyolite, Andesite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1225 TA/OU 10-1079 Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 4-7 Start Date/Time 23 Aug 97 0730 End Date/Time 23 Aug 97 1150

Drilling Equip./Method F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	Run 8 2.5/2.5	AAB5241 and AAB5242 FD AAB5243 [illegible]	∅ cpm 100cpm βt	30.0 – 35.0 Box 4	30.0-32.0 - SAA 32.0-32.5 - Abundant dacite and rhyolite fragments [illegible] 32.0 feet. From 32.0- [illegible] 1-3cm in size [illegible], angular [illegible] 32.5 - [illegible] SAA		Otowi Member FR	Resumed and began drilling at 1030 hours
32.5	Run 9 1.7/2.5		∅ cpm 100cpm βt		32.5-32.5 SAA 32.5-35.0 - Dry fine grained homogeneous ash. Mildly [illegible], unconsolidated with 1-2mm pumice [illegible] present			
35	Run 10 2.2/2.5	AAB5244 Fae 362 36.2	∅ cpm 100cpm βt		Dry quartz rich med grained SAND with light colored ash. Abundant large rhyolite, dacite and pumice fragments present throughout. [illegible]		BANDELIER	
37.5	Run 11 2.5/2.5		∅ cpm 100cpm βt	35.0 – 40.0 Box 5	37.5-38.0 SAA 38.0-40.0 - Oxidized abundant pumice [illegible] small [illegible] & tuff pumice fragments [illegible] stained [illegible]			
40	Run 12 2.5/2.5	AAB5245 Fae 41.2 42.1	∅ cpm 100cpm βt		SAA		Base of	
42.5	Run 13 2.5/2.5		∅ cpm 100cpm βt	42.5 – 47.5 Box 6	SAA		TUFF Otowi	
45	Run 14 2.5/2.5	AAB5246 Fed 46.5-46.6	∅ cpm 100cpm βt		SAA		Member	
47.5	Run 15 2.5/2.5	AAB5247 Fae 48.5 49.3	∅ cpm 100cpm βt	47.5 – 50 Box 7	SAA		FO	Drilling ended at 1150 hours at a depth of 50 feet.
50								

Prepared by [signature] Date 23 Aug 97 Checked By [signature] Date 9/6/97

- [symbol] ASH
- [symbol] Rhyolite, Andesite, Dacite and Pumice fragments
- [symbol] TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.5 / 2.5	none	0 ppm		[illegible]		ALLUVIUM	[illegible] EZ 22 Jul 94 at 0740. Background for OVM = 0.2
2.5	2.5 / 2.5	AAB [illegible]	0 ppm		SAA [illegible]			[illegible] water at [illegible]
5	1.5 / 2.5	none	0 ppm		[illegible]			
7.5	2.5 / 2.5	AAB [illegible]	0 ppm		SAA			
10	2.5 / 2.5	none	0 ppm		SAA			
12.5	2.5 / 2.5	AAB [illegible]	0 ppm		SAA			Break at 0950 [illegible]
15	2.5 / 2.5	none	0 ppm		[illegible]			
17.5	2.5 / 2.5	AAB [illegible]	0 ppm		[illegible]			
20	2.5 / 2.5	none	0 ppm		SAA [illegible]			
22.5	2.5 / 2.5	AAB [illegible]	0 ppm		[illegible]			AAB [illegible]
25	1.5 / [illegible], 0/.5	[illegible]	[illegible]		SAA [illegible] Core 1055			[illegible]
27.5	2.5 / 2.5	AAB [illegible]	0 ppm		[illegible]			[illegible] EZ [illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

Rad Suite
gross α β γ moist
[illegible]
SVOA [illegible]

Full Suite
gross α β γ moist
TAL metals
SVOA
Tot U, Sr-90
HE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller Stewart Brothers Box #(s) 7-10 Start Date/Time 20 Jul 94 0746 End Date/Time 21 Jul 94 1030

Drilling Equip./Method [illegible] / hollow stem auger Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	2.5 / 2.5	none	0 ppm 240 β?	[illegible]	SAA			
	2.5 / 2.5	[illegible]	0 ppm 240 β?	[illegible]	[illegible]			AAB 3057 Full [illegible]
	2.5 / 2.5	none	0 ppm 200 β?	[illegible]	SAA			
	2.5 / 2.5	AAB 3056 [illegible] 373-377	0 ppm 24 β?	Box 9 35-[illegible]	SAA			
40	2.5 / 2.5	none	0 ppm 220 β?		SAA		Lower Bandelier Tuff	
	2.5 / 2.5	AAB 3058 [illegible]	0 ppm 300 β?	[illegible]	SAA			AAB 3059 Full [illegible] (300 β?)
45	2.5 / 2.5	none	0 ppm 260 β?	[illegible]	SAA			
	2.5 / 2.5	AAB 3060 Full 497-499	0 ppm 260 β?	Box 10 [illegible]	SAA			
50					[illegible] 1030			

Prepared by Laurel [illegible] Date 21 Jul 94 Checked By [illegible] Date [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-3 Start Date/Time 2 Aug 94 10:30 End Date/Time 2 Aug 94 [illegible]

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	Run 1 2.5/2.5	None	0 cpm 300cpm/βγ		Soft, grayish red (10R 4/2), heterogeneous alluvial Silty Clay. Angular to subangular coarse sand grains. Small pebbles present			2 Aug 94 Begin drilling at 10:30
2.5	Run 2 2.5/2.5	Full suite HE AAB4423 (3-3.3)	0 cpm 250cpm/βγ		SAA Sand grains increase in occurrence and appear to be [illegible]			
5.0	Run 3 2.5/2.5	None	0 cpm 250cpm/βγ		SAA w an increase in % of silt. Becoming a Sandy Clay. Poorly sorted		Alluvium	
7.5	Run 4 2.4/2.5	AAB4424 Radionuclides (9-9.5)	0 cpm 200cpm/βγ		SAA becoming Clayey Sand			
10.0	Run 5 2.5/2.5	None	0 cpm 200cpm/βγ		SAA, decrease in Clay content to a Sand. 1-3 mm coarse sand present. Possible lithic fragments present			
12.5	Run 6 2.5/2.5	AAB4425 Radionuclides (14.5-14.9)	0 cpm 200cpm/βγ		SAA to 13.0; 13.15- Began to encounter pale tuff specks. Some minerals as above			
15	Run 7 2.0/2.5	None	0 cpm 230cpm/βγ		SAA to 17; 17- Soil Tuff interface			
17.5	Run 8 2.5/2.5	AAB4426 Radionuclides (19.5-19.9)	0 cpm 250cpm/βγ		Nonwelded, yellowish gray (5Y 8/1) tuff. Hard, crumbly. Possible minor weathering [illegible]			21.5 Tuff-Sediment interface
20	Run 9 5.0/5.0	[illegible]	0 cpm Tuff 250cpm/βγ		SAA - 21.5; 21.5-22.5 Fine grained well sorted Sandy Clay		Alluvium	A break was taken at 12:45 hours. Drilling resumed at 13:45 hours
	5.0	AAB4427 Radionuclides (24.1-24.5)	Clay-200cpm/βγ		22.5-25.0 Very cohesive, consolidated moderate reddish brown (10R 4/6) Clay. Minor amounts of sand, silt, and lithics			
25	Run 10 3.0/5.0	[illegible]	0 cpm 220cpm/βγ		25.0-27.0 unrecovered; 27.0-28.5 - Sandy Clay with fragments of dacite, pumice, and feldspar		Tsf	
	5.0	AAB4423 Full (Radion) (29.1-29.6)			28.5-30.0 - Interbedded Clay with pumice fragments. Larger fragments than above			
30								

Prepared by [illegible] Date 08-08-94 Checked By [illegible] Date 8/8/94

SILT
SAND
Clay
Pumice
Pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 ft Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
32.5	Run 11 2.5/2.5	None	Ø cpm 24 cpm/ 82		Sandy alluvial, heterogeneous, soft, moderate reddish brown (10R 4/6) from 30.0-31.5. From 31.5-32.5 interbedded clay and pumice fragments, poorly sorted, angular [illegible]		QTO	[illegible]
35	Run 12 2.3/2.5	AAB 4329 Rad 34.4-34.7	Ø cpm 24 cpm/ 82		Very pale orange (10YR 8/2) matrix containing pumice fragments which increase in size and core [illegible] downward			
37.5	Run 13 5.0/5.0	AAA 4330 Rad 39.6-39.9	Ø cpm 24 cpm/ 81		SAA [illegible] increase in pumice fragment size to 4-6mm [illegible] (orange fragments)			
42.5	Run 14 5.0/5.0	AAA 4331 Rad 44.6-44.9 AAB 4332 Fission [illegible]	Ø cpm 24 cpm/ 83 350 cpm		40.0-40.6 unconsolidated, soft, heterogeneous sandy matrix particles, containing [illegible], pumice, [illegible] feldspars 40.6-45.0 SAA (32.5-35.0)		Bandelier Tuff	
47.5	Run 15 5.0/5.0	AAA 4333 Fission [illegible] 49.1-49.3	Ø cpm 24 cpm/ 80		45.0-45.9 unconsolidated pumice and soft clay matrix 45.9-50.0 SAA (32.5-35.0)			2 Aug 94 Drilling ended at 1620 hours.
50								

Prepared by [illegible] Date 08-02-94 Checked By [illegible] Falk Date 8/8/94

SILT

SAND

Clay

Pumice

Pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1228 TA/OU 10/1079 Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Brothers Box #(s) 1-4 Start Date/Time 26Jul94 0700 End Date/Time 27Jul94 1000

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless steel split spoon

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.5/2.5 Core 1	none	0 ppm 250 βγ	Box 1 of 4	0-0.3 moderate brown, very soft, heterogeneous organic rich silt, some sand, roots; 0.3-2.2 pale brown fine sand, some silt, trace clay; 2.2-2.5 moderate brown medium fine sand			Enter EZ on 26 Jul 94 0700
2.5	2.4/2.5 Core 2	AAB 3062 Field 3.5-4.2	0 ppm 220 βγ		SAA increasing in grain size downwards to coarse sand, some gravel, little silt, trace roots			
5	0.5/2.5 Core 3	none	0 ppm 220 βγ		moderate brown, very soft, heterogeneous, coarse sand and gravel, some cobbles of dacite, trace silt			
7.5	2.3/2.5 Core 4	AAB 3063 Field 9.9-5	0 ppm 240 βγ	Box 2 of 4 10 to 12.5 ft	SAA			
10	2.4/2.5 Core 5	none	0 ppm 250 βγ		10-11.2 SAA; increased amount of silt to coarse sand and gravel, some silt trace clay			
12.5	2.5/2.5 Core 6	AAB 3064 Field 14.3-14.8	0 ppm 250 βγ		SAA, increasing amount of pumice fragments downwards			Break @ 0926; Reentered EZ 1010
15	2.3/2.5 Core 7	none	0 ppm 240 βγ		pale brown very soft, heterogeneous, silt, some fine grained sand, little pebbles of dacite, increasing amount of pumice fragments towards bottom		ALLUVIUM	
17.5	2.5/2.5 Core 8	AAB 3065 Field 18-18.4	0 ppm 270 βγ	Box 3 of 4	17.5-18.4 SAA; pale brown, some silt			
20	2.3/2.5 Core 9	AAB 3073 Field 21.4-21.9	0 ppm 240 βγ		soft, weak brown heterogeneous clay and silt, some pebble sized pumice fragments			
22.5	2.3/2.5 Core 10	AAB 3066 RAD 24-24.4	0 ppm 190 βγ		SAA except for pumice fragments			
25	1.0/2.5 Core 11	none	0 ppm 240 βγ		SAA except from 25.5 to 26.5 drilled through a boulder of gray welded tuff			hit ROCK
27.5	0/1.0 Core 12	NA	NA		no recovery had to drill through rock			
	1.5/1.5 Core 13	AAB 3067 RAD 29-29.5	0 ppm 240 βγ	Box 4	nonwelded ignimbrite in a clay matrix, pebble sized poorly sorted pumice fragments; 29.5 tuff interface			1320: break for lunch
30								

Prepared by L Shaw Date 7/27/94 Checked By [illegible] Date 7/27/94

Silt

Sand

Gravel

nonwelded ignimbrite

RAD Suite: gross α β γ moisture; XRF metals; SVOA screen

Full Suite: gross α β γ moisture; TAL metals; SVOA; Tot U Sr-90; High Explosives

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU 10/1579 Drill Depth From 30 To 50 Page 2 of 2

Driller Stewart Brothers Box #(s) 6-10 Start Date/Time 7/20/94 0700 End Date/Time 7/27/94 1000

Drilling Equip./Method Failing Fleet/Hollow Stem Auger Sampling Equip./Method stainless steel split spoon

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2.5/2.5 Run 14	AAB 3069 Full 30-32.5	0 ppm 240 Am 32.5	Box 6 of 10	SAA			entered EZ 27 July 94 0720 AAB 3069 Full suite Air high rod 30 ppm
32.5	2.5/2.5 Run 15	AAB 3068 Cor 33-34.4	0 ppm 190 BF	Box 7 of 10 32.5 to 37.5	SAA			
35	2.4/2.5 Run 16	none	0 ppm 220 BK		35-35.3 SAA; 35.3 nonwelded ignimbrite, 90% poorly sorted angular, pebble sized pumice, ... ~90%, 10% groundmass (mostly clay, glass shards, lithic fragments)			
37.5	2.4/2.5 Run 17	AAB 3070 End 39-39.5	0 ppm 290 BB		SAA increase in pumice to 95% (no clay) pumice gray in color (5YR 7/1) 5% groundmass (lithic fragments)			
40	2.0/2.5 Run 18	none	0 ppm 210 BB	Box 8 of 10 37.5 to 42.5	SAA			
42.5	2.5/2.5 Run 19	AAB 3071 End 44.5-44.9	0 ppm 200 BK		SAA			
45	2.2/2.5 Run 20	none	0 ppm 240 BB	Box 9 of 10 42.5 to 47.5	SAA			
47.5	2.5/2.5 Run 21	AAB 3072 Full 47.0-49.9	0 ppm 230 BK	47.5 to 50 Box 10	SAA bottom of borehole 1000			AAB 3073 Full Suite Random 21.4-21.8 from clay + silt horizon
50								

Prepared by L Shesta Date 7/27/94 Checked By [illegible] Date 5/10/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 25' Page 1 of 2

Start Date/Time 5-1-94/[illegible] End Date/Time 5-1-94/1530

Driller [illegible] Box #(s) 1-2

Drilling Equip./Method [illegible] Hollow Stem Auger

Sampling Equip./Method 5' Stainless Steel Split Barrel Sampler - [illegible]

Depth (feet)	Recovery (feet per feet)	Field Analytical Sample Number	Field Screening Results	Top/bottom of Core in Box	Lithology Petrology Soil	Graphic Log	Lithologic Unit	Notes
0	2.5/2.5 100%	NO SAMPLE	JM=0 β/γ=20	Box [illegible]	Run # 1, 0-2.5 Very loose unconsolidated Dk. Brown sandy silt (SM), trace organics, damp		Homogeneous Alluvium	4" piece of wire and a wooden stake included in sample.
	2.5/2.5 100%	AAB 3055	JM=0 β/γ=[illegible]		Run # 2, 2.5-5.0 Very loose dark brown silty sand (SM), some clay (lumps), damp			Full sample suite, sample from 3.3'-3.5'
5	2.5/2.5 100%	NO SAMPLE	JM=0 β/γ=[illegible]		Run # 3, 5-7.5 Very loose brown coarse sand (SW), some silt & fine sand [illegible] predominantly quartz, damp			
	2.5/2.5 100%	AAB 3055	JM=0 β/γ=[illegible]		Run # 4, 7.5-10 SAA			Sample for rad suite only sample from 9.4'-9.7'
10	2.5/2.5 100%	NO SAMPLE	JM=0 β/γ=[illegible]	Box [illegible]	Run # 5, 10-12.5 Very loose brown coarse sand (SW) some angular gravel clasts predominantly quartz trace silt damp			
	2.5/2.5 100%	AAB 3090	JM=0 β/γ=[illegible]		Run # 6, 12.5-15 SAA			Sample for rad suite only sample from 14.4'-14.6'
15	2.5/2.5 100%	NO SAMPLE	JM=0 β/γ=200	Box [illegible] 15' to 20'	Run # 7, 15-17.5 Very loose unconsolidated brown coarse sand (SM) some angular gravel & clay present clasts predominantly quartz trace silt, moist			
	2.5/2.5 100%	AAB 3090	JM=0 β/γ=[illegible]		Run # 8, 17.5-20 Soft cohesive, red brown inorganic clayey sand (SC) and brown [illegible] phase change to sand at 18.3 ft coarse sand angular gravels moist			Sample for rad suite only sample from 18.3' to 18.5'
20	2.5/2.5 100%	NO SAMPLE	JM=0 β/γ=[illegible]		Run # 9, 20-22.5' Firm, cohesive brown, inorganic clayey silt (MH) phase change from coarse sand to silt at 22.8' trace gravel damp			
22.5	2.5/2.3 92%	AAB3091 AAB3092 AAB0413	JM=0 β/γ=200	Box 1/3 20' to 25'	Run # 10, 22.5'-25' Non welded, pumice rich ~30% vitrified ashflow tuff, fully inflated pumice, 1-4 cm, 2 cm avg, white to lt gray in color, aphanitic, vitric white to lt gray sugary texture matrix is a red brown, fine to v. fine grain ash, <1% lithics present ~5% quartz & sanidine with no visible smaller phenocrysts are angular to subangular ~1-3 mm <5% phenocrysts present some horizontal fractures present ~2-4 cm apart, indurated, damp		Otowi Member of the Bandelier Tuff	Sample AAB3091 for full rad suite collected from 22.5' to 22.8'. AAB3092 is a field blank. AAB0413 is an equipment rinsate blank. First sign of tuff encountered at 22.5 ft. Driller thought he hit refusal at 24.6 ft.

Prepared by Dale [illegible] Date 5-1-94 Checked By [illegible] Date 5/8/94

All JM Readings Are in ppm All β/γ Readings Are in cpm

Sandy Silt

Coarse Sand & Gravel

Clayey Coarse Sand & Gravel

Non Welded Tuff

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 25' To 50' Page 2 of 2

Box #(s) 5-9 [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Driller [illegible] Sampling Equip./Method 5' Stainless Steel Split Barrel Sampler

Drilling Equip./Method [illegible]

Depth (feet)	Recovery (feet/percent)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology Soil	Graphic Log	Lithologic Unit	Notes
25					Run #12 on previous page		Otowi Member of the Bandelier Tuff	
	2.5/2.5 100%	No sample	[illegible] 8/1-220	Box 5 of 9 25 to [illegible]	Run #11, 24.6 - 27.6 SAA Some large [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] 25' [illegible]			Full Sample Size Sample From 28.0' To 28.2' AABL415 is A Blank, AABL416 [illegible]
	2.5/2.5 100%	AABL414 AABL415 AABL416	[illegible] 8/1-240		Run # 12, 27.5 - 30' SAA Tuff Non [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]			Ext. Sample Size Sample From 32.5' To 32.8'
30	5.0/5.0 100%	AAF 2419	[illegible] 8/1-220	Box 6 of 9 [illegible]	Run # [illegible] 30 - 35 SAA			
35	5.0/5.0 100%	AABL420 AABL421 AABL422	[illegible] 8/1-250	Box 7 of 9 40 to 35	Run # [illegible], 35 - 40 Tuff Consisting [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] Sanidine, [illegible] Grains			Ext. Sample Size Sample From 37.5' To 37.8' AABL421 Is Full Sample Size, AABL422 Is A Duplicate
40	5.0/5.0 100%	AAF 2418	[illegible] 8/1-220	Box 8 of 9 [illegible]	Run # 15, 40 - 45 SAA			
45	5.0/5.0 100%	AAF 2420	[illegible] 8/1-190	Box 9 of 9 50 to 45	Run # 16, 45 - 50 ; SAA			Full Sample Size Collected From 47.5' - 47.8'
50					End of Boring 50 Ft			

Prepared by [illegible] Date [illegible] Checked By [signature] Date 8/8/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 30.0 Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 4 Aug 94 1500

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0			1.7 cpm		Dark Brown (5YR 2/2) SAND, SILT [illegible] fine and coarse sand grains [illegible] pumice fragments [illegible]			Aug 3, 1994 began drilling at 1045
2.5			2 cpm		SAA [illegible] 40% sand 40% silt 20% clay			
5.0					5.2 – 7.0 – SAA. 7.0 – 7.5 – Medium to coarse grained angular [illegible] SAND [illegible] (5YR 4/4) [illegible]. 7.5 – 9.0 – Medium to coarse grained SAND [illegible] SILTY SAND [illegible]			
7.5			2 cpm					[illegible] 1510
10.0			2 cpm		Medium grained [illegible] consolidated SAND & CLAY. [illegible] 10.0 – 11.5 [illegible]. 12.6 – 12.9 – SAA			
12.5					12.9 – 13.9 [illegible] fine grained consolidated [illegible] Brown (10YR 5/4) SILT [illegible]. 13.5 – 14.5 [illegible] grained [illegible]			
15.0			2 cpm		15.0 – 16.5 – SAA. 16.5 – 17.5 [illegible] SAND & SILT with dark grey clay inclusions [illegible] 16.5 – 16.7			
17.5			2 cpm		17.5 – 19.5 [illegible] pumice [illegible] SAND [illegible] CLAY matrix. 19.5 – 20.0 [illegible] CLAYEY SAND [illegible]			
20.0			2 cpm		20.0 – 21.0 – Medium grained CLAYEY SAND with pebbles [illegible]. 21.0 – 22.5 [illegible] homogeneous [illegible] reddish brown (10R [illegible]) CLAY			
22.5		AAS[illegible]	2 cpm		22.5 – 24.0 – SAA with pumice fragments [illegible]. 24.0 – 25.0 [illegible] consolidated light grey [illegible]			[illegible] Tuff
25.0			2 cpm	25.0 – 31.0	25.0 – 25.7 – SAA. 25.7 – 26.5 Medium coarse grained [illegible] homogeneous SAND. 26.5 – 30.0 – Consolidated [illegible] pumice fragments [illegible]			
27.5	5.0							
30								

Prepared by [illegible] Date [illegible] 94 Checked By [illegible signature] Date 16 Aug 94

SILT

SAND

CLAY

~~Tuff~~ TUFF [illegible]

Pumice, Rhyolite, Andesite and Obsidian Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 500? Page 2? of 2?

Driller [illegible] Box #(s) 4? Start Date/Time [illegible] End Date/Time 04 Aug 94? [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]OTO[illegible] MEMBER OF BANDELIER TUFF	Ended drilling [illegible] 1540?
39.5	5.0	[illegible]	[illegible]	[illegible]	[illegible]			Aug 4 1994 Began drilling at 0751?
41.5	5.0	[illegible]	[illegible]	[illegible]	[illegible]			
47.5	5.0	[illegible]	[illegible]	[illegible]	[illegible]			End drilling at [illegible] 50 feet 04 Aug 94?
5[illegible]	5.0	[illegible]						

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 16 Aug 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 30' Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time 09 Aug 94 0730 End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	Run 1 2.5/2.5	None	0.2 cpm 30 cpm		Dusty Brown (5YR 2/2) Sandy SILT, Medium grained sand with Abundant Pumice fragments. Abundant [illegible] 70% silt 20% sand 10% silt. Moist, moderately cohesive			9 Aug 94 Started drilling @ 730
	Run 2 2.5/2.5	AA Bureau (Fe...) 4.0-4.5	0.4 cpm 25 cpm		Becoming Sandier with [illegible] Consistent downwards. 50% silt 40% sand 10% clay. [illegible] 15mm. Dry/moist			
	Run 3 2.5/2.5	None	0 cpm 30 cpm		Continuing to coarsen downwards with 5-10mm Pebbles/gravel SILTY SAND 75% sand 20% silt 5% clay. Moist unconsolidated			100mm Rhyolite Cobble found at 8'
	Run 4 2.5/2.5	AA Bureau (Rad) 8.5-9.5	0.1 cpm 30 cpm		7.5-8.5' SAA 8.5-10' Fining of Sand grains to medium-fine. Unconsolidated, homogeneous moist SAND Moderate Brown (5YR 4/4)			Abundant Roots and small rhyolite pebbles 5-10mm
	Run 5 2.5/2.5	AA Bureau Gas Rad 11.0-11.8	[illegible]		10-11.0 SAA 11.0-12.5 Moderate Brown SILTY CLAY 70% clay 20% silt 10% sand. Few pumice fragments. Cohesive			Contact [illegible] @ 30cm 340 cpm
12.5	Run 6 2.5/2.5	None	0 cpm 30 cpm		Fine to Sand, dry, coarse grained alluvial SAND. Angular unconsolidated homogeneous Moderate Brown (No Roots)			
	Run 7 2.5/2.5	AA Bureau Rad AA Bureau 16.0-17.5	0 cpm 30 cpm		15.0-15.5 SAA 15.5-17.0 Very fine moderately consolidated SILT, Dry 17.0-17.5 Fine to medium angular sand [illegible]			Roots Reappear
	Run 8 2.5/2.5	None	0 cpm 30 cpm		17.0-19.0 Med-Coarse grained angular unconsolidated SILTY SAND Homogeneous and dry 19.0-20.0 Very fine consolidated SILTY CLAY. Banded [illegible] Dusty Brown (5YR 2/2)			
	Run 9 2.4/2.5	AA Bureau Rad [illegible]	0 cpm 30 cpm		20-[illegible] SAA [illegible] Moderately [illegible] [illegible] Abundant Dry			
	Run 10 2.3/2.5	None	0 cpm 30 cpm		23.4-23.7 [illegible] 23.7-25.0 SILT SAA [illegible]			
25	Run 11 2.4/2.5	AA Bureau (Rad) [illegible]	0 cpm 30 cpm		SAA with [illegible] clay banding [illegible] becomes CLAY			
	Run 12 2.5/2.5	None	0 cpm 30 cpm		SILTY CLAY increasing in lithic fragments. [illegible] Small to medium [illegible] 10YR 5/2 [illegible]		Alluvium	[illegible]
30								

Prepared by [illegible] Date Aug 9 94 Checked By [illegible] Date [illegible]

SILT
SAND
CLAY
TUFF
Rhyolite Pebbles or Cobbles

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30 – 32.5 – 35	Run 15, 5.0/5.0	AAB[illegible] (RAD); AAB[illegible]; 335-33.5	[illegible] Bkgd; RL	[illegible]	[illegible] clay. [illegible] consolidated [illegible] small [illegible] pumice present [illegible] Orange [illegible] Dry [illegible]	[illegible]	[illegible]	
35 – 37.5 – 40	Run 14, 5.0/5.0	AAB[illegible] (RAD); [illegible]	[illegible]; RL	[illegible]	Clay [illegible] fine [illegible] small to medium [illegible] pumice gravel [illegible]	[illegible]	[illegible]	
40 – 42.5 – 45	Run 15, 5.0/5.0	AAB[illegible] (RAD); [illegible]	[illegible]; RL	[illegible]	SAA [illegible]. Changing [illegible] Pale Orange 10YR5/5	[illegible]	[illegible]	
45 – 47.5 – 50	Run 16, 5.0/5.0	AAB[illegible] (RAD); 47.8-49.3	[illegible]; BL	[illegible]	SAA	[illegible]	[illegible]	[illegible] Drilling at Depth [illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

SILT

SAND

CLAY

TUFF

[illegible], Pumice, and Obsidian [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time [illegible] End Date/Time 28 Jul 94 1530

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–2.5	2.5/2.5 Cor 1	none	0 ppm 240 βγ	[illegible]	Alluvium, heterogeneous, [illegible] brown, 5YR 4/4, organic rich, SILT, some sand, trace [illegible] and pumice pebbles. First [illegible] of core is moist, remaining core is damp. ALLUVIUM		ALLUVIUM	[illegible] 0710
2.5–5	2.4/2.5 Cor 2	[illegible] Full	0 ppm 200 βγ	[illegible]	SAA, increase in grain size downwards to silt and coarse [illegible]			
5–7.5	2.0/2.5 Cor 3	none	0 ppm 250 βγ	[illegible]	SAA, increase in grain size downwards to SAND, some fine gravel, pumice fragments (pebble size) increase downwards			
7.5–10	2.5/2.5 Cor 4	[illegible] Cas	0 ppm 130 βγ	Box 1	SAA			
10–12.5	2.5/2.5 Cor 5	none	0 ppm 240 βγ		10–11.4 SAA 5YR 4/4; 11.4–12 light brown, silt, heterogeneous, silt [illegible] clays [illegible]; 12–12.5 SAND, some fine gravel, [illegible] heterogeneous			
12.5–15	2.5/2.5 Cor 6	[illegible] Cas	0 ppm 150 βγ	[illegible]	SAA			break at 0910 resume @ 1000
15–17.5	2.4/2.5 Cor 7	none	0 ppm 140 βγ	Box [illegible]	[illegible] silt, heterogeneous, [illegible] brown 5YR 5/2, silt, some sand, trace gravel			
17.5–20	2.2/2.5 Cor 8	[illegible] Cas	0 ppm 200 βγ	[illegible]	SAA			
20–22.5	2.5/2.5 Cor 9	[illegible] Full	0 ppm 220 βγ	[illegible]	20–20.5 [illegible] clayey silt ([illegible]); 20.5–20.9 [illegible] brown silt; 20.9–21.9 [illegible] brown clayey silt ([illegible]); 21.9–22.5 [illegible] brown silt; 22.5–23.4 [illegible] brown clayey silt			
22.5–25	1/2.5 Cor 10	[illegible] Cas	0 ppm 180 βγ	[illegible]	23.4–24 light gray welded tuff (boulder)			hit ROCK!
	0/1 Cor 11	NA	NA		complete core loss			
25–27.5	2.5/2.5 Cor 12	none	0 ppm 240 βγ	Box [illegible]	25–26 soft heterogeneous light brown silt, trace sand [illegible]; 26– [illegible] silt [illegible] clay matrix surrounding pumice fragments and cobbles of welded tuff (soil-tuff interface)		SOIL-TUFF INTERFACE	
27.5–30	2.5/2.5 Cor 13	[illegible] Cas	0 ppm 160 βγ	[illegible]	SAA light brown heterogeneous, firm, 7.5YR 6/4, abundant pumice fragments (unwelded [illegible]) in matrix of clay			Break for lunch 1149

Prepared by Laurd Sh[illegible] Date 29 Jul 94 Checked By [illegible] Date 8/8/94

[illegible]

[illegible]

[illegible]

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1232 TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 6-10 Start Date/Time [illegible] End Date/Time 28 Jul 94 1520

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless steel split barrel

Core #	Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Lithologic Unit	Notes
14	30	2.3 / 2.5 Core 14	none	0 ppm [illegible]	[illegible]	SAA	Upper Tuff Interface	[illegible] 1250; [illegible] 1505; [illegible] 1515
15		2.3 / 2.5 Core 15	AAB [illegible] [illegible]	0 ppm 220 cpm	[illegible]	32.5 32.3 SAA [illegible] [illegible]		
16	35	2.5 / 2.5 Core 16	none	0 ppm 250 cpm	Box 7 top [illegible]	SAA 95% [illegible] 5% lithics (dark pebbles) and ground mass		
17	37.5	2.5 / 2.5 Core 17	AAB 3083 [illegible]	0 ppm 240 cpm	[illegible]	SAA	Lower Bandelier Tuff	AAB 3085 - high rad [illegible] from 41.8 42.3 360 cpm [illegible]
18	40	5.0 / 5.0	AAB 3085 [illegible]	0 ppm 240 [illegible] 360 [illegible]	[illegible]	SAA		
	42.5	Core 18	AAB [illegible] [illegible] Rad	[illegible]	[illegible] 42.5			
	45	5.0 / 5.0		0 ppm 220 cpm	[illegible] 42.5	SAA		
50	47.5	Core 19	AAB 3086 47.4-[illegible] [illegible]		[illegible] 47.5-50 ft	Bottom of Borehole 1520		
	50							

Prepared by Laurel Shaskin Date 29 Jul 94 Checked By [illegible] Date 8/8/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1233 TA/OU 10-1022 Drill Depth From 0 To 50 Page 1 of 2

Driller [illegible] Box #(s) 1-[illegible] Start Date/Time 05 Aug 94 [illegible] End Date/Time 08 Aug 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run #1 2.7/2.5	None	0.1 Cum 130 cpm β γ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.5	Run #2 2.5/2.5	AAB0447 (Full) [illegible]	0 Cum 150 cpm β γ	[illegible]	[illegible]		[illegible]	
5	Run #3 2.7/2.5	None	0 Cum [illegible] cpm β γ	[illegible]	[illegible]	[illegible]	[illegible]	
7.5	Run #4 2.5/2.5	AAB0445 (Rad) [illegible]	0 Cum 200 cpm β γ	[illegible]	[illegible]		[illegible]	
10	Run #5 2.1/2.5	None	0 Cum 200 cpm β γ	[illegible]	SAA		[illegible]	
12.5	Run #6 2.5/2.5	AAB0447 (Rad) [illegible]	0 Cum 150 cpm β γ	[illegible]	[illegible]	[illegible]		[illegible]
15	Run #7 2.5/2.5	None	0.1 Cum 200 cpm β γ	[illegible]	[illegible]	[illegible]	[illegible]	
17.5	Run #8 2.5/2.5	AAB0456 (Rad) [illegible]	0 Cum 150 cpm β γ	[illegible]	[illegible]	[illegible]	[illegible]	
20	Run #9 2.5/2.5	None	0 Cum 250 cpm β γ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22.5	Run #10 2.4/2.5	AAB0451 (Rad) AAB0450 [illegible]	0 Cum 220 cpm β γ	[illegible]	[illegible]		[illegible]	
25	Run #11 2.5/2.5	None	0 Cum 270 cpm β γ	[illegible]	[illegible]		[illegible]	
27.5	Run #12 2.3/2.5	AAB0457 (Full) AAB0455 [illegible]	0 Cum 270 cpm β γ	[illegible]	[illegible]	[illegible]	[illegible]	28.5 [illegible]
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

SILT
SAND
CLAY
Tuff
[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	5.0 / 5.0	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	5.0 / 5.0	[illegible]	[illegible]	[illegible]	SAA			
[illegible]	5.0 / 5.0	[illegible]	[illegible]	[illegible]	SAA			[illegible]
[illegible]	5.0 / 5.0	[illegible]	[illegible]	[illegible]	SAA			1300 Completed [illegible] drilling.

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

SILT
SAND
CLAY
TUFF
Rhyolite, Andesite, Obsidian Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5	[illegible] (RAD)	[illegible]		[illegible]			[illegible]
	Run 2 2.5/2.5	[illegible]	[illegible]		[illegible]			
5	Run 3 2.5/2.5	None	0 ppm [illegible]		SAA [illegible]			[illegible]
	Run 4 2.5/2.5	[illegible]	0 ppm [illegible]		[illegible] SILTY SAND [illegible]			[illegible]
	Run 5 2.5/2.5	None	0 ppm [illegible]		SAA [illegible]			
12.5	Run 6 2.5/2.5	[illegible] (RAD)	0 ppm [illegible]		[illegible] SILTY CLAY [illegible] SILT [illegible]			[illegible]
15	Run 7 2.5/2.5	None	0 ppm [illegible]		15.2 [illegible]			
17.5	Run 8 2.5/2.5	[illegible] Rad	0 ppm [illegible]		Moderately Consolidated [illegible] SILTY SAND [illegible]			
20	Run 9 2.5/2.5	[illegible]	0 ppm [illegible]		[illegible] SAND and Clay [illegible]			[illegible] 1335
22.5	Run 10 2.5/2.5	[illegible] (Full [illegible])	0 ppm [illegible]		SAA - 95% Clay Consolidated Clay			
25	Run 11 2.5/2.5	None	0 ppm [illegible]		SAA			
27.5	Run 12 2.5/2.5	[illegible] Rad	0 ppm [illegible]		Unconsolidated [illegible]			27.5 - Soil Tuff Contact
30								

Prepared by [illegible] Date 10 Aug 94 Checked By [signature] Date [illegible]

SILT

SAND

CLAY

TUFF

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50' Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 10 Aug 94 1350

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–35	5.5/5	[illegible]	[illegible]	[illegible]	SAA [illegible]	[illegible]		
35–40	5.9/5	[illegible]	[illegible]	[illegible]	SAA [illegible]	[illegible]		
40–45	5.0/5	[illegible]	[illegible]	[illegible]	SAA - [illegible]	[illegible]		
45–50	5.0/5	[illegible]	[illegible]	[illegible]	SAA	[illegible]		Drilling ended at 1350 when depth 50' was achieved

Prepared by [illegible] Date 10 Aug 94 Checked By [illegible] Date [illegible]

SILT

SAND

CLAY

TUFF

Rhyolite, Pumice, and Obsidian Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1 [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5	None	40 cpm [illegible] Pb		Dark Brown (5 YR 2/4) homogeneous [illegible] SILTY SAND [illegible]		ALLUVIUM	Began drilling 11 Aug 94 at 0945.
2.5	Run 2 2.5/2.5	AAB0415 (Rad) AAB0416 [illegible]	[illegible] Pb		SAA SANDY SILT, [illegible]			
5	Run 3 2.5/2.5	None	29 cpm [illegible] Pb		[illegible] SILTY SAND. [illegible]			
7.5	Run 4 2.5/2.5	AAB0417 (Rad) 9.7.5	12 cpm [illegible] Pb		[illegible]			
10	Run 5 2.5/2.5	None	21 cpm [illegible] Pb		[illegible] 15% silt 15% clay			
12.5	Run 6 2.5/2.5	AAB0455 (Rad) 14.2-14.9	0 cpm [illegible] Pb		[illegible] CLAYEY SAND [illegible]			- Sharp SAND-CLAY Interface
15	Run 7 2.5/2.5	None	0 cpm [illegible] Pb		[illegible] in CLAYEY SAND [illegible]			- [illegible]
17.5	Run 8 2.5/2.5	AAB0458 (Rad) 18.5-19.2	0 cpm [illegible] Pb		17.5 Moderately Consolidated CLAYEY SAND. [illegible] CLAYEY SAND [illegible] fragments			- Large Rhyolite [illegible]
20	Run 9 2.5/2.5	None	7 cpm [illegible] Pb		[illegible] 21.5-22.5 clay [illegible]			Stopped drilling for lunch at 1125. Resumed 1319. - 22' Tuff [illegible]
22.5	Run 10 2.5/2.5	AAB0460 (Rad) [illegible]	0 cpm [illegible] Pb		22.5-23.5 [illegible] 23.5-25 [illegible]			
25	Run 11 2.5/2.5	None	0 cpm [illegible] Pb		Dry Consolidated [illegible] Pink 5 YR 7/2 [illegible] Tuff [illegible]			
27.5	Run 12 2.5/2.5	AAB0491 RAD 28.5-29.4	0 cpm [illegible] Pb		27.5-28.5 SAA 28.5-30.0 Moderately Consolidated homogeneous SILTY SAND [illegible] 5 YR [illegible]			
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

Silt and Clay

Sand

Gravel

Rhyolite [illegible]

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50 Page 2 of 2

Driller [illegible] Box #(s) 3 - 10 Start Date/Time 11 Aug 94, [illegible] End Date/Time 12 Aug 94, 0735

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	5.0 / 5.0	AAB[illegible] (Field Screening) AAB[illegible] F[illegible]	0 ppm 200 ppm / [illegible]	[illegible]	30-31.5 - SANDSTONE Alluvial Sediment moderately consolidated. 31.5-35.0 - [illegible] 10YR [illegible] moderately consolidated [illegible]	[illegible]	Alluvium; [illegible] Tuff	
35	3.9 / 5.0	[illegible] AAB[illegible]	[illegible] ppm	[illegible]	35-[illegible] [illegible] amounts of clay	[illegible]	Tuff	[illegible] drilling at hole [illegible] Exchanged [illegible] 0702
40	4.5 / 5.0	AAB[illegible] AAB[illegible]	200 ppm 0 ppm	[illegible]	SAA - trace amounts of clay [illegible]	[illegible]	[illegible]	[illegible] sample AAB[illegible] - 300 ppm
45	4.8 / 5.0	AAB[illegible] AAB[illegible] AAB[illegible]	[illegible] ppm	[illegible]	SAA - [illegible] clay with depth [illegible] increasing [illegible]	[illegible]	[illegible]	TD 0735
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

[illegible] Clay

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]
2.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
5	[illegible]		[illegible]	[illegible]	[illegible]			[illegible]
7.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
10	[illegible]			[illegible]	[illegible]			
12.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
15	[illegible]		[illegible]	[illegible]	[illegible]			
17.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
20	[illegible]		[illegible]	[illegible]	[illegible]			
22.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
25	[illegible]		[illegible]	[illegible]	[illegible]			
27.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
30								

moderate reddish brown (10R 4/6) to moderate reddish orange (10R 6/6)

Prepared by [illegible] Date [illegible] Checked By Derek Faulk Date 1 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ______ TA/OU ______ Drill Depth From ______ To ______ Page ______ of ______

Driller ______ Box #(s) ______ Start Date/Time ______ End Date/Time ______

Drilling Equip./Method ______ Sampling Equip./Method ______

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	

Prepared by ______ Date ______ Checked By [illegible signature] Date 1 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ______ TA/OU ______ Drill Depth From ______ To ______ Page ______ of ______

Driller ______ Box #(s) ______ Start Date/Time ______ End Date/Time ______

Drilling Equip./Method ______ Sampling Equip./Method Stainless Steel Core Barrel, Dry

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Prepared by ______ Date ______ Checked By Derek Frueh Date 1 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ______ TA/OU ______ Drill Depth From ______ To ______ Page ______ of ______

Driller ______ Box #(s) ______ Start Date/Time ______ End Date/Time ______

Drilling Equip./Method ______ Sampling Equip./Method ______

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes

Prepared by ______ Date ______ Checked By Dick Fruk Date 1 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Steel Split Spoon [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		Alluvium	[illegible]
								Break 1400
								Back in 1430

Prepared by [illegible] Date [illegible] Checked By [signature] Date 12 July 94

Silt

Sand

Gravel

Non [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Run #	Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
11	30	5.0/5.0	[illegible]	[illegible]	[illegible]	[illegible]		Tuff	
12		5.0/5.0	[illegible]	[illegible]	[illegible]	[illegible]			
14		5.0/5.0	[illegible]	[illegible]	[illegible]	[illegible]			
15		5.0/5.0	[illegible]	[illegible]	[illegible]	[illegible]			TD 1540

Prepared by [illegible] Date [illegible] Checked By Derek Faulk Date 12 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
2.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
7.5	[illegible]		[illegible]	[illegible]	[illegible]			
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
12.5	[illegible]		[illegible]	[illegible]	[illegible]			
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
17.5	[illegible]		[illegible]	[illegible]	[illegible]			
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
22.5	[illegible]		[illegible]	[illegible]	[illegible]			
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
27.5	[illegible]		[illegible]	[illegible]	[illegible]			[illegible] 0835
30								

Prepared by [illegible] Date [illegible] Checked By [illegible signature] Date 1 July 94

Soil

Sand

Gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ______ TA/OU ______ Drill Depth From ______ To ______ Page ______ of ______

Driller ______ Box #(s) ______ Start Date/Time ______ End Date/Time ______

Drilling Equip./Method ______ Sampling Equip./Method ______

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes

Prepared by ______ Date ______ Checked By *Nick Faulk* Date *1 July 94*

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–12	[illegible]	[illegible]	[illegible]	[illegible]	5YR 4/4 ... 5YR 4/4 ... 5YR 4/4 ... 5YR 3/4 ... 5YR 3/4 ... [illegible]	[illegible]	[illegible]	[illegible]

Prepared by [illegible] Date [illegible] Checked By Derek Faulk Date 12 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From ____ To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
15	[illegible]							
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
20	[illegible]	[illegible]						[illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible signature] Date 12 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1241 TA/OU 10/1079 Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Brothers Box #(s) 1-6 Start Date/Time 8 Jul 94 1330 End Date/Time 11 Jul 94 1100

Drilling Equip./Method Failing Eight / Hollow Stem Auger Sampling Equip./Method STAINLESS STEEL SPLIT BARREL

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.5/2.5 Run 1	none	0 ppm 2uc β γ NA α		very soft light brown silt, some sand, little clay, heterogeneous, trace organic; core is dry. Alluvium		ALLUVIUM	Began drilling 8 Jul 94 1330; no α meter
2.5	2.0/2.5 Run 2	AAB 2911 Full 3.5-4.0	0 ppm 2uc β γ NA α		SAA contains medium pebble sized pumice fragments (pale orange)			
5	2.5/2.5 Run 3	none	0 ppm 2uc β γ NA α		SAA			
7.5	1.6/2.5 Run 4	AAB 2912 Rad 8.5-8.9	0 ppm 2uc β γ NA α		SAA core is damp			
10	2.3/2.5 Run 5	none	0 ppm 2uc β γ NA α		very soft light brown heterogeneous fine to medium sand; some silt, trace clay, damp core, fining downwards to fine sand and silt			
12.5	2.5/2.5 Run 6	AAB 2913 Rad 12.7-13.2	0 ppm 2uc β γ NA α		~~SAA except from~~ 12.5-13.2 there is a moderate brown silt, trace sand, trace clay horizon; 13.2 heterogeneous medium sand, some gravel, trace silt, moist core. Alluvium			0247 break; Began drilling 0756 11 Jul 94; no α meter
15	2.2/2.5 Run 7	none	0 ppm 2uc β γ NA α		SAA gravel consists of pumice fragments. Sand is composed of quartz & feldspar grains			
17.5	2.4/2.5 Run 8	AAB 2914 Rad 19-19.4	0 ppm 2uc β γ NA α		17.5-19.4 SAA; 19.4 silt light brown clayey silt, heterogeneous, damp core			AAB 3002 Full, Full for high rad (300 ppm β)
20	2.3/2.5 Run 9	AAB 3002 Full 22-22.3	0 ppm 3 m β γ NA α		silt moderate brown silt, some fine sand, trace clay, stiff heterogeneous, 3.5 mm size pumice pinkish gray in color. Alluvium, Stratified core			
22.5	2.3/2.5 Run 10	AAB 2996 RAD 24-24.3	0 ppm 2uc β γ NA α		22.5-23.5 SAA with medium sand; 23.5 silty clay, firm, light brown, little sand, damp core; 24.3 coarse sand and clasts of dacite andesite			
25	2.1/2.5 Run 11	none	0 ppm 2uc β γ NA α		SAA medium sand little gravel; slight change in color from light brown 5YR5/4 to light brown at 26.5 ft			
27.5	2.4/2.5 Run 12	AAB 2997 29.3-29.6 RAD	0 ppm 2uc β γ NA α		27.5-28.8 SAA; 28.8-29.3 pinkish gray dark silt with pieces of gravel 5YR 8/1; 29.3 firm light brown silty clay little fine sand trace medium sand 5YR5/6			
30								

Prepared by Laurel Stecher Date 11 Jul 94 Checked By Bruce Brown Date 7/11/94

[ ] silt
[ ] sand
[ ] gravel
[ ] nonwelded ash ...

Rad suite: gross α β γ, XRT metals, ...

Full Suite: gross α β γ, Total U, Sr-90, TAL metal, SVOA

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To ____ Page 2 of ____

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	2.2/2.5	none	[illegible]		Stiff, [illegible] silty clay (SAA) [illegible]			
25	1.4/2.5	AAB [illegible] 34-34.5	[illegible]		SAA interbedded with [illegible] clay			AAB 3[illegible] Full [illegible] from soil/tuff interface 33.9-34.3
	2.2/2.5	none	[illegible]		[illegible] pumice [illegible]			
	2.5/2.5	AAB2999 [illegible]	[illegible]		SOIL TUFF INTERFACE [illegible]			
	5.0/5.0	AAB 3[illegible]	[illegible]		SAA		Lower Bandelier Tuff	
	5.0/5.0	AAB 3[illegible] Full [illegible]	[illegible]		SAA			
					bottom of hole [illegible]			Full suite [illegible] AAB 3002 22-22.3
								Random [illegible] from [illegible] the soil-tuff interface AAB 3003 33.9-34.3

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 7/1/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time [illegible] 0715 End Date/Time [illegible] 1150

Drilling Equip./Method [illegible] Auger Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	2.5/2.5	none	[illegible] NDA	[illegible]	0-1.2 [illegible] silt, some fine sand, little clay, organic rich (roots). Trace of [illegible]		ALLUVIUM	[illegible] 0715 L.P. Green is driller
2.5	2.3/2.5	AAB [illegible]	0 ppm [illegible] NDA	[illegible]	1.2-2.5 [illegible] gravel, [illegible] heterogeneous. 2.5-4.1 SAA [illegible] heterogeneous, [illegible] sand			AAB [illegible] field blank
5	2.3/2.5	AAB [illegible]	0 ppm [illegible] NDA	[illegible]	SAA (still organic rich, [illegible] roots)			
7.5	2.5/2.5	AAB [illegible]	0 ppm [illegible] NDA	[illegible]	SAA			
10	2.0/2.5	none	0 ppm [illegible] NDA	[illegible]	[illegible] heterogeneous [illegible] sand [illegible]			[illegible] replaced [illegible] as driller (0835)
12.5	2.4/2.5	AAB [illegible]	0 ppm [illegible] NDA	[illegible]	SAA [illegible]			
15	2.0/2.5	none	0 ppm [illegible] NDA	[illegible]	SAA [illegible] fine sand and silt [illegible]			
17.5	2.4/2.5	AAB [illegible]	0 ppm 240 [illegible] NDA	[illegible]	SAA [illegible] heterogeneous, silt, some sand, little clay, pale brown			
20	2.3/2.5	none	0 ppm 240 [illegible] NDA	[illegible]	SAA except [illegible] clay [illegible] slight increase in amount of [illegible] clay, sand			
22.5	2.5/2.5	AAB [illegible]	0 ppm [illegible] NDA	[illegible]	SAA clayey sand, [illegible]. 24.2 drilled through a boulder of [illegible] and medium grained sand			take break 0935 entered EE 1007
25	2.5/2.5	none	0 ppm [illegible] NDA	[illegible]	25-26.2 [illegible] silt, very [illegible] heterogeneous fine grained sand, [illegible] silt [illegible]. 26.2 [illegible] sand, increasing sand [illegible]			
27.5	2.5/2.5	AAB [illegible]	0 ppm 240 [illegible] NDA	[illegible]	27.5-29.1 SAA [illegible], increasing silt, more clay to silty clay. 29.1 [illegible] welded [illegible] interlayered with silt, sand, clay			
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

[illegible] silt
[illegible] sand
[illegible] gravel
[illegible]

RAD Suite
gross αβγ moisture
XRF metals
SVOA Screen

Full Suite
gross αβγ moisture
TAL metals
SVOA
Total U S-90
High Explosives

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of [illegible]

Driller [illegible] Box #(s) 7-10 Start Date/Time [illegible] End Date/Time 14 Jul 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology Soil	Graphic Log	Lithologic Unit	Notes
30	2.0 / 2.5	AAB [illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
	2.2 / 2.5	AAB [illegible]	[illegible]	[illegible]	[illegible]			
	2.0 / 5.0	AAB 3028	[illegible]	[illegible]	SAA [illegible]			
	5.0 / 5.0	AAB 30[illegible]	[illegible]	[illegible]	SAA			
	5.0 / 5.0	AAB [illegible]	[illegible]	[illegible]	SAA ... bottom of borehole			AAB 3031 [illegible]
		AAB [illegible]						[illegible] 300 cpm [illegible] AAB 3032 6.2-6.8 [illegible] AAB 3033 from sed tuff [illegible] 50.3-[illegible]

Prepared by [illegible] Date 14 Jul 94 Checked By [illegible] Date 7/[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of ____

Driller [illegible] Box #(s) 1-5 Start Date/Time [illegible] End Date/Time ____

Drilling Equip./Method [illegible] Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.0/2.5	none	[illegible]		[illegible]		ALLUVIUM	[illegible] 0946
2.5	2.5/2.5	[illegible]	[illegible]		SAA			
5	2.4/2.5	none	[illegible]		SAA [illegible]			
7.5	2.5/2.5	AAB 3235	[illegible]		SAA [illegible] sand [illegible]			
10	2.5/2.5	AAB [illegible]	[illegible]		SAA [illegible]			
12.5	0/2.5	[illegible]	NA		NO RECOVERY			[illegible]
15	2.5/2.5	AAB 3237	[illegible]		[illegible] light brown [illegible] medium [illegible] sand [illegible]			[illegible]
17.5	0/2.5	[illegible]	NA		NO RECOVERY			
20	2.5/2.5		[illegible]		[illegible] sand and silt [illegible] trace clay [illegible]			
22.5	2.5/2.5	[illegible]	[illegible]		SAA [illegible] clay [illegible]			
25	2.5/2.5	AAB 3045	[illegible]		SAA [illegible] sand and silt [illegible] gravel			AAB 3045 = [illegible] (260 cpm [illegible])
27.5	2.3/2.5	AAB 3050	[illegible]	Box 5	[illegible] sand and gravel [illegible]			
30								

Prepared by [illegible] Date 7/5/94 Checked By [illegible] Date [illegible]

silt

sand

gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1245 TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 6-9 Start Date/Time [illegible] 0740 End Date/Time 18 3 94 0830

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	1.5/2.5	NONE	0 ppm [illegible]	Box 6 of 9	SAA ↓		ALLUVIUM	[illegible] EZ 1358 [illegible] 18 3 94 at 0740
32.5	Run 13 1.2/2.5	AAB 30[illegible] 332-335	0 ppm [illegible]		SAA ↓			Background for PID = 0 ppm
35	Run 14 2.5/2.5	AAB 30[illegible] Full 3[illegible]	0 ppm [illegible]	Box 7 of 9	2.5 Y [illegible] clay, heterogeneous, silt, [illegible], contains pebbles of dacite and pumice [illegible] sand			AAB 3042 random full
37.5	Run 15 5.0/5.0	AAB 3041 353-[illegible]	0 ppm [illegible]		37.5-38 SAA; 38-39 [illegible] pumice fragments in matrix of clay - soil-tuff interface; 39 nonwelded ignimbrite [illegible]			Soil-tuff transition zone
40					[illegible] in color, [illegible] down to [illegible] in matrix of pumice [illegible] glass shards and [illegible] fragments of dacite		LOWER BANDELIER TUFF [illegible]	
42.5	Run 16 4.9/5.0	AAB 3043 [illegible]	NA [illegible]	Box 8 of 9	SAA ↓			ovm not functioning properly
45	↓							
47.5	Run 17 1.5/2.5	AAB 30[illegible] Full 48.1-[illegible]	0.1 ppm [illegible]	Box 9 of 9	SAA			ovm working again
50	Run 18				Bottom of borehole 0830			high rad [illegible] AAB 3045 259-265 PY = 280 [illegible] in clay rich [illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.4/2.5	none	[illegible] NDA		[illegible] clayey silt ... [illegible] ALLUVIUM			[illegible] EZ [illegible]
2.5	2.5/2.5	[illegible]	[illegible]		[illegible] fine sand ... [illegible]			
5	2.2/2.5	none	[illegible] NDA		SAA			
7.5	2/2.5	[illegible]	[illegible] NDA		SAA			
10	2.4/2.5	none	[illegible] NDA		[illegible] little fine sand [illegible]			Thunderstorm!
12.5	2.5/2.5	[illegible]	[illegible] NDA		[illegible] medium sand, some [illegible]			[illegible] EZ 11:55
15	2.5/2.5	none	[illegible] NDA		[illegible] clayey silt, moderate [illegible]		ALLUVIUM	
17.5	2.5/2.5	[illegible]	[illegible] NDA		[illegible] sharp contact with [illegible] some clay			
20	1.7/2.5	[illegible]	[illegible] NDA		SAA [illegible]			
22.5	2.5/2.5	none	[illegible] NDA		[illegible] SAA [illegible] clayey silt [illegible]			[illegible]
25	1.7/2.5	none	[illegible] NDA		[illegible] clayey silt [illegible]			
27.5	2.5/2.5	[illegible]	[illegible] NDA		SAA silt, [illegible] clay silt [illegible]			
30								

Prepared by [illegible] Date 13 Jul 94 Checked By [illegible] Date 7/14/94

- silt
- sand
- gravel
- [illegible]

[illegible] Suite
[illegible]

Full Suite
gross αβγ moist
TAL metals
SVOA
Total U Sr-90
High Explosives

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] hollow stem auger Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	2.5/2.5	none	[illegible]	[illegible]	SAA [illegible] clay to silty clay [illegible]			
32.5	2.5/2.5	AAB [illegible]	[illegible]	[illegible]	[illegible]			
35	5.0/5.0	AAB [illegible]	[illegible]	[illegible]	[illegible]			AAB 3013 Field blank; Blank [illegible]
40	5.0/5.0	AAB [illegible]	[illegible]	[illegible]	SAA [illegible]			AAB 3015 Rinsate Blank
45	5.0/5.0	AAF [illegible]	[illegible]	[illegible]	SAA			[illegible] AAB 3017 taken in clay [illegible] 32 - 32.5 ft; High RAD = AAB 3017 AAB 3016 taken at [illegible] of [illegible] 45 - 47 [illegible] 390 [illegible]; [illegible] AAB 3018 12.5 - 13.1 [illegible]
50					[illegible]			

Prepared by [illegible] Date 13 Jul 94 Checked By [illegible] Date [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From ______ To 5[illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 15 June 94, 1630

Drilling Equip./Method [illegible] Sampling Equip./Method Split Spoon [illegible]

Stainless Steel Split barrel [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–2	[illegible]	AAB 2[illegible]	[illegible]		[illegible] SILT			
2–4	2.5/[illegible]	AAB 2[illegible]	[illegible]		[illegible] brown 5YR 3/4 [illegible] SILT			
4–10	[illegible]	AAB 2[illegible]	[illegible]		dark yellowish brown 10YR 4/2 [illegible] SILT [illegible]			
10–12	[illegible]	AAB 25[illegible]	[illegible]		dark yellowish brown 10YR 4/2 [illegible] SAND [illegible]			
12–15	[illegible]	AAB 2[illegible]	ND		moderate yellowish brown 10YR 5/4 [illegible] silty sand [illegible]			
15–17	[illegible]	AAB 25[illegible]	ND		moderate yellowish brown 10YR 5/4 [illegible] silty SAND [illegible]			
17–20	[illegible]	AAB 25[illegible]	ND		moderate yellowish brown 10YR 5/4 [illegible] silty SAND [illegible]			
20–22	[illegible]	AAB 283[illegible]	ND		10% [illegible] moderate yellowish brown 10YR 5/4 coarse grained [illegible] sandy SILT low moisture			Break taken 1105 Start drilling 1210
22–25	1.5/2.5	[illegible]	ND		moderate yellowish brown 10YR 5/4 [illegible] sandy SILT low moisture			
25–27	[illegible]	AAB 2[illegible]	ND		moderate yellowish brown 10YR 5/4 [illegible] sandy silt low moisture and cohesive			
27–30	2.0/2.5	AAB 28[illegible]	ND		moderate yellowish brown 10YR 5/4 [illegible] grained sandy SILT low moisture low cohesiveness			

Prepared by [illegible] Date 15 June 94 Checked By [illegible] Date 27 June 94

[illegible] sand

[illegible] silt

[illegible] gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible] 94, 1030

Drilling Equip./Method [illegible] Sampling Equip./Method Split Spoon [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–34	[illegible]			[illegible]	[illegible]			
35–37	1.5/5	[illegible]	[illegible] 300BY [illegible]	[illegible]	[illegible] 5YR 3/4 [illegible] SAND [illegible] 15% [illegible]	[illegible]	[illegible]	[illegible] Core [illegible] Break 1300 Back in 1430
38–39	2.0/2.0	[illegible]	[illegible]	[illegible]	[illegible] SAND [illegible]	[illegible]		
40–41	[illegible]	[illegible]	200pBY [illegible] 0 ppm	[illegible]	[illegible] 5% [illegible]		[illegible]	
42–44	[illegible]	AAB2841 Radon	[illegible] 0 ppm 200BY [illegible]	[illegible]	[illegible] 5YR 5/6 [illegible] interbedded Silt and Sand moderate moisture and moderate cohesion	[illegible]	[illegible]	
45–47	[illegible]	AAB2842 Radon 423415	0 ppm [illegible] NDA 200BY	[illegible]	upper 1.5' [illegible] interbedded with Silts [illegible] [illegible] 5YR [illegible]	[illegible]	[illegible]	
47–50	[illegible]	AAB2843 [illegible]	0 ppm [illegible] 300BY	[illegible]	AAB 2843 [illegible] Radium/[illegible] [illegible] 5% [illegible]	[illegible]		

Prepared by [illegible] Date [illegible] 94 Checked By [illegible] Date 27 June 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Split Spoon [illegible]

Run #	Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
1	0	[illegible]	[illegible]	0 ppm, 0 N/A, 200 pY	Box 1	[illegible] SILT [illegible]			[illegible] 0715, Began Drilling 0720
2	2.5	2/2.5	AAB2955 [illegible]	0 ppm, 300 pY, 0 N/A		SAA ~5% [illegible]			
3	5	2/2.5	no sample	N/A, 300 pY, 0.0 ppm	Box 2	SAA >5% [illegible]			
4	7.5	2/2.5	[illegible]	N/A, 300 pY, 0 ppm		SAA w/ [illegible] tuff fragments ~5% [illegible]			
5	10	2/2.5	no sample	0 N/A, 300 pY, 0.0 ppm	Box 3	lt brown fine to medium [illegible] Sandy SILT low moisture low cohesion			
6	12.5	1/2.5	AAB2[illegible]	N/A, 300 pY, 0 ppm		SAA			
7	15	2/2.5	no sample	N/A, 200 pY, 0.0 ppm		SAA			
8	17.5	2/2.5	AAB2[illegible]	N/A, 300 pY, 0 ppm	Box 4	lt brown fine to medium [illegible] silty SAND low moisture and cohesion			
9	20	2/2.5	no sample	0 N/A, 0.0 ppm, 200 pY		moderate brown [illegible] SAND medium grained [illegible]			
10	22.5	2/2.5	AAB2[illegible]	N/A, 0 ppm, 200 pY	Box 5	moderate brown, coarse to medium grained, clay rich (30%) SAND with tuff/pumice fragments (<10%) moderate moisture [illegible] cohesion			
11	25	2.5/2.5	no sample	0 N/A, 0.0 ppm, 200 pY		moderate brown coarse to medium grained silty SAND			
12	27.5	2/2.5	AAB2990 [illegible], AAB2991 Dup	0 N/A, 0 ppm, 300 pY	Box 6	lt brown, medium grained silty SAND with 15% tuff/pumice fragments low moisture and cohesion			Break 0935
	30								

Prepared by [illegible] Date [illegible] Checked By [signature] Date 7/94

Silt

Sand

Gravel

non welded [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page [illegible] of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Split Spoon [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2/2.5	[illegible]	0 ppm, N/A, 72°F	[illegible]	SAND Low moisture [illegible]			[illegible]
32.5	[illegible]	AAB [illegible]	0 ppm, 72°F, N/A		Brown very coarse [illegible] sand [illegible]			
35	[illegible]	[illegible]	N/A, 0 ppm, 72°F		SAA			
37.5	[illegible]	AAB [illegible] Field S[illegible]	N/A, 0 ppm, 72°F	[illegible]	SAA			
40	2.3/2.5	AAB [illegible] Field [illegible]	N/A, 72°F, 0 ppm	[illegible]	SAA [illegible] orange brown tuff - clay rich [illegible]			
42.5	2/2.5	AAB [illegible] Field Sam	N/A, 0 ppm, 72°F	Box [illegible]	[illegible] tuff [illegible] 15% lithics 30-45% pumice clay [illegible]			
45	[illegible]	[illegible]	N/A, 72°F, 0 ppm	[illegible]	[illegible] brown [illegible] 15% lithics [illegible] 30-55% pumice clay rich [illegible]			
47.5	[illegible]	AAB [illegible] Field [illegible]	N/A, 72°F, 0 ppm	Box [illegible]	[illegible] pumice			TD [illegible]
50								

Prepared by [illegible] Date [illegible] Checked By [illegible signature] Date 7 1 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 50 Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 21 June 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–2.5	2.5/2.5	[illegible]	0 0 ppm, NDA, [illegible]	Box 1	Medium Brown, Clayey [illegible] SILT [illegible] moderate brown 5YR 4/4			[illegible] 0780 Drilling Began 0800
2.5–5	2.0/2.5	no sample	0 0 ppm, NDA, [illegible]		Medium brown, Clay [illegible] SILT [illegible] moderate brown			
5–7.5	2.5/2.5	[illegible]	0 0 ppm, [illegible], NDA		Medium [illegible] Clay [illegible] SILT [illegible] moderate brown			
7.5–10	[illegible]	no sample	0 0 ppm, [illegible], NDA	Box 2	Medium brown [illegible] moderate brown 5YR 4/4 [illegible] SAND			
10–12.5	2.5/2.5	AAB[illegible]	[illegible], NDA		Medium brown [illegible] moderate brown 5YR 4/4			
12.5–15	[illegible]	no sample	0 0 ppm, [illegible], NDA	Box 3	SAA [illegible] moderate brown 5YR 4/4			
15–17.5	1.5/[illegible]	[illegible]	0 0 ppm, [illegible], NDA		[illegible] SAND [illegible] moderate brown 5YR 4/4; SAA [illegible]			
17.5–20	[illegible]	no sample	0 0 ppm, NDA, [illegible]		[illegible] moderate brown 5YR 4/4			Break 0943
20–22.5	[illegible]	AAB[illegible] Field Dup AAB[illegible]	0 0 ppm, [illegible], NDA		SAA first [illegible] coarse grained Sandy SILT moderate moisture / [illegible] moderate brown 5YR 4/4			
22.5–25	1.6/[illegible]	no sample	0 0 ppm, [illegible], NDA	Box 4	[illegible] SILT moderate moisture low cohesion lt Brown [illegible] yellowish brown 10YR 5/4			
25–27.5	2/[illegible]	AAB[illegible] 25'-27.5' AAB[illegible]	0 0 ppm, 240 B[illegible], NDA	Box 5	Lt Brown [illegible] SAND [illegible] yellowish brown 10YR 5/4			
27.5–30	2/[illegible]	no sample	[illegible], NDA, 0 0 ppm		lt brown silty SAND [illegible] low moisture [illegible] cohesion moderate yellowish brown 10YR 5/4			Break due to weather 1152

Prepared by [illegible] Date 20 [illegible] Checked By [illegible] Date 1 July '94

Silt

Sand

Gravel

Non-welded [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method FAILING [illegible] [illegible] Sampling Equip./Method Stainless Steel Core Barrel [illegible] Spoon [illegible]

Run	Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
13	30–32	[illegible]/2.5	[illegible]	[illegible] cpm, 220 BY, N/A	Box (cont.)	lt brown medium to fine/coarse silty SAND [illegible] moderate yellowish brown 10YR 5/4			[illegible] 0700 Drilling Began 0705 [illegible] not working
14	32–35	[illegible]/2.5	no sample	0 ppm, 240 BY, 0 NA		lt [illegible] SAND moderate [illegible] / coarse [illegible] moderate yellowish brown 10YR 5/4			
15	35–37	2.5/2.5	[illegible] AAB [illegible]	N/A, 0 ppm, 220 BY		SAA small amounts [illegible] gravel [illegible] SAND [illegible] coarse [illegible] moderate yellowish brown 10YR 5/4			
						SAA moderate yellowish brown 10YR 5/4			
16	37–40	1.4/2.5	no sample	N/A, 0 ppm, 200 BY	Box [illegible]	SAA some pumice fragments [illegible] 10YR 4/2 dark yellowish brown			
17	40–42	1.6/2.5	AAB2480 [illegible]	N/A, 200 BY, 0 ppm		yellowish brown [illegible] SAND with increasing pumice [illegible]			
18	42–45	2.5/2.5	no sample	N/A, 200 BY, 0 ppm	Box [illegible]	buff fragments [illegible]			
19	45–47.5	2.5/2.5	AAB [illegible]	0 ppm, N/A, 300 BG		lt brown/orange [illegible] pumice [illegible] 20-30% [illegible] dark [illegible]			
20	47.5–50	2.5/2.5	AAB2582 [illegible]	N/A, 300 BY, 0 ppm	[illegible]	lt orange/cream [illegible] 10YR 8/2 [illegible] pumice [illegible]			TD 50 ft 0940

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 1 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 50 Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method Hollow Stem Auger Sampling Equip./Method Split Spoon

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	2/5	sample	0 ppm 200 pBY NDA	Box 1 of 10	moderate brown, top soil silt 10-15% gravels moderate moisture low cohesion			Entered site 0650 Begin drilling 0715
2.5	1.5/5	AAB 6430 2.5-2.7 AAB 6429 [illegible]	0 ppm 300 pBY NDA		SAA			
5	2.5/5		0 ppm NDA 280 pBY	Box 2 of 10	moderate brown fine grained sandy SILT - [illegible] 20% [illegible]			
7.5	3/5	AAB [illegible] 7.5-7.7 Field Screen	0 ppm NDA 260 pBY		moderate brown [illegible] fine grained SAND - no clay low moisture - low cohesion >5% organics			
10	[illegible]		0 ppm NDA 280 pBY	Box 3 of 10	SAA			
12.5	5/5	AAB [illegible] 12.5-12.7	0 ppm 280 pBY NDA		moderate brown silty medium grained SAND low moisture - low cohesion			Break 0845 Back in 0900
15	3/5		0 ppm 280 pBY NDA	Box 4 of 10	moderate brown silty clay rich medium grained SAND low moisture / cohesion			
17.5	2/5	AAB [illegible] 17.5-17.7 Field Screen	0 ppm 280 pBY NDA		lt brown clay rich (20-30%) fine grained [illegible] SILT low moisture and cohesion			
20	2/5		0 ppm 280 pBY NDA	Box 5 of 10	SAA			
22.5	2/5	AAB 6434 22.5-22.7 Field Screen	0 ppm 280 pBY NDA		[illegible] brown clay-rich (20-30%) SILT w/ 20% gravels - tuff fragments - [illegible] low moisture and cohesion			
25	5/5		0 ppm 260 pBY NDA	Box 6 of 10	lt brown clay (10%) silty (30%) SAND w/ 20% gravel - tuff fragments low moisture and cohesion			
27.5	5/5	AAB 6435 27.5-27.7 Field Screen AAB 6443 [illegible] 29.4-30.0	0 ppm 300 pBY NDA	Box 6 of 10	SAA			
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 1 July 94

Silt

Sand

Gravel

Nonwelded Tuff [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible] 1140

Drilling Equip./Method [illegible] Sampling Equip./Method Split Spoon

Run #	Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
13	30 / 32.5	3/5	[illegible] 25-27 Field Screen	0 PPM 300 BKY NDA	Box 1 of 10	[illegible] brown [illegible] SAND [illegible] [illegible] tuff [illegible] and gravel			
14	35	1.5/5		0 PPM 300 BKY NDA	Box	SAA			
15	37.5	1.5/2.5	AAB[illegible] 25-[illegible] Field Screen	0 PPM NDA [illegible]	Box 8 of 10	SAA			
						38 [illegible] moderate brown, coarse grained sand / [illegible] tuff fragments / [illegible] no [illegible] moderate [illegible]			
16	40	2/2.5		0 PPM 300 BKY NDA					
						40 [illegible] moderate brown [illegible] gravelly sand as above [illegible] contact with tuff [illegible] 44.0 feet [illegible] weathered tuff w/ pumice [illegible]			
17	42.5	2/2.5	AABL[illegible] 25-[illegible] Field Screen, AABL[illegible] 39 [illegible] Field Screen	0 PPM 300 BKY, 0 PPM	Box 9 of 10	[illegible] tuff - color 60% pumice, 20% lithics, 20% clay [illegible] moderate [illegible] poorly consolidated			
18	45 / 47.5	3/2.5	AABL[illegible] 40 [illegible] Field Screen	0 PPM 300 BKY NDA	Box				
						[illegible] tuff - no [illegible] 65% pumice, [illegible] lithics			
		3/6		0 PPM 300 BKY NDA	10 of 10 Box				TD 1140
	50	1.9/6	AAB[illegible] Field Screen, AAB[illegible] 42 Field Blank, AAB[illegible] Rinsate Blank	0 PPM NDA		SAA			

Prepared by [illegible] Date [illegible] Checked By Neil Faulk Date 1 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 50 Page 1 of 2

Driller [illegible] Box #(S) [illegible] Start Date/Time [illegible] End Date/Time 13 [illegible] 94 1025

Drilling Equip./Method [illegible] Sampling Equip./Method Split Spoon [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0–2.5	2.5/2.5	[illegible]	[illegible]		[illegible]			[illegible]
2.5–5	2.5/2.5	[illegible]	[illegible] NDA		[illegible]			
5–7.5	2.5/2.5	XRF	[illegible] NDA		SILT [illegible]			
7.5–10	2/2.5	[illegible]	[illegible]		[illegible]			[illegible]
10–12.5	2.5/2.5	[illegible] XRF	NDA		SAND [illegible]			
12.5–15	2.5/2.5	[illegible]	[illegible]		SAND, [illegible]			
15–17.5	2.5/2.5	[illegible] XRF	NDA		SAA			
17.5–20	2.5/2.5	[illegible]	[illegible]		SAA [illegible]			
20–22.5	2/2.5	[illegible] XRF	NDA	Box [illegible]	Silty SAND [illegible]			
22.5–25	2.5/2.5	[illegible]	NDA		Sandy SILT [illegible]			
25–27.5	1.5/2.5	[illegible]	NDA	Box [illegible]	SAA [illegible]			
27.5–30	2.5/2.5	[illegible]	0 OPP [illegible] NDA	[illegible]	[illegible] SILT w/ [illegible]			End drilling 1500 [illegible]

Prepared by [illegible] Date [illegible] 94 Checked By [illegible] Date 1 July 94

[illegible] SAND [illegible] [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page 2 of 2

Driller Stewart [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 17 June 94 1025

Drilling Equip./Method Hollow Stem Auger Sampling Equip./Method Split Spoon

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–32	2/2	[illegible]	0 cpm / 2 ucs / N/A	[illegible]	[illegible] SILT low moisture [illegible]			[illegible] 0920 Started Drilling 0945 [illegible]
32–34	2/2	AAB[illegible]	0 cpm / 2 [illegible] / N/A	Box [illegible]	[illegible] SAND with [illegible] moderate moisture [illegible]			
35–37	2/2.5	[illegible]	0 cpm / N/A / 2 [illegible]		[illegible] moderate [illegible] no recovery			
38–40	0/2.5							
40–42	2/2.5	[illegible] AAB[illegible]	[illegible] / N/A	Box [illegible]	[illegible] SAND w/ gravel [illegible] SAND [illegible] fragments moderate [illegible]			Break 0920 [illegible] 0950
42–45	2/2	AAB[illegible]	0 cpm / [illegible] / N/A		Silty SAND [illegible] 10% gravel weathered [illegible]			
45–47	2/2.5	AAB[illegible]	0 cpm / N/A / [illegible]		lt gray [illegible] weathered tuff [illegible] moderate / low [illegible]			
47–50	2/2.5	AAB[illegible]	0 cpm / [illegible] / N/A	Box [illegible]	lt gray [illegible] weathered tuff [illegible] moderate [illegible]			TD 1025

Prepared by D. [illegible] Date 17 June 94 Checked By [illegible] Date 1 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	2/2		[illegible]	[illegible]	[illegible]		Alluvium	[illegible]
2.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
5	2/2	[illegible]	[illegible]	[illegible]	[illegible]			
7.5	1/2.5		[illegible]	[illegible]	SAA			
10	0/2		[illegible]	[illegible]	[illegible]			
12.5	2/2.5	[illegible]	[illegible]	[illegible]	[illegible]			
15	[illegible]		[illegible]	[illegible]	SAA [illegible]			
17.5	2/2	[illegible]	[illegible]	[illegible]	[illegible]			
20	[illegible]		[illegible]	[illegible]	[illegible]			
22.5	2/2	[illegible]	[illegible]	[illegible]	[illegible]			Break 0910 Back – 1000 [illegible]
25	2/2	[illegible]	[illegible]	[illegible]	[illegible]			
27.5	2/2	[illegible]	[illegible]	[illegible]	SAA [illegible]			
30								

Prepared by [illegible] Date [illegible] Checked By [signature] Date 12 July 94

Silt

Sand

Gravel

Non-Welded Tuff

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Drill Depth From [illegible] To [illegible] Page 2 of 2

Borehole ID [illegible] TA/OU [illegible] Start Date/Time: [illegible] End Date/Time [illegible]

Driller [illegible] Box #(s) [illegible] Sampling Equip./Method [illegible] Barrel

Drilling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–35	5.0/5.0	[illegible]	[illegible] NDA 0 ppm	[illegible]	[illegible]		Bandelier Tuff	
35–40	5.0/5.0	[illegible]	[illegible] NDA 0 ppm	[illegible]	[illegible]			
40–45	5.0/5.0	AAB6226 [illegible] / AAB6225 403-409 [illegible]	240 [illegible] NDA 0 ppm	[illegible]	SAA [illegible] at 41.0 41.05 – rust colored object			
45–50	5.0/5.0	[illegible]	240 [illegible] NDA 0 ppm	[illegible]	SAA			TD [illegible]

Prepared by D. [illegible] Date [illegible] Checked By [illegible] Date 12 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 50 Page 1 of 2

Driller [illegible] Box #(s) 1 - 5 Start Date/Time [illegible] 1035 End Date/Time [illegible]

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Run #	Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
1	0	2/2.5		NDA 2.5 ppm		[illegible] SILT [illegible]		Alluvium	[illegible]
2	2.5	2/2.5	AAB6255	NDA ppm		[illegible] silty SAND [illegible]			
3	5	1.8/2.5	AAB6257	NDA ppm		SAA [illegible] SILT [illegible]			
4	7.5	2.5/2.5		NDA ppm		SAA [illegible] SAND [illegible]			
5	10	0/2.5	AAB6260	NDA ppm		SAA			
6	12.5	2/2.5		NDA ppm		SAA [illegible]			
7	15	2/2.5	AAB6261	NDA ppm		moderate [illegible] SAND [illegible]			
8	17.5	2/2.5		NDA ppm		SAA to 18.5 [illegible] sandy SILT [illegible] clay moderate moisture and cohesion			
9	20	2/2.5	AAB6262	NDA ppm		[illegible] SAND [illegible]			
10	22.5	2/2.5		NDA ppm		SAA			
11	25	2/2.5	AAB6263	NDA 0 ppm		[illegible] sandy SILT clay [illegible] SAND [illegible]			
12	27.5	2/2.5	AAB6264	NDA 0 ppm		SAA [illegible] 28.5 ft [illegible] sandy SILT moderate moisture and cohesion			

Prepared by D. [illegible] Date [illegible] Checked By [illegible] Date 18 July 9[illegible]

Silt

Sand

Gravel

Non-welded Ignimbrite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Stem Auger Sampling Equip./Method [illegible] Split Barrel

Run #	Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
13	30	2/2.5	AAB[illegible] 30.0-[illegible] [illegible]	220 βγ / α N/A / 0 ppm	[illegible]	SAA		Alluvium	
14	32.5	2/2.5		220 βγ / α N/A / 0 ppm	[illegible]	SAA			Breakdown [illegible] 1245 [illegible]
15	35	2/2.5	AAL[illegible] 35.0-[illegible] [illegible]	220 βγ / α N/A / 0 ppm	[illegible]	[illegible]		Tuff Alluvium Transition Zone	[illegible]
16	37.5	2.5/2.5		220 βγ / α N/A / 0 ppm	[illegible]	SAA - [illegible]			
17	40	5/5	AAB[illegible] 40.0-[illegible] [illegible]; AAB[illegible] [illegible]	240 βγ / α N/A / 0 ppm	[illegible]	SAA 350 βγ at 44.5 ft		Lower Bandelier Tuff	
18	45	5/5	AAB[illegible] 45.0-45[illegible] [illegible]; AAB[illegible] 49-50 [illegible]	240 βγ / α N/A / 0 ppm	[illegible]	SAA - less silt and clay [illegible] staining [illegible] fractures			TD 0355 Leave [illegible] 0815
	50								

Prepared by [illegible] Date [illegible] Checked By [illegible signature] Date 18 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	[illegible]		[illegible]		[illegible]			[illegible]
	[illegible]	[illegible]	[illegible]		[illegible]			
	[illegible]	[illegible]	[illegible]		[illegible]			
	[illegible]		[illegible]		[illegible]			
	[illegible]	[illegible]	[illegible]		[illegible]			
	[illegible]		[illegible]		[illegible]			
	[illegible]	[illegible]	[illegible]		[illegible]			
	[illegible]		[illegible]		[illegible]			[illegible]
	[illegible]	[illegible]	[illegible]		[illegible]			
	[illegible]		[illegible]		[illegible]			
	[illegible]	[illegible]	[illegible]		[illegible]			
	[illegible]		[illegible]		[illegible]			[illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 [illegible] 94

Silt

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Core Barrel [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
								TD [illegible]

Prepared by [illegible] Date [illegible] Checked By [signature] Date 12 [illegible] 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ________ TA/OU ________ Drill Depth From ____ To 20 Page ____ of 2

Driller ________ Box #(s) ____ Start Date/Time ________ End Date/Time ________

Drilling Equip./Method ________ Sampling Equip./Method ________

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
1					[illegible]			[illegible]
2		[illegible]	[illegible]					
3		[illegible]	[illegible]		[illegible]			
4			[illegible]		[illegible]			
5		[illegible]	[illegible]		[illegible]			
6			[illegible]		[illegible]			
7		[illegible]	[illegible]		[illegible]			
8			[illegible]		[illegible]			
9		[illegible]	[illegible]		[illegible]			
10			[illegible]		[illegible]			Break [illegible]
11		[illegible]	[illegible]		[illegible]			

Prepared by ________ Date ________ Checked By [signature] Date 18 July 94

Silt

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ______ TA/OU ______ Drill Depth From ______ To ______ Page ______ of ______

Driller ______ Box #(s) ______ Start Date/Time ______ End Date/Time ______

Drilling Equip./Method ______ Sampling Equip./Method ______

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]

Prepared by ______ Date ______ Checked By [signature] Date 18 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1234 TA/OU 10/1079 Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time 5-11-94 [illegible] End Date/Time 5-11-94 [illegible]

Drilling Equip./Method [illegible] Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2/2.5		[illegible] N/A [illegible]		[illegible] SILT with 10% organics, low moisture [illegible]			Entered zone 10SC [illegible] Drilling 1037 [illegible]
2.5	2/2.5	AAB [illegible]	[illegible] N/A [illegible]		SAA			
5	2/2.5	AAB [illegible]	[illegible] N/A [illegible]		[illegible] SAND [illegible] SILT [illegible]			
7.5			[illegible]		[illegible]			
10	2/2.5	AAB [illegible]	[illegible] N/A [illegible]		[illegible] SAND [illegible]			
12.5	0/2.5				No recovery			
15	2/2.5	AAB [illegible]	[illegible] N/A		SAA [illegible] sandy SILT [illegible]			
17.5	2/2.5		[illegible] N/A		SAA [illegible] SAND [illegible]			
20	2/2.5	AAB [illegible]	[illegible] N/A		[illegible] SAND (30%) SILT (50%) [illegible]			
22.5	2/2.5		[illegible] N/A		SAA [illegible]			
25	2/2.5	AAB [illegible]	[illegible] N/A [illegible]		SAA to [illegible] feet [illegible] sandy SILT [illegible]			Break 1230 Back in [illegible]
27.5	2/2.5	AAB [illegible]	[illegible] N/A		SAA with [illegible] to 25%			
30								

Prepared by [illegible] Date 5-11-94 Checked By [illegible] Date [illegible]

Silt

Sand

Gravel

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 15 Jul 94, 1342

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30 – 32.5	4.5/5.0	[illegible]	[illegible] N/A	[illegible]	30 – [illegible] SAA [illegible] ... 32.5 ft [illegible]	[illegible]	[illegible]	
35 – 37.5	5.0/[illegible]	[illegible]	[illegible] N/A	[illegible]	[illegible]	[illegible]	[illegible]	
40 – 42.5	5/5.0	[illegible]	[illegible]	[illegible]	SAA	[illegible]	Bandelier [illegible]	
45 – 47.5	5/5.0	[illegible]	[illegible] N/A	[illegible]	SAA	[illegible]	Lower [illegible]	TD 1342
50								

Prepared by [illegible] Date 15 Jul 94 Checked By [illegible] Date 18 July 94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time [illegible] 1305 End Date/Time [illegible] 0940

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	Run 1 2.5/2.5		15 Cpm; ≤ 250 cpm/βδ		Pale brown (5 YR 5/3) SANDY SILT. [illegible]			16 Aug 94 Began drilling 1305 hours.
2.5	Run 2	[illegible]	[illegible] ≤ 250 cpm/βδ		[illegible] SILTY SAND [illegible]			
5.0	Run 3 2.5/2.4		[illegible] ≤ 250 cpm/βδ		[illegible] SILT [illegible]			
7.5	Run 4 2.5/2.5	[illegible]	[illegible] ≤ 250 cpm/βδ		[illegible] Pumice [illegible]			[illegible] 1450
10.0	Run 5 2.5/2.5		[illegible] ≤ 250 cpm/βδ		[illegible]			
12.5	Run 6 2.5/2.5	[illegible] Rad [illegible]	0 Cpm ≤ 250 cpm/βδ		SAA		ALLUVIUM	
15.0	Run 7 2.5/2.5		0 Cpm ≤ 250 cpm/βδ		SAA			
17.5	Run 8 2.5/2.5	[illegible]	0 Cpm ≤ 250 cpm/βδ		SAA			stopped drilling for the day at 1590
20.0	Run 9 2.5/2.5	[illegible]	[illegible] ≤ 250 cpm/βδ		SAA moist			17 Aug 94 began drilling at 0730
22.5	Run 10 2.5/2.5	[illegible] Rad 233-393	0 Dcpm ≤ 250 cpm/βδ		SAA			
25.0	Run 11 2.5/2.5		0 Dcpm ≤ 250 cpm/βδ		SAA			Full suite [illegible] sample [illegible] middle of [illegible]
27.5	Run 12 2.5/2.5	[illegible] 233-253	[illegible] ≤ 250 cpm/βδ		SAA 29.0-30.0 becomes CLAYEY SILT more consolidated			
30.0								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

SILT

SAND

CLAY

Pumice Rhyolite Obsidian [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	[illegible] 5/5	[illegible]	0.0 cpm <25c [illegible]	[illegible]	30-31.5 SAA 31.5-32.5 [illegible]	[illegible]	[illegible]	
35	[illegible] 5/5	[illegible]	[illegible] <25c cpm/β	[illegible]	SAA [illegible]		[illegible]	
38	[illegible] 5.0/5.0	[illegible]	[illegible] <25cpm [illegible]	[illegible]	[illegible] 10 YR [illegible] 0.5-15mm [illegible] 90% [illegible]		[illegible]	
40	[illegible] 5.0/5.0	[illegible]	[illegible] <25 cpm/β	[illegible]	SAA [illegible]		[illegible]	
45	[illegible] 5/5.0	[illegible]	[illegible]	[illegible]	[illegible] 10-30mm [illegible]	[illegible]	[illegible]	Ended [illegible] 0940 [illegible] 50'
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

SILT

CLAY

ASH

TUFF

Pumice Rhyolite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY — **CORE SAMPLE LOG**

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.5/2.5	NONE	0 cpm 250 cpm [illegible]	[illegible]	Fine to med. grained, [illegible] moist, heterogeneous SILTY SAND. [illegible] 5YR 2/2 [illegible] [illegible] throughout			26 Aug 94 Began drilling at 0745 hours
2.5	2.5	AAB[illegible]	0 cpm 200 cpm [illegible]	[illegible]	Unconsolidated, homogeneous [illegible] SAND. [illegible]			
5	2.5	NONE	0 cpm 250 cpm [illegible]	[illegible]	[illegible] consolidated [illegible] CLAY. Small pumice fragments present [illegible] SILT. [illegible]			
7.5	2.5/2.5	AAB[illegible] RAD [illegible]	0 cpm 200 cpm [illegible]	[illegible]	[illegible] homogeneous SILT [illegible] becomes a CLAYEY SILT [illegible] moderately consolidated moist [illegible] 5-50mm pumice fragments			
10	2.5	NONE	0 cpm 200 cpm [illegible]	[illegible]	Fine grained moist unconsolidated SILT. Small [illegible] fragments [illegible]			
12.5	2.5	AAB[illegible] RAD [illegible]	0 cpm 200 cpm [illegible]	[illegible]	[illegible] becomes more consolidated at 14 feet, and now [illegible] 25% CLAY 75% SILT.			
15	2.5	NONE	0 cpm 200 cpm [illegible]	[illegible]	SAA			Took break at 0900
17.5	2.5	AAB[illegible] RAD [illegible]	0 cpm 150 cpm [illegible]	[illegible]	SAA, [illegible] more pumice fragments 5-15mm [illegible]			Resumed [illegible] 0925
20	2.5/2.5	NONE	0 cpm 250 cpm [illegible]	[illegible]	SAA			
22.5	2.5/2.5	AAB[illegible] RAD [illegible]	0 cpm 200 cpm [illegible]	[illegible]	SAA [illegible] crystals of quartz, [illegible] and feldspars [illegible] throughout, [illegible] moist			
25	2/2.5	NONE	0 cpm 200 cpm [illegible]	[illegible]	Continuing as fine possibly becoming ASH [illegible] along with other small fragments [illegible]			
27.5–30	2.5/2.5	AAB[illegible] [illegible]	0 cpm 200 cpm [illegible]	[illegible]	SAA, moderately consolidated			Random sample collected [illegible]

Prepared by [signature] Date 26 Aug 94 Checked By [signature] Date 8/31/94

- Full Suite: Gross Alpha, beta, gamma spec, [illegible], [illegible], strontium, TAL metals, semi volatiles
- Field Screening: Gross alpha, beta, gamma spec, Moisture, semi volatiles

SILT
SAND
CLAY
ASH
Pumice and [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	[illegible]	None	[illegible]	[illegible]	[illegible] ASH with TUFF section ... [illegible]			
	2.5	[illegible]	[illegible]	[illegible]	[illegible] to 33.5 feet [illegible]			[illegible] TUFF [illegible]
35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
40	4.8/5.0	[illegible]	[illegible]	[illegible]	[illegible] Pumice fragments [illegible] at 44.7 feet			
45	3.3/5.0	[illegible]	[illegible]	[illegible]	[illegible] TUFF [illegible]		[illegible] TUFF	Drilling ended 26 August [illegible] 1120 hours
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

ASH

TUFF

Pumice Rhyolite Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-12 Start Date/Time [illegible] 0720 End Date/Time 24 August 1994 [illegible]

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5	None	4.1 ppm NDA/ β1	0 5.0 Box 1 & 2/10	Moderate to Coarse grained alluvial sediments Dusky Brown 5YR 2/2 to Moderate Brown 5YR 3/4, Dark grains angular in a silt matrix. 70% sand 20% silt 10% clay. [illegible]		ALLUVIUM	24 Aug 94. Began drilling at 0720. Asphalt present at 1.5 foot interval
2.5	Run 2 2.5/2.5	AAB6537 Full AAB6538 [illegible]	0 ppm NDA/ β		DAA - becoming more CLAY rich at the 4' interval Changing to light Brown 5YR 5/6 and is moderately consolidated. Moist			AAB6538 Rinsate 2.0-4.2
5.0	Run 3 2.2/2.5	None	2.3 ppm NDA/ β1	0 9.0 Box 3/10	45% CLAY 25% SILT 30% SAND Moderately consolidated with small white pumice fragments ≤ 10mm [illegible] phenocrysts [illegible] altered. Dry to moist			
7.5	Run 4 2.5/2.5	AAB6540 RAD 8.1-8.5	0 ppm 300 cpm β1		Very fine grained homogeneous SILT. Moderately consolidated well sorted. Dry			
10.0	Run 5 2.5/2.5	None	0 ppm 25 NDA/ β	10.0 15.0 Box 3/10	DAA w/ pumice fragments containing small pumice phenocrysts. Moist			
12.5	Run 6 2.5/2.5	AAB6541 RAD AAB6542 [illegible] AAB6543	0 ppm NDA/ β		DAA, becoming lighter to Pale Yellowish Orange 10YR 8/6			300 cpm 24 Aug ~~[illegible]~~ ~~[illegible]~~ 12.5 - 14.0 Tuesday break at 0900 hours Resumed drilling at 1045 hours
15.0	Run 7 2.3/2.5	None	0 ppm NDA/ β1	15.0 20.0 Box 4/10	DAA			
17.5	Run 8 2.5/2.5	AAB6544 RAD 18.6-19.0	0 ppm NDA/ β1		DAA with pumice fragments becoming more abundant comprising 8%. Fragments have small quartz phenocrysts and [illegible] altered [illegible]			
20.0	Run 9 2.5/2.5	AAB6537 Full Random 20.0-20.8	0 ppm NDA/ β1	20.0 25.0 Box 5/10	DAA, with pumice % dropping to about 6%.			Took random Full Suite Sample at transition zone between SILT and ASH
22.5	Run 10 2.5/2.5	AAB6545 RAD 23.6-23.9	0 ppm NDA/ β1		Fining to a very fine grained, [illegible], homogeneous ASH. Minor lithics present along with rhyolite and pumice fragments		TSHIREGE	
25.0	Run 11 2.5/2.5	None	0 ppm NDA/ β1	25.0 30.0 Box 6/10	DAA, Dry to moist with phenocrysts and crystals becoming more abundant. Last 5' at 27-27.5' more consolidated with 10-15mm pumice fragments			
27.5	Run 12 2.5/2.5	AAB6546 Full Random 28.4-29.1	0 ppm NDA/ β1		Fine to very fine ASH. Pinkish white pumice fragments 5-20mm with small quartz phenocrysts. Moderately consolidated. Dry to moist			Random Sample collected at apparent bottom of fill area
30.0								

Prepared by [signature] Date 24 Aug 94 Checked By [signature] Date [illegible]

· Full Suite ·
Gross alpha, beta, gamma spec, moisture, total uranium, strontium, TAL metals, Semi-volatiles

· Field Screening ·
Gross alpha, beta, gamma spec, moisture, Semi-volatiles, [illegible]

SILT
SAND
CLAY
ASH
Pumice Rhyolite [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 24 August 94 1430

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 1.5/2.5	None	0 cpm NDA/ βγ	30.0 [illegible]	SAA. 95% ASH 5% Pumice and other lithics		MEMBER OF the BANDALIER TUFF ↓	
32.5	Run 14 2.5/2.5	AAB6047 RAD 33.5 33.7	0 cpm NDA βγ	30.0 [illegible]	32.5-33.0 SAA 33.0 35.0 light grey, dry, consolidated Tuff [illegible] feldspar phenocrysts. 90% pumice [illegible]			Ended drilling at 1200 for lunch. 33.0-35.0 soft Tuff [illegible]
35	Run 15 5.0/5.0	AAB6048 RAD [illegible]	0 cpm NDA βγ	40.0 [illegible]	SAA. Pumice & Crystals increasing [illegible] 5-7% [illegible] Pumice fragments to 50mm			Resumed Core at 1345 hours
40	Run 16 5.0/5.0	AAB6549 RAD 43.9-44.3	0 cpm NDA/ βγ	45.0 [illegible]	Becoming lighter colored [illegible] consolidation. 75% ASH 25% Pumice and lithics. Ash massive very fine grained, homogeneous well sorted [illegible] minor lithics 44.0-50.0 grey crystalline TUFF consist of 85% Pumice 10% crystals and 10% ash			~~45.0 50.0 Tuff~~ JDD 24 Aug
45	Run 17 5.0/5.0	AAB6550 [illegible] 45.5-49.9	0 cpm NDA βγ	45.0 50.0	Grey crystalline TUFF. Comprising 95% pumice 5% crystals and phenocrysts. Moderately consolidated, dry, homogeneous. Pumice fragments are slightly welded. 1-3 mm phenocrysts [illegible] Other constituents [illegible] include [illegible] obsidian, biotite, quartz, and feldspar			Drilling ended at 1430 hours at a total depth 50 feet
50								

Prepared by [signature] Date 24 Aug 94 Checked By [signature] Date 7/?/94

ASH

TUFF

Pumice, Rhyolite, obsidian fragment

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-10 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	Run 1 2.5/2.5	NONE	Ø cpm ≤ 250 cpm βγ		Fine to medium grained, [illegible] ... Dark Brown 5YR 3/2 to [illegible] 5YR [illegible]		ALLUVIUM	[illegible] Aug 94. Began drilling at 1450 hours
2.5	Run 2 2.5/2.5	[illegible] Full	Ø cpm ≤ 250 cpm βγ		[illegible] consolidated dry SILT [illegible]			
5.0	Run 3 2.5/2.5	NONE	[illegible]		SAA [illegible]			
7.5	Run 4 2.5/2.5	[illegible]	[illegible]		SAA [illegible] ... [illegible]			
10	Run 5 2.5/2.5	NONE	Ø cpm ≤ 250 cpm βγ		[illegible] homogeneous dry [illegible] 5YR 5/6 SILT [illegible]			
12.5	Run 6 2.5/2.5	[illegible] 241 [illegible]	Ø cpm ≤ 250 cpm βγ		12.5-13.2 SAA; 13.2-13.5 Consolidated [illegible] TUFF [illegible] ... 13.5 SAA			29 Aug 94 Drilling ended at 1530 hours [illegible]; 30 Aug 94 Drilling began at 0715 hours
15	Run 7 2.5/2.5	NONE	Ø cpm ≤ 250 cpm βγ		[illegible] homogeneous SILT dry [illegible]			
17.5	Run 8 2.5/2.5	[illegible] 240 [illegible]	Ø cpm ≤ 250 cpm βγ		SAA			
20	Run 9 2.5/2.5	NONE	Ø cpm ≤ 250 cpm βγ		SAA becoming moist and possibly [illegible]			
22.5	Run 10 2.5/2.5	[illegible] 240 [illegible]	Ø cpm ≤ 250 cpm βγ		Coarsening [illegible] slightly, [illegible] quartz grains. [illegible] Moderate Yellowish Brown 10YR 5/4			
25	[illegible] 2.5/2.5	NONE	Ø cpm ≤ 250 cpm βγ		SAA moist.			
27.5	Run 12 2.5/2.5	[illegible] Full	Ø cpm ≤ 250 cpm βγ		Fine grained, [illegible] homogeneous, dry to moist ASH. Pale Yellowish Orange 10YR 8/6 with [illegible] and small 2-10mm Pumice fragments			Random full sample collected [illegible] Alluvium Ash interface
30								

Prepared by [signature] Date 30 Aug 94 Checked By [signature] Date [illegible]

- Full Suite -
Gross alpha, beta, gamma, [illegible], [illegible], [illegible], TAL metals, semi-volatiles.

Field Screening
Gross alpha, beta, gamma [illegible], [illegible], semi-volatiles, [illegible]

SILT
SAND
ASH
Pumice and Rhyolite Fragments
TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 15 2.3/[illegible]	None	0 cpm <250 cpm Bt	[illegible]	Becoming more consolidated very pale orange 10YR 8/4 Tuff with quartz and feldspar phenocrysts. [illegible] [illegible] [illegible]			
32	Run 14 2.3/[illegible]	[illegible] RAD [illegible]	0 cpm <250 cpm Bt	[illegible]	Moderately consolidated [illegible] ASH. Dry [illegible] [illegible] [illegible]			
35	Run 15 5.0/5.0	[illegible] RAD 35.0-[illegible]	0 cpm <250 cpm Bt	[illegible]	AAA [illegible] 30% pumice			
40	Run 16 5.0/5.0	[illegible] RAD 40.0-41.5	0 cpm <250 cpm Bt	[illegible]	AAA [illegible] 45 feet [illegible] [illegible]			
45	Run 17 5.0/5.0	[illegible] Full 45.0-49.9	0 cpm <250 cpm Bt	[illegible]	[illegible] Tuff [illegible] fragments [illegible] [illegible] 50% [illegible]			Drilling ended at 0900 at depth 50 feet
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

Ash

Rhyolite and Pumice Fragments

Tuff

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To ___ Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 18 Aug 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.5 / 2.5		0.0 cpm ≤ 35c	[illegible]	0.0-0.4 Topsoil [illegible] ... [illegible]		ALLUVIUM	Began drilling 17 Aug 1994 at 1350 hours
2.5	2.5 / 2.5	AAB [illegible]	[illegible] 52 cpm [illegible]		2.5-3.2 AAA; 3.5-5.0 [illegible]			
5	2.5 / 2.5		0.0 cpm ≤ 35c [illegible]		[illegible] SILT [illegible] from 7.4-7.5 feet			Drilling ended at 1440 hours due to rain
7.5	2.5 / 2.5	AAB6513 [illegible]	0.0 cpm ≤ 35c [illegible]		AAA [illegible]			18 Aug 1994 Drilling resumed at 0730 hours [illegible]
10	2.5 / 2.5		0.0 cpm ≤ 35c	[illegible]	AAA [illegible]			
12.5	2.5 / 2.5	AAB6514 RAD [illegible]	0.0 cpm ≤ 35c [illegible]		AAA			
15	2.5 / 2.5		0.0 cpm ≤ 35c [illegible]		AAA			
17.5	2.5 / 2.5	AAB6517 RAD/ [illegible]	70 cpm ≤ 35c [illegible]		AAA			High cpm [illegible] sample [illegible]
20	2.5 / 2.5		0.0 cpm ≤ 35c [illegible]	[illegible]	AAA [illegible] 22.0-22.5			
22.5	2.5 / 2.5	AAB6518 RAD AAB6517 [illegible]	12 cpm ≤ 35c [illegible]		Changing to ASH with very fine [illegible] [illegible] unconsolidated [illegible]			Took a break at 0930 hours; Resumed drilling at 1010 hours
25	2.5 / 2.5		0.0 cpm ≤ 35c [illegible]	[illegible]	25.0-26.0 AAA [illegible]; [illegible] CLAYEY SILT [illegible] unconsolidated			
27.5	2.5 / 2.5	AAB6520 [illegible]	0.0 cpm ≤ 35c [illegible]	[illegible]	[illegible] grayish orange 10YR 7/4 unconsolidated homogeneous ASH			
30								

Prepared by [signature] Date 18 Aug 94 Checked By [signature] Date [illegible]

SILT
SAND
CLAY
ASH
[illegible]
Rhyolite Pumice Obsidian Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 1 [illegible]		[illegible] <250 cpm/ft	[illegible]	[illegible] ASH TUFF [illegible] welded [illegible]		OTAWI MEMBER of the BANDELIER TUFF	
32.5	Run [illegible] 2.5 [illegible]	Archive [illegible]		[illegible]	32.5 - 33.7 [illegible] Ash 33 [illegible] 35.0 [illegible] Ash [illegible]			
35	Run 3 4.5 / 5.0	Archive RAD [illegible]	[illegible] <250 cpm/ft	[illegible]	35.0 - 37.5 [illegible] Ash [illegible] 37.5 - 40.0 [illegible] Ash [illegible]			
40	Run [illegible] 5.0 / 5.0	Archive RAD [illegible]		[illegible]	SAA 44.7 - 45.0 [illegible]			Tested [illegible] at 1115 Returned at 1520 44.7 [illegible] Tuff Interface
45	Run [illegible] 4.5 / 5.0	[illegible]		[illegible]	[illegible] feldspars [illegible]			Ended drilling at 1200 hours 18 Aug 1994 at a depth of 50'.
50								

Prepared by [illegible] Date 18 Aug 94 Checked By [illegible] Date [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1 - 6 Start Date/Time 25 Aug 94 0750 End Date/Time 25 Aug 94 1445

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	Run 1 2.5/2.5	NONE	Top 2.0 cpm Rest [illegible] cpm Screening	0.0 - 5.0 Box 1	Very moist med-coarse grained topsoil sediment 0.0-2.0 - 50% SAND 50% SILT. Abundant roots. 2.0-2.5 - 70% SILT 25% SAND 5% CLAY. Pumice fragments present small asphalt present 2Y.		ALLUVIUM	25 Aug 94 Began drilling at 0750 hours.
2.5	Run 2 2.5/2.5	AAB6552 Fun 2.5-3.5	0 cpm 220 cpm βγ		Moist fine to med grained SANDY SILT. Large asphalt concrete at 3.0 ft. Moderately consolidated, homogeneous			
5.0	Run 3 2.5/2.5	NONE	0 cpm 225 cpm βγ	5.0 - 10.0 Box 2	Consolidated SILTY CLAY with 5-20 mm size pink pumice with 2 mm quartz phenocrysts. Matrix is fine grained, moist, and dark yellowish brown 10YR 4/2			
7.5	Run 4 2.5/2.5	AAB6553 RAD 8.5-9	0 cpm 150 cpm βγ		7.5-8.5 - Very moist consolidated CLAYEY SILT. 8.5-10.0 - Consolidated, fine grained SILT with small angular fragments and moderately abundant [illegible] pumice fragments			Tool a break at 0925 hours. Resumed at 0945 hours
10.0	Run 5 2.5/2.5	NONE	0 cpm 200 cpm βγ	10.0 - 15.0 Box 3	Very fine unconsolidated homogeneous, moist sandy SILT. 20 mm pumice fragments present			
12.5	Run 6 2.5/2.5	AAB6554 RAD AAB6555 Dup	0 cpm 150 cpm βγ		DAA - 13.0. 13.0-15.0 - Becoming moderately consolidated with an increase in clay to 30%, homogeneous CLAYEY SILT			
15.0	Run 7 2.5/2.5	AAB6565 [illegible] Random 15.0-15.5	0 cpm 190 cpm βγ	15.0 - 20.0 Box 4	Fining back to SILT, unconsolidated to moderately consolidated. Pumice fragments			
17.5	Run 8 2.5/2.5	AAB6556 RAD 18.9-19.3	0 cpm 200 cpm βγ		DAA			
20.0	Run 9 2.2/2.5	NONE	0 cpm 300 cpm βγ	20.0 - 25.0 Box 5	DAA to ~~21.8~~ 21.8. 21.8-22.5 - Coarser grained with numerous pumice fragments. Pumice exhibits [illegible] vapor phase alteration and slight welding			
22.5	Run 10 2.5/2.5	AAB6557 RAD 23.7-24.1	0 cpm 200 cpm βγ		22.5-24.0 Very fine grained homogeneous SILT. 24.0-25.0 Consolidated fine grained SILT to ASH matrix with small crystals and pumice fragments			
25.0	Run 11 2.2/2.5	AAB6558 [illegible] Random 25.[illegible]	0 cpm 150 cpm βγ	25.0 - 30.0 Box 6	Fine unconsolidated, grayish orange 10YR 7/4 ASH. 2-5 mm quartz crystals present in homogeneous clay ASH matrix			Random sample collected at SILT - ASH interval
27.5	Run 12 2.2/2.5	NONE	0 cpm 225 cpm βγ		DAA becoming more consolidated, less crystals, but pumice (light gray) ~~becoming~~ present.			
30.0								

Prepared by [signature] Date 25 August 94 Checked By [signature] Date [illegible]

☐ SILT
☐ SAND
☐ CLAY
☐ ASH
☐ Rhyolite and Pumice Fragments

- Fingerprint -
Gross Alpha, Beta, gamma spec, moisture, [illegible] uranium, strontium, TAL metals, and Semi-volatiles

- Field Screening
[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50' Page 2 of 2

Driller [illegible] Box #(s) [illegible] - 10 Start Date/Time 25 August [illegible] End Date/Time 25 August 94 1445

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] split barrel

Depth (feet)	Recovery (feet per total / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30'	Run 13 2.0/2.5	AAB6551 RAD 303-317	0 Ovm 2000 cpm βγ	30.0 35.0 Box 9 of 10	30.5-32.0 SAA with less pumice, more homogeneous ASH. 32.0-32.5 TUFF. Base moderately consolidated, pumice, nonwelded, few small quartz phenocrysts		Otowi Member of the Bandalier Tuff	32.0' dark Tuff interface
32.5'	Run 14 2.0/2.5	None	0 Ovm 1500 cpm βγ		Very fine uniform dense pale yellowish orange 10YR 8/6 ASH, dark pink stain on some of the pumice fragments, mostly homogeneous.			Took a lunch break at 1200 hours
35'	Run 15 2.5/2.5	AAB6[illegible] RAD 3[illegible]-365	0 Ovm 1500 cpm βγ	35.0 40.0 Box 9 of 10	Moderately consolidated, ASH with little pumice, small quartz and feldspar crystals present in fine grained ASH matrix. Few lithics. Large [illegible] [illegible] present 3[illegible]-3[illegible] feet			Resumed at 1300 hours
37.5'	Run 16 2.5/2.5	None	0 Ovm 2000 cpm βγ		SAA with pumice fragments increasing in size and abundance, white. Slightly welded with quartz phenocrysts. ASH matrix fine grained dry			
40'	Run 17 4.4/5.0	AAB6561 RAD 435-442	0 Ovm 2000 cpm βγ	40.0 45.0 Box 9 of 10	40.0-42.5 Very fine ASH with very little pumice or lithics. 42.5-45.0 Consolidated, dry, homogeneous TUFF with slight welded pumice fragments. Fine grained matrix with small quartz, feldspars and rhyolite fragments			
45'	Run 18 3.3/5.0	AAB6[illegible] Full 484-493	0 Ovm 2000 cpm βγ	45.0 50.0 Box 10 of 10	Coarse grained crystalline TUFF 90-95% pumice with small quartz phenocrysts. Unconsolidated sediment in crystal pumice and ASH matrix			Drilling ended at 1445 hours at a depth of 50 feet
50'								

Prepared by [illegible] Date 25 August 94 Checked By [illegible] Date [illegible]

Ash

Rhyolite and Pumice Fragments

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1 - 5 Start Date/Time 30 Aug 94 1250 End Date/Time 31 Aug 94 1430

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.0/2.5	AAB[illegible] [illegible] 1.8-1.9	[illegible] ≤25 cpm [illegible]		Organic rich [illegible] 1.0 1.0-2.0 Consolidated SILT [illegible] Highest Reading [illegible]			30 Aug 94 started drilling 1250 hours
2.5	Run 2 2.5/2.5	AAB[illegible] [illegible] 2.7-3.2	[illegible] ≤25 cpm [illegible]	Box 1	2.5-3.5 Fine grained [illegible] dry [illegible] SILT 3.5-5.0 [illegible] SILTY [illegible]			
5	Run 3 1.9/2.5	AAB[illegible] [illegible]	50 cpm ≤25 cpm [illegible]		[illegible] dry SILT. Dark yellow [illegible] 10YR 4/6			
7.5	Run 4 2.5/2.5	AAB[illegible] [illegible] 9.1-9.5	40 cpm ≤25 cpm [illegible]	Box 2	SAA			Drilling ceased 30 Aug 1430 hours and depth 10 feet
10	Run 5 2.5/2.5	None	100 cpm ≤250 cpm [illegible]		very fine [illegible] SILT pale yellow [illegible] 10YR 5/6 Consolidated pumice fragments [illegible]		ALLUVIUM	31 Aug 94 resumed drilling at 0735
12.5	Run 6 1.7/2.5	AAB[illegible] [illegible] 15.3-15.5	15 cpm ≤250 [illegible]		SAA			Drilling ended 0800 due to inclement weather
15	Run 7 2.5/2.5	15.2-15.8 ~~None~~ AAB[illegible]	0 cpm 200 cpm [illegible]	Box 3	SAA - [illegible] pumice fragments [illegible] Dry			[illegible]
17.5	Run 8 2.5/2.5	AAB[illegible] [illegible]	250 cpm [illegible]		[illegible] SILT, [illegible] dry			
20	Run 9 2.5/2.5	None	[illegible] 0 cpm	Box 4	[illegible] SILTY SAND [illegible] Some organic [illegible]			No [illegible]
22.5	Run 10 2.5/2.5	AAB[illegible] [illegible]	0 cpm [illegible]		SILT, [illegible] 10YR [illegible]			
25	Run 11 2.5/2.5	None	270 cpm 0 cpm	Box 5	SAA, [illegible] pumice fragments, [illegible]			
27.5	Run 12 2.5/2.5	AAB[illegible] [illegible] 29.6-29.8	[illegible] cpm		SAA to [illegible], then tuff [illegible]			
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 9/21/94

- Full Suite -

[illegible], moisture, [illegible], TAL metals, [illegible] volatiles.

- Radian -

[illegible], moisture [illegible]

☐ SILT
☐ SAND
☐ CLAY
☐ Rhyolitic pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50' Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time 30 Aug 94 1250 End Date/Time 31 Aug 94 1430

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 3 2.5/2.5		0 Dum 250 cpm βγ	29.5 - 35.0 Box 4 [illegible]	[illegible] ASH Dry with nonwelded vitric pumice fragments comprising 10% of lower portion of core		OTOWI MEMBER OF THE BANDELIER TUFF	[illegible] drilling 1320 hours [illegible] John Dugas has resumed [illegible]
	Run 4 2.5/2.5	AAB 6025 RAD 33.5-35	0 Dum 200 cpm βγ		32.5 33.5 - [illegible] with some [illegible] 33.5-35 - SAA but more consolidated and pumice [illegible] 15% Pumice light [illegible] yellowish [illegible]			
35	Run 5 4.3/5.0	AAB 6026 RAD 38-39	0 Dum 300 cpm βγ	35.0 40.0 Box [illegible]	SAA becoming 20% pumice			
40	Run 6 5.0/5.0	AAB 6027 RAD 43.5 44	0 Dum 200 cpm βγ	40.0 45.0 Box 8 [illegible]	Becoming more consolidated, noncohesive, dry. Ash with [illegible] 20% pumice. Fine grained Ash matrix with minimal lithics. Pumice fragments 20-70mm [illegible] hornblendes and vesicular			
45	Run 11 4.3/5.0	AAB 6028 Full 47.3-48.3	0 Dum 250 cpm βγ	45.0 - 50.0 Box 9 [illegible]	Nonwelded TUFF. 90-95% pumice along with abundant hornblende [illegible] and rhyolite fragments. Pumice 5-50mm [illegible] with [illegible] alteration. Slight to [illegible] pumice Pale Olive 5Y 6/2		[illegible]	31 Aug 94 Drilling ended at 1430 [illegible] a depth of 50 feet
50								

Prepared by [illegible] Date 08-31-94 Checked By [illegible] Date 9/1/94

ASH

TUFF

Pumice, Rhyolite Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time 22 Aug 94 1130 End Date/Time 23 Aug 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	Run 1 2.5/2.5	None	0 cpm NDA/ [illegible]	0.0 – 2.5	[illegible] SILTY SAND [illegible] Pale Reddish [illegible] 10 YR 5/4		ALLUVIUM	22 Aug 94 Began drilling at 1130 hours
2.5	Run 2 2.5/2.5	[illegible]	0 cpm NDA/ [illegible]	2.5 – 5.0	2.5 3.5 SAA; 3.5 5.0 Consolidated [illegible], homogeneous CLAY [illegible] SAND, Small [illegible] fragments			
5.0	Run 3 2.5/2.5	None	0 cpm NDA/ [illegible]	0.0 – [illegible]	[illegible] CLAYEY SILT moderately consolidated [illegible] 70% silt 25% clay 5% SAND			
7.5	Run 4 2.5/2.5	[illegible]	0 cpm [illegible]	5.0 – [illegible]	7.5 8.5 [illegible] homogeneous SILT [illegible] SILTY CLAY [illegible]; 10.0 12.5 very fine SILT homogeneous, dry [illegible]			
10.0	Run 5 2.5/2.5	None	0 cpm NDA/ [illegible]	[illegible]	[illegible] 12.5 [illegible] CLAYEY SILT			
12.5	Run 6 2.1/2.5	[illegible] RAD	0 cpm NDA/ [illegible]	10.0 – [illegible]	very fine SILT to 14.0 14.0 15.0 [illegible] SILTY CLAY with pumice inclusions [illegible]			Stopped drilling for lunch at 12:45 [illegible] 15 feet. Began drilling again at [illegible]
15.0	Run 7 2.2/2.5	[illegible]	0 cpm NDA/ [illegible]	[illegible]	SAA			
17.5	Run 8 2.2/2.5	[illegible] RAD	0 cpm NDA/ [illegible]	15.0 – [illegible]	SAA - Less Clay on bottom half section. 55% Clay 40% silt 5% sand.			
20.0	Run 9 2.1/2.5	None	0 cpm NDA/ [illegible]	[illegible] – 25.0	Very fine [illegible] with [illegible] crystals, small [illegible] pumice, [illegible] fragments [illegible]		OTOWI	
22.5	Run 10 2.5/2.5	[illegible] RAD	0 cpm NDA/ [illegible]	20.0 – [illegible]	22.5 - 24.4 - SAA; 24.4 25.0 - [illegible] fragments [illegible]			
25.0	Run 11 2.5/2.5	None	0 cpm NDA/ [illegible]	[illegible] – 30.0	SAA - very fine [illegible] Ash [illegible] pumice fragments.			
27.5	Run 12 2.5/2.5	[illegible]	0 cpm NDA/ [illegible]	25.0 – [illegible]	SAA			[illegible]
30.0								

Prepared by [illegible] Date 23 Aug 94 Checked By [illegible] Date [illegible]

SILT

SAND

CLAY

ASH

Pumice, [illegible], and Obsidian Fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 43.2 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5	None	0 cpm NDBT 2.5	[illegible]	[illegible]		MEMBER OF THE BANDELIER TUFF	22Aug94 Ended drilling at 1540 hours. 23Aug94 Began drilling at 0710 hours.
32.5	Run 14 2.5/2.5	AA0… RAD 33.4-35	0 cpm NDBT	[illegible]	DAA [illegible]			
35	Run 15 2.5/2.5	None	20 cpm NDBT	[illegible]	DAA [illegible]			
	Run 16 2.5/2.5	AA0… RAD 35.7-37	20 cpm NDBT	[illegible]	DAA [illegible]			
40	Run 17 3.3/5.0	AA0… [illegible]	0 cpm NDBT	[illegible]	DAA			23Aug94 Drilling ended at 0900 at a total depth of 43.2 feet
42		42.5-43						
	Run 18 /5.0							
50								

Prepared by [illegible] Date 23Aug94 Checked By [illegible] Date 8/…/94

ASH

Rhyolite, Pumice and Obsidian fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Brothers Box #(s) 1-5 Start Date/Time 21 Jun 94 0950 End Date/Time 22 Jun 94 1200

Drilling Equip./Method [illegible] hollow stem auger Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 0.9/2.5	none	0 ppm 22cps NDA		[illegible] 5YR 4/4 and sand [illegible]			Started drilling 0950 21 Jun 94. No α probe is available
2.5	Run 2 1.5/2.5	[illegible]	0 ppm 25cps NDA	Box 1	light brown 5YR [illegible] some organics some organic [illegible] some sand			
5	Run 3 2/2.5	none	0 ppm 28cps NDA		light brown 5YR [illegible] SAA 50% sand + silt			
7.5	Run 4 2/2.5	[illegible]	[illegible]		SAA			[illegible] AAB 2905 Full Suite
10	Run 5 1.5/2.5	none	0 ppm 26cps NDA	Box 2	first [illegible] ft [illegible] SAA next 1.3 ft is coarse-grained sand and gravel light brown poorly sorted			Change from fine silt to coarse sand, segregated core into boxes at [illegible] - break for lunch 11:38. 0940 begin drilling activities 22 Jun 94. Some trouble with the drilling - not core [illegible]
12.5	Run 6 1.5/2.5	AAB 2915 [illegible] RAD	NDA [illegible] 24cps OK		[illegible] brown medium grained sand with some silt, contains 5% lithic and pumice fragments			
15	Run 7 2.5/2.5	AAB 29[illegible] RAD	NDA [illegible] 26 [illegible]	Box 3	This core is moist, core is holding together. Moderate yellowish brown 10YR 5/4 coarse-medium sand SAA except [illegible]		Alluvium	RAD suite = XRF metal SVOA screen gross α βγ moist
17.5	Run 8 2.5/2.5	none	NDA [illegible] 26cps OK		light brown, contains coarse grained sand core is [illegible] unconsolidated [illegible] but appears [illegible] (SAA)			
20	Run 9 2.5/2.5	AAB 2817 [illegible]	NDA [illegible] 26cps OK		SAA. Still coarse sand + silt with pumice fragments (5%) [illegible] lithic fragments (5%) [illegible] (clay + [illegible] 5%)			core very crumbly
22.5	Run 10 1/2.5	none	NDA ppm 26cps OK	Box 4	SAA no lithics, no pumice core is unconsolidated / dry [illegible]			
25	Run 11 2.2/2.5	AAB 2919 [illegible] RAD	NDA ppm 24cps OK		moderate brown 5YR 4/4 coarse grained gravel from 25-26.2 ft and a few cobbles + clasts from 26.2 ft, coarse sand			0946 break
27.5	Run 12 2.5/2.5	AAB 2919 [illegible] RAD	NDA ppm 26cps OK	Box 5	SAA coarse sand + gravel			
30								

Prepared by David Sheslin Date [illegible] 94 Checked By [illegible] Date 7/6/94

SILT
SAND
GRAVEL
NONWELDED IGNIMBRITE

RAD Suite: gross α βγ, moist; XRF metal (21 Jun 94)

RAD Suite: gross α βγ, moist; XRF metal; SVOA screen (22 Jun 94)

Full Suite: TAL metal; Total U, Sr-90; Semi Volatiles; gross α βγ, moist

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU 10/1079 Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 5-9 Start Date/Time 21 Jun 94 [illegible] End Date/Time 22 Jun 94 1200

Drilling Equip./Method [illegible] / Hollow Stem Auger Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2.5/2.5	None	[illegible] 240BE [illegible]	[illegible]	30-31 [illegible] coarse grained sand (SAA) 31.3-32.0 red gravel + medium sand 32.0-32.5 [illegible] 5YR6/1 interface, looks like [illegible]		Alluvium	1030 began drilling Soil tuff interface
32.5	2.2/2.5	[illegible]	[illegible]	[illegible]	32.5-34 SAA [illegible] pumice fragments [illegible] 34 tuff [illegible]			
35	2.5/2.5	[illegible]	[illegible]	[illegible] 37.5	SAA pumice fragments [illegible] [illegible]			AAB 2924 this sample interval showed highest rad screening levels collected full suite
37.5	2.1/2.5	[illegible]	[illegible]	[illegible]	SAA [illegible] tuff [illegible] 10% pumice fragments			
40	2.5/2.5	None	[illegible]	[illegible]	SAA		Lower Bandelier Tuff	
42.5	2.5/2.5	[illegible]	[illegible]	[illegible] 47.5	SAA			
45	5.0/5.0	[illegible]	[illegible]	[illegible]	SAA [illegible] grey NE [illegible] tuff. 95% pumice 2% lithic fragments			
47.5			[illegible]	47.5 [illegible]				
50								reach 50 ft stop drilling 1200 [illegible] sample full suites + move core to core trailer * highest rad reading is from below soil-tuff interface 36.7-37.2 ft. * Random sample 7.5-10 ft in fine sand + silt above gravel contact

Prepared by Laurel [illegible] Date [illegible] 94 Checked By [illegible] Date 7/5/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 30 Page [illegible] of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 28 Jun 94 0855

Drilling Equip./Method [illegible] Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	2.5	none	20CPS		light brown silt/gravel ... mud sand 2% organics (roots)			began drilling 1058
2.5	3 / 2.5	AAB 2935	20 CPS		fine ... silt ... sand			
5		none	0 ppm 260 BK		SAA 25% silt ... sand			
7.5	2.7							AAB 2937 duplicate of AAB 2936 RAD
10	2.6	none	0 ppm 240		... 20% sand			
12.5	2.4 / 2.5	AAB 2938 RAD			12.5 SAA ... silt 60% ... sand			1225 break for lunch ... EZ HOD ... battery not working
15		none	0 ppm 220 CPS NA		SAA some ... sand 5YR 5/6		ALLUVIUM	
17.5		AAB 2939	0 ppm 240		Fine silt ... sand ... 10% light brown 5YR			
20	2.5 / 2.5	none	240 CPS NA		70% silt 20% sand 10% clay ... 5YR 4/4			
22.5	2.2 / 2.5	AAB 2940 RAD 23-23.5	0 ppm 200 BK NA		22.5-23.5 SAA 23.5 coarse sand and ...			
25	0 / 2.5	NONE	NA		NO RECOVERY			
27.5	2.5 / 2.5	AAB 2941 RAD	0 ppm 220 BK		27.5-28 coarse sand & tuff fragments & cobbles 28-30 50% clay 50% silt some tuff fragments light brown 5YR 5/6			AAB 2947 full suite 28.6-28.9 random sample
30								

Prepared by [illegible] Date 28 Jun 94 Checked By [illegible] Date [illegible]

silt

Sand

gravel

non welded ignimbrite

RAD SUITE
gross α β γ moisture
XRF metal
SVOA screen

Full Suite
gross α β γ moist
Sr-90, Tot U
TAL metals
SVOA

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller Stewart Bros. Box #(s) 6-10 Start Date/Time 27 Jun 94 1056 End Date/Time 29 Jun 94 0855

Drilling Equip./Method hollow stem auger, Failing F-10 Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2.3 / 7.5	none	0 ppm 200 Bt	6	30 - 30.5 SAA clay ... 30.5 31.8 Soil-tuff interface 31.8 tuffs			soil exclusion zone 1520 27 Jun 94
32.5	2.5 / 2.5	AAB 2946 33-35.3	0 ppm 24181 Oa	7	SAA tuff nonwelded unconsolidated pumice (95%) and lithics (2%) ...			entered EZ 0715 28 Jun 94
35	5.0 / 5.0	35.5-37 AAB 2944 FULL AAB 2943 35-37	0 ppm ...	8	SAA 35 - 37.5 - tuff more weathered, brown ... in places 37.5 - ... tuff ... white, unstained			AAB 2944 - wet rad tuff 35.5-37 ft 380 ...
37.5								
40	5.0 / 5.0	AAB 2945 43.5-...	0 ppm 28032 Oa	9	SAA		LOWER BANDELIER TUFF	
42.5								
45	5.0 / 5.0	... AAB 2946 48.5 49	0 ppm 28452 Oa	10	SAA			
47.5								
50				17	Bottom of borehole 0855			Random sample from clayey horizon above soil tuff interface 25.6 - 28.9 AAB 2947

Prepared by Laurel Shastri Date 29 Jun 94 Checked By [illegible] Date 7/5/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From ____ To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 5 Jul 94 1215

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] skel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.4 / 2.5	[illegible]	[illegible] ppm	[illegible]	light brown [illegible] sand ([illegible]) 5YR6/R			[illegible] 5 July 94 [illegible]
	2.5 / 2.5	[illegible]	[illegible] ppm	[illegible]	SAA [illegible]			
5	2.5 / 2.5	[illegible]	[illegible] ppm	[illegible]	SAA [illegible]			
	2.5 / 2.5	[illegible]	[illegible] ppm	[illegible]	SAA			
10	2.2 / 2.5	none	0 ppm [illegible] 0 cm	[illegible]	SAA			
	1.5 / 2.5	[illegible]	0 ppm [illegible] 0 cm	[illegible]	SAA [illegible] coarse sand [illegible]			
15	2.2 / 2.5	[illegible]	[illegible] 200 CPM 0 cm	[illegible]	[illegible] 5YR6/R [illegible]		ALLUVIUM	[illegible] of contact [illegible] ARB 2962 [illegible] [illegible] in fine sand [illegible]
17.5	2.5 / 2.5	[illegible]	[illegible] 200 CPM 0 cm	[illegible]	5YR5/6 [illegible]			
20	2.2 / 2.5	none	0 ppm 150 [illegible] 0 cm	[illegible]	SAA [illegible] coarser [illegible] 5YR6/R [illegible] downwards			[illegible]
22.5	2 / 2.5	MB 2153 [illegible]	0 ppm 200 [illegible] 0 cm	[illegible]	SAA light brown fine grained sand and silt			
25	0 / 2.5	NA	NA	25 to 30 [illegible]	No Recovery			
27.5	2.3 / 2.5	[illegible]	0 ppm 200 CPM 0 cm	[illegible] 27.5 to 30 [illegible]	light brown coarse sand and gravel 5YR6/R [illegible] slightly ~~[illegible]~~ [illegible] sand			

Prepared by [illegible] Date 5 Jul 94 Checked By [illegible] Date 7/8/94

[illegible] silt

[illegible] sand

[illegible] gravel

[illegible] nonwelded [illegible]

RAD SUITE
gross α β γ moisture
XRF metals
SVOA screen

FULL SUITE
gross α β γ moisture
TAL metals
Total U [illegible]
SVOA

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 5 Jul 94 1215

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	[illegible]	None	0 ppm, 26 PPB, 0 cts		SAA coarse sand and gravel; sharp contact to [illegible]		Alluvium	1200 - 2 photo of [illegible] with sand
	[illegible]	[illegible]	0 ppm [illegible]		[illegible] sharp contact [illegible]			1200 - 3 photo of [illegible] / [illegible] contact
	5.0/5.0		[illegible] ppm, 29 PPB, [illegible]		[illegible]			
		[illegible]						
	[illegible]	AAB 2958 [illegible]	[illegible]		SAA			AAB 2958 - high rad full suite 350 PPB 40.2-40.8 ft
		AAB 29[illegible]	[illegible]					
	5.0/5.0		[illegible]		SAA			AAB 2960 field blank (full suite)
		AAB 29[illegible] [illegible] 49.5-50			1215 [illegible]			AAB 2961 rinsate (full suite)
								AAB 2962 - random sample collected at [illegible] ft below contact from coarse gravel to fine sand and silt

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 7/8/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time [illegible] End Date/Time 8-1-94/0930

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Run #

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Pedology - Soil	Graphic Log	Lithologic Unit	Notes
0	[illegible] 2.5/2.5	None	0 ppm 240 [illegible]	[illegible]	[illegible] Clayey Sand [illegible]	[illegible]	ALLUVIUM	
	Run 2 [illegible]	[illegible]	0 ppm 280 [illegible] nda [illegible]	[illegible]	[illegible]	[illegible]		
5	Run 3 [illegible]	None	0 ppm 240 [illegible] nda [illegible]	[illegible]	[illegible] 5YR 4/4	[illegible]		
	Run 4 [illegible] 2.5	[illegible]	0 ppm 240 [illegible] nda [illegible]	[illegible]	[illegible] 5YR 6/4	[illegible]		
	Run 5 [illegible]	[illegible]	[illegible]		[illegible]			
	Run 6 [illegible] 2.5	[illegible]	0 ppm 280 [illegible] nda [illegible]	[illegible]	[illegible]	[illegible]		[illegible] 10:5?
	Run 7 1.7/2.5	None	0 ppm 240 [illegible] nda [illegible]	[illegible]	[illegible]	[illegible]		
	Run 8 [illegible] 2.5	[illegible]	0 ppm 230 [illegible] nda [illegible]	[illegible]	[illegible]	[illegible]		
20	2.5/2.5	AAB2750 Full [illegible] 20-20.5	240 [illegible] [illegible] NDA 0 ppm	[illegible]	[illegible] SILT [illegible] Clay (20%) [illegible]	[illegible]		RANDOM AAB2790 Full [illegible] 20-20.5
	2.5/2.5	AAB2[illegible] 23.5-23.? Field [illegible]	220 [illegible] [illegible] NDA 0 ppm	[illegible]	SAA [illegible]	[illegible]		
25	2.?/2.5	AAB2[illegible] 25-?? [illegible]	230 [illegible] [illegible] NDA ppm N/A	[illegible]	[illegible] SILT [illegible] 20% Clay [illegible]	[illegible]		PID [illegible] functioned
27.5	2.5/2.5	AAB2785 27.5-2? [illegible] Field [illegible]	260 [illegible] [illegible] NDA ppm N/A	[illegible]	SAA	[illegible]		Stop 1420 [illegible] PID
30								

Prepared by [illegible] Date 7-11-94 Checked By [signature] Date 7/14/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY — CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 8 Jul 94 / 0930

Drilling Equip./Method [illegible] / Hollow Stem Auger Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–32.5	2.3/2.5	none	0 ppm 220 pr NOA	30 to 35 ft	moderate brown coarse sand some [illegible] fining downwards to poorly sorted medium - coarse grained sand soft, moist, [illegible] ALLUVIUM		ALLUVIUM	8 Jul 94 [illegible]
32.5–35	2.2/2.5	AAB2786 Rad 34-34.5	0 ppm 160 pr NOA		SAA with pebbles of dacite and [illegible] (intermediate) brown 5YR[illegible] (10R 7/4)			
35–37.5	2.4/2.5	none	0 ppm 240 pr NOA	35 to 40 ft	SAA 35 36.5 ft fining downwards to clayey silt [illegible] [illegible] brown with coarse grains of dacite and pumice, fine sand			
37.5–40	2.5/2.5	AAB2788 Full 37.5-37.8	0 ppm 340 pr [illegible] NOA		[illegible] 37.5-37.8 clayey silt containing glass shards/pumice [illegible] by clay [illegible] at 37.8 ft		transition	Soil? tuff interface? AAB 2788 [illegible] 340 pr 37.5 - 37.8
40–42.5	2.2/2.5	none	0 ppm 240 pr NOA		SAA increasing amount of pumice fragments to 30-50%			
42.5–45	2.5/2.5	AAB2787 Rad 44-44.5	0 ppm 260 pr NOA	40 to 45	nonwelded pinkish grey ignimbrite		LOWER BANDELIER TUFF	
45–50	5.0/5.0	AAB2789 Full 47-47.5	0 ppm 240 pr NOA; 0 ppm [illegible] NOA	45 to 50	SAA — 0900 bottom			
50								RANDOM SAMPLE AAB 2990 20-20.5 Full [illegible] silty clay

Prepared by [illegible] Date 11 Jul 94 Checked By [illegible] Date 7/18/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-[illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Bros Box #(s) [illegible] Start Date/Time 23Jan94 [illegible] End Date/Time 23 Jan 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0 – 2.5	2.4/2.5	No sample	340 B.Y		0-0.4 ft root/organic matter [illegible]; 0.4-1.4 light brown coarse sand [illegible]; 1.4-2.4 light brown sand & silt 5YR [illegible]			entered exclusion zone at 0700. Began drilling at 0715. K meter not working properly not used
2.5 – 5	2.2/2.5	AAB 2[illegible]	0 ppm 240 BY		Light brown sand and silt (75%) [illegible] still some organic (roots) matter SAA			Full Suite = Total U, Sr-90, TAL metal, SVOA, gross α β γ moist
5 – 7.5	2.5/2.5	No sample	1.7 ppm 240 BY		SAA 75% silt [illegible] sand [illegible] brown sand [illegible] coarse sand horizons			RAD Suite = XRF metal, SVOA screen, gross α β γ moist
7.5 – 10	0.9/2.5	AAB 2907	[illegible] 260 AY		SAA			
10 – 12.5	2.0/2.5	No sample	220 BY		SAA more coarse sand (40%) silt (50%) some [illegible] (5-10%) [illegible]			
12.5 – 15	2.5/2.5	AAB 2910	[illegible] 260 BY		SAA more silt (70%)			* AAB 2910 [illegible] FULL SUITE
15 – 17.5	2.5/2.5	No sample	[illegible] 240 [illegible]		SAA [illegible] coarse gravel		ALLUVIUM	
17.5 – 20	2.5/2.5	AAB 29[illegible]	[illegible] 240 BY		SAA 70% silt 30% sand light brown			break 0940; entered EZ 1038
20 – 22.5	2.5/2.5	No sample	0 ppm 220 BY		20-21 coarse gravel; 21-22.5 fine gravel 70% silt sand few pumice fragments			
22.5 – 25	2.3/2.5	AAB 29[illegible]	0 ppm 200 BY		SAA increasing amount of pumice clast; 23.0 coarse, poorly sorted gravel, pumice + tuff fragments			
25 – 27.5	2.5/2.5	None	0 ppm 240 BY		25-26.8 SAA with 15% of pebble (25%) [illegible] 26.8 soil/tuff interface fine grained silty			* AAB 2917 26.5-27 random full suite sample
27.5 – 30	2.0/2.5	AAB 29[illegible] 28-28.5	0 ppm 220 BY		27.5-28.5 SAA tuff detritus [illegible] brown 5YR 5/4 sand [illegible] with some gravel		Soil tuff interface	

Background for PID readings 1.0

Prepared by [illegible] Date 23 Jan 94 Checked By [illegible] Date 2/5/94

silt

sand

gravel

nonwelded ignimbrite

RAD SUITE
gross α β γ moisture
SVOA screen
XRF metal

FULL SUITE
gross α β γ moisture
Sr-90, Total U
SVOA
TAL metals

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 23 Jun 94 1510

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless steel split barrel [illegible]

Depth (feet)	Recovery/ (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
	2.5/2.5	NONE	240BY		SAA [illegible] and [illegible]			31 ft. ≈ top of tuff
					[illegible]			
					SAA [illegible]			
					[illegible]			
					SAA [illegible]			
	5.0/5.0	AAB 2917					Tuff	
					SAA			
	5.0/5.0	AAB [illegible]						
					SAA			
	5.0/5.0	AAB [illegible]						[illegible] 1510
								AAB 2916 rad 320 BY full suite w/ highest rad
								AAB 2917 random sample full suite from soil-tuff interface in soil - look 26.5 - 27

Prepared by [illegible] Shash[illegible] Date 23 Jun 94 Checked By [illegible] Date 7/5/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time 6 Jul 94 0720 End Date/Time 6 Jul 94 1150

Drilling Equip./Method [illegible] stem auger Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	2.3/2.5	none	12 ppm 25 BY Cx	[illegible]	very soft, pale brown (5YR 5/2) heterogeneous silty sand, some organic material, trace plastic, trace gravel. Soil is dry. ALLUVIUM		ALLUVIUM	enter EZ 0720 begin drilling
2.5	2.4/2.5	[illegible]	[illegible] 25 BY Cx	[illegible]	SAA except soft, decreasing grain size to silt, trace clay, soil is dry			
5	2.5/2.5	none	0 ppm 20 BY Cx	[illegible]	SAA			
7.5	2.3/2.5	[illegible]	0 ppm 20 BY Cx	[illegible]	SAA			
10	1.3/2.5	none	0 ppm 20 BY Cx	[illegible]	SAA			
12.5	2.3/2.5	[illegible]	0 ppm 30 BY Cx	[illegible]	SAA, moist core, increasing amount of clay to clayey silt, trace sand			
15	2.2/2.5	none	0 ppm 20 BY Cx	[illegible]	very soft, heterogeneous, light brown (5YR 6/4) silt, some sand, trace clay, trace pumice fragments, core is moist ALLUVIUM			
17.5	2.3/2.5	[illegible] 17-19.5 RAD	0 ppm 24 BY Dx	[illegible]	SAA			Break 0914 return to EZ 1000
20	2.2/2.5	none	0 ppm 24 BY Cx	[illegible] 20-25	SAA			
22.5	2.0/2.5	[illegible] 24-24.5 RAD	0 ppm 26 BY Cx	[illegible]	22.5-23 SAA 23-25 very soft, pale brown (5YR 5/2) coarse sand, some gravel, heterogeneous, damp core ALLUVIUM			
25	2.1/2.5	none	0 ppm 250 BY Cx	Box 6 of 6 25-30	SAA pale brown coarse sand, some gravel (composed of 80% quartz, 10% feldspar, trace dacite pebbles, trace silt)			
27.5	2.4/2.5	[illegible] 29-29.5 RAD	0 ppm 320 BY Cx		SAA			
30								

Prepared by Laurel Shaski Date 12 Jul 94 Checked By [illegible] Date 7/14/94

silt
sand
gravel
nonwelded [illegible]

RAD Suite
gross α β γ moisture
SVOA screen
XRF metals

Full Suite
gross α β γ moist
TAL metal
SVOA
Tot U Sr-90

* NOTE
Background for PID on 6 Jul 94 was 0.2 ppm

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1270 TA/OU 10/1079 Drill Depth From 30 To 50 Page 2 of 2

Driller Stewart Brothers Box #(s) 7-9 Start Date/Time 6 Jul 94 0720 End Date/Time 6 Jul 94 1150

Drilling Equip./Method Failing F10 HT/Hollow Stem Auger Sampling Equip./Method Stainless steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–35	1.2/2.5; 2.3/2.5	none; AAB2971 34.6–34.8 Rad	Off 250ff 0ca; 0.4 ppm 240 ff 0cm	Box 7 of 9 30–35 ft	very soft, light brown (5YR 5/6) heterogeneous medium–coarse sand composed of quartz and feldspar, trace pumice and dacite grains. 32.5–33.5 SAA moderate brown (5YR 3/4) increasing gravel. 33.5 sub-tuff interface moderate orange-pink (5YR 8/4) clay + pumice, cobbles of andesite		ALLUVIUM	random – full suite AAB 2976 34.6–34.8 pumice in clay matrix
35–40	1.6/5.0	AAB 2972 36.5–37.5 Rad	Off ppm 240ff 0cm	Box 8 of 9 35–45 ft	Soft, heterogeneous, silty clay and pumice, light brown (5YR 6/4) (SAA); trace dusky brown (5YR 2/2) dacite grains; damp core; SOIL-TUFF INTERFACE		TRANSITION ZONE	rock caught in shoe chute caused core loss
40–45	1.5/5.0	AAB 2973 40–41.5 Full	0 ppm 240 ff 0cm		pinkish gray (5YR 8/1) tuff detritus, pumice, unconsolidated glass shards, pebble-sized pumice fragments, little dacite grains, little quartz, trace silt; SOIL-TUFF INTERFACE		SOIL – TUFF	AAB 2974 field blk; AAB 2975 rinsate blk analyzed for rad suite
45–50	5.0/5.0	AAB2977 45.5–46.0 Full; AAB 2979 49–49.5 Rad	0.4 ppm 45.5–46.0 340ff; 49–49.5 300ff 250cm 0cm	Box 9 of 9 45–50 ft	45.5 potential staining of the core, patchy moderate orange pink (10R 7/4) zone ~0.5 ft wide, corresponds to high rad. 340 cpm. below is pinkish gray (5YR 8/1) nonwelded ignimbrite; 40% pumice, 2% phenocrysts and lithic fragments; pumice contains slight vapor phase alteration, phenocrysts of quartz and feldspar; groundmass consists of glass shards, dusky brown dacite fragments, and pale yellowish brown (10YR 6/2) pumice fragments; NONWELDED IGNIMBRITE		Unit Qbt1 – TUFF	AAB 2977 full suite from interval showing highest rad 340 cpm 45.5–46.0; Bottom of hole 1150; Random sample AAB 2978 collected from top of soil-tuff interface (pumice in clay matrix) 34.6–34.8

Prepared by David Steck Date 12 Jul 94 Checked By Rebecca B[illegible] Date 7/14/94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU TA-[illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Brothers Box #(s) [illegible] Start Date/Time 24 Jun 94 [illegible] End Date/Time 27 Jun 94 0930

Drilling Equip./Method Hollow stem auger Sampling Equip./Method ~~split spoon~~ stainless steel split barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	2.2/2.5 Run 1	no sample	0 ppm 360 PF [illegible]		light brown sand and silt, some organic matter (35%) 5YR 6/4			[illegible] begin drilling [illegible]
2.5	2.3/2.5 Run 2	AAB 2922 Full suite [illegible]	0 ppm 29 CPY Ca		SAA large component of silt (70%) yellow sand (30%)			Full suite TAL metals SVOA, total U Sr-90, gross α β γ moist
5	2.5/2.5 Run 3	none	0 ppm 300 CPY Ca		SAA [illegible]			Rad suite gross α β γ moist XRF metals SVOA screen
7.5	2.5/2.5 Run 4	AAB 2921 [illegible] 7.5	0 ppm 280 [illegible] Ca		SAA 75% silt 25% sand			
10	2.5/2.5 Run 5	none	0 ppm 22 CPY Ca		SAA			
12.5	2.2/2.5 Run 6	AAB 2923 [illegible] 12.5	0 ppm 300 PF Ca		SAA			AAB 2919 - field blank AAB 2923
15	2.2/2.5 Run 7	none	0 ppm 260 PF Ca		SPP		ALLUVIUM	[illegible] Tim [illegible] is sample [illegible]
17.5	2.5/2.5 Run 8	AAB 2924 [illegible] 17.5	0 ppm 250 PF Ca		17.5 SAA dark brown [illegible] (50%) sand [illegible] some clay (30%)			AAB 2918 - rinsate
20	2.5/2.5 Run 9	AAB 2928 [illegible]	0 ppm 300 PF [illegible]		increasing amount of pumice fragments [illegible] silt and sand [illegible]			AAB 2928 (dup) AAB 2929 [illegible]
22.5	2.4/2.5 Run 10	AAB 2927 [illegible] 22.5	0 ppm 290 PF Ca		SAA except no [illegible] fragments silt [illegible] sand (50%)			Analyzed for full suite + isoU + Gamma spec
25	2.3/2.5 Run 11	none	0 ppm 280 CPY		SAA			
27.5	1.5/2.5 Run 12	AAB 2926 27.5 [illegible]	0 260 SY		SAA [illegible] amount of clay (30%)			
30								

Prepared by [illegible] Date [illegible] 94 Checked By [illegible] Date [illegible]

Full blank AAB 2919

Rinsate AAB 2918

Background for PID = 0

Rad Suite: gross α β γ moist, XRF metals, SVOA screen

Full Suite: gross α β γ moist, Sr-90, Total U, SVOA, TAL metals

silt

sand

gravel

- non welded ignimbrite

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 7-10 Start Date/Time [illegible] End Date/Time 27 Jun 94 0930

Drilling Equip./Method [illegible] Sampling Equip./Method ~~split spoon~~ Stainless Steel split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2.5/2.5	none	0 ppm		(Dark brown) 5YR 5/2		Alluvium	
		AAB 2927	0 ppm					
35	2.5/2.5	none	0 ppm					1305 stop drilling activities for 24 Jun 94. Came back and collected full suite/dup from interval with the highest rad (420 cpm β) from 21.8 - 22.3 AAB 2928 AAB 2929 (dup)
	3/3.5				37 - 37.7			
40	4/4.6		0 ppm		5YR 6/1		Tuff	
								0905 27 Jun 94 begin drilling
45	1.5	No sample	0 ppm				Lower Bandelier	AAB 2930
	2/3	AAB 2931	0 ppm					AAB 2931
50								AAB 2934 random full suite sample from the soil tuff interface 38.3 - 39

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 7/5/94

* NOTE Box #8 is ½ full was put in core [illegible] over the weekend. Bring back [illegible] to site to continue filling it.

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time 22 Sept 94/1450 End Date/Time 23 Sept 94/1030

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless Steel Split spoon Core Barrel [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number AA1A #	Field Screening Results OVM, [illegible]	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		Ø OVM <250 BY		0.0-1.0 Organics, yellow brown (10YR 5/4) sand consisting of silty sand, gravel, clay. 1.0-3.5 silty sand, med brown (5YR 4/4), fine grain, trace gravel		Alluvium	22 Sept 94 In zone 1425 Drilling 1450
	Run 2 2.5/2.5	AAB[illegible] 3.5-5.0 [illegible] 0-p	Ø OVM <250 BY		3.5-5 med to coarse gr sand, trace clay, moist			
5	Run 3 0/2.5			0-[illegible]	5-7.5 Core loss, fell out of core barrel while pulling out.	Core loss		5-7.5 Core loss, putting on sample catcher
	Run 4 2.5/2.5	AAB[illegible] 9.5-10 RAD ALA [illegible] O-p	Ø OVM <250 BY		7.5-24 med to coarse gr sand, pale brown (5YR 5/2) 5-10% gravel 1-3cm (cobbles), moist			
10	Run 5 2.5/2.5		Ø OVM <250 BY		SAA			
	Run 6 2.5/2.5	AAB[illegible] 14.5-15 RAD	Ø OVM <250 BY	25-15 [illegible]	SAA			Stop drilling: 1545
15	Run 7 2.5/2.5		Ø OVM <250 BY		SAA			23 Sept 94 In zone: 0715 Drilling: 0720
	Run 8 2.5/2.5	AAB[illegible] 19.5-20 RAD	Ø OVM <250 BY	15-20 [illegible]	SAA 10-15% gravel 1-3cm			
20	Run 9 2.5/2.5		Ø OVM <250 BY		SAA 5% silt/clay			
	Run 10 2.0/2.5	AAB[illegible] 23.7-24.5 Fill	Ø OVM <250 BY	20-24.5 [illegible]	SAA 24- fine grain silt, med yellow brown (10YR 5/6) dry 24.5-25 Core loss			
25	Run 11 2.5/2.5		Ø OVM <250 BY		25-26.9 SAA 26.9- fine-med gr sand with 60% tuff 2-4cm (10YR 7/4), moist			
	Run 12 2.5/2.5	AAB[illegible] 29.5-30 RAD	Ø OVM <250 BY	24.5-30 [illegible]	27.8-30 fine grain silt, white yellow brown (10YR 7/2) compacted soil, roots, dry, <5% gravel			
30								

Prepared by J Walterscheid Date 23 Sept 94 Checked By [illegible] Date 9-27-94

Sand

silt/clay

gravel

Pumice

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] 72 TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 5-8 Start Date/Time 22 Sept 94 / 1452 End Date/Time 23 Sept 94 / 1030

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Split spoon

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number AAB #	Field Screening Results (ppm)	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5		0 OVM <25 AT	[illegible]	Fine grained silt, mod. yellowish brown (10YR 5/4), <5% tuff fragments, slightly moist, soft		Alluvium	
	Run 14 2.5/2.5	AAB 7950 32.5-35 RAD	0 OVM <25 AT		Fine grained silty sand, mod. yellowish brown (10YR 5/4), trace gravel, [illegible] silt, trace organics (roots)			
35	Run 15 2.5/2.5	AAB 7951 ~~[illegible]~~ 36-37 Full	0 OVM <25 AT	[illegible] 32.5-37.5	[illegible] sand at contact. 36.4 Contact pumice bed, strongly weathered pumice, pale orange to dark yellowish orange (10YR 6/6) [illegible] stony pumice [illegible] from 1cm - 3cm [illegible], moist			
	Run 16 2.5/2.5	AAB 7952 38.5-40 RAD	0 OVM <25 AT		SAA			
40	Run 17 2.5/2.5		0 OVM <25 AT	[illegible] 42.5	SAA			
	Run 18 0/2.5	~~[illegible]~~ [illegible] ~~RAD~~	OVM AT		42.5-45 Sample fell out	Core loss	Guaje Pumice	
45	Run 19 2.5/2.5		0 OVM <25 AT	[illegible] 45-50	SAA [illegible] open space between pumice [illegible] [illegible] with depth [illegible] in [illegible]			Break: 0926 Inside 0955 [illegible] 1000
	Run 20 2.5/2.5	AAB 7954 47.5-50 Full	0 OVM <25 AT		SAA			Completed Hole: 1030
50					50' TD			

Prepared by [illegible] Date 23 Sept 94 Checked By [illegible] Date 9-27-94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1273 TA/OU 10/1079 Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Bros Box #(s) 1-5 Start Date/Time 23Sept94/1350 End Date/Time 26 Sept94/1030

Drilling Equip./Method Failing F-10/Hollow Stem Auger Sampling Equip./Method Stainless Steel ~~Hollow Stem Auger~~ Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number AAB	Field Screening Results OVM, dry CPM	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 1.5/2.5		0 OVM ≤250 BY	Box 1 of 8 0-7 Fill	0.0-2.0 Fine grain silt, dk yellowish orange (10YR 6/6) organics (roots, needles, etc) trace gravel, upper 1 ft. ~~[illegible]~~ dry		Alluvium	23 Sept 94 In zone: 1310 Drilling: 1350
	Run 2 2.5/2.5	AAB 9455 2.5-3.3 Fill	0 OVM ≤250 BY		2-19 med - Coarse grains silt Sand, mod yellow brown (10YR 5/4) dry, trace gravel, trace organics			
5	Run 3 2.5/2.5		0 OVM ≤250 BY		Coarse gr Sand, pale brown (5YR 5/2) dry tuff bank at 7' trace gravel			
	Run 4 2.5/2.5	AAB 9456 7.5-10 RAO	0 OVM ≤250 BY	Box 2 of 8 7-12.5 Fill	SAA, moist, 5% gravel			
10	Run 5 2.5/2.5		0 OVM ≤250 BY		SAA			
	Run 6 2.5/2.5	AAB 9456 14.5-15 RAO	0 OVM ≤250 BY		SAA			
15	Run 7 2.5/2.5		0 OVM ≤250 BY	Box 3 of 8 12.5-17.5 Fill	SAA 17' increase in clay by tuff blk			Back: 1500 Drilling: 1515 ~~AAB 9458~~ [illegible] 9/23/94 ~~AAB 9459~~ stop Drilling: 1530
	Run 8 1.5/2.5	AAB 9457 17.5-19 RAO ~~[illegible]~~ ~~[illegible]~~	0 OVM ≤250 BY		SAA 19-20' Core loss			
20	Run 9 2.5/2.5	[illegible]	0 OVM ≤250 BY	Box 4 of 8 17.5-26 Fill	20-22 SAA damp 10% gravel at S.H contact 22-22.5 S.H Grayish orange (10YR 7/4) trace gravel dry			26 Sept 94 In zone: 0735 Drilling: 0800
	Run 10 0.5/2.5	AAB 9460 RAO 22.5-23 AAB 9458 Rinsate	0 OVM ≤250 BY		23-25 Core loss	Core loss		Run 10 AAB 9458 Rinsate AAB 9459 Field Blk
25	Run 11 2.5/2.5	AAB 9459 Field Blk	0 OVM ≤250 BY	Box 5 of 8 26-29.5 Fill	~~[illegible]~~ Fine grain silt, SAA, [illegible] (10YR 7/4) dry, trace organics (roots)			
	Run 12 2.5/2.5	AAB 9461 27.5-28.3 Fill	0 OVM ≤250 BY		Fine grain silt, moderate yellowish brown (10YR 5/4) damp, tuff fragments up to 3cm.			
30								

Prepared by J. Walterscheid Date 26 Sept 94 Checked By Dick Faulk Date 9/27/94

- Sand
- gravel
- silt/clay
- tuff
- pumice

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1373 TA/OU 10/1079 Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 5-8 Start Date/Time 23 Sept 94/1350 End Date/Time 26 Sept 94/1030

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number Add.	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	[illegible] 0.5/2.5		Ø OVM 5250 BT		SAA 30.5-32.5 Core loss	Core loss	Alluvium	
	[illegible] 2.5/2.5	AA8[illegible] 33-33.5 KAO	Ø OVM 5250 BT		Fine grain sand S. M. dry, pale yellow brown (10YR 6/2) 510% gravel up to 2cm. Increasing sand w/ depth		Alluvium	
35	[illegible] 2.5/2.5	AA8[illegible] 36-36.5 Full	Ø OVM 5250		SAND fine grain, moist. 34.5 Pumice bed, yellow (5YR 7/2) with strong FeOx staining, damp, friable, pumice crystals range 1cm - 3.5cm, clay alteration is evident			
	[illegible] 2.5/2.5		Ø OVM 5250 BT					
40	[illegible] 2.5/2.5	AA8[illegible] 42-42.5 KAO	Ø OVM 5250 BT		SAA slightly less FeOx staining, drying out with depth, competent core		Guaje Pumice	Break: 0920
	[illegible] 2.5/2.5		Ø OVM 5250 BT		SAA			Back in hole: 1005, Drilling: 1007
45	[illegible] 2.5/2.5		Ø OVM 5250 BT		SAA			
	[illegible] 2.5/2.5	AA8[illegible] 49.5-50 Full	OVM BT		SAA less FeOx, crystals larger, dry			T.D. 1030
50					50 T.D.			

Prepared by J [illegible] Date 26 Sept 94 Checked By [illegible] Date 9.27.94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1274 TA/OU 10/1072 Drill Depth From 0 To 30ft Page 1 of 2

Driller Stewart Bros Box #(s) 1-4 Start Date/Time 29Sept94/1115 End Date/Time 29Sept94/1620

Drilling Equip./Method Failing F10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		Ø OVM ≤250 BT	Box 1 0-7.0ft	0-2.5ft Sandy SILT, moderate yellowish brown (10YR 5/4) fine to medium grain sand. Trace fine gravel, humus layer at surface (grass roots, twigs etc.), damp.			29Sept94 In zone: 1110 Drilling: 1115
	Run 2 2.5/2.5	AAB9477 2.5-5.0' Full	Ø OVM ≤250 BT		2.5-5ft SAND fine to medium grain, trace coarse gravel (tuff, rhyolite, volcanics), moist, unconsolidated			2.5-5.0': photo
5	Run 3 2.5/2.5		Ø OVM ≤250 BT		SAA coarse with depth			
	Run 4 2.5/2.5	AAB9478 7.5-10' RAD	Ø OVM ≤250 BT	Box 2 7-15.0ft	7.5-10ft SAND, medium to coarse grain, moderate yellowish brown (10YR 5/4), trace fine volcanic gravels, unconsolidated, damp, trace silt/clay.			7.5-10': photo Lunch: 1200 In zone: 1300 Drilling: 1310
10	Run 5 1.5/2.5		Ø OVM ≤250 BT		10-11ft SAA 11-11.5ft Silty SAND, coarse grain, 10% clay, moist. 11.5-12.5ft (No Recovery)	Loss		
	Run 6 2.5/2.5	AAB9479 14.5-15' RAD	Ø OVM ≤250 BT		12.5-15ft Coarse grain SAND, little coarse volcanic gravel clasts, damp, unconsolidated			12.5-15': photo
15	Run 7 2.5/2.5		Ø OVM ≤250 BT	Box 3 15-22.5ft	SAA			
	Run 8 2.5/2.5	AAB9480 18.5-20' Full AAB9481 D-P	Ø OVM ≤250 BT		17.5-18.5ft SAND, fine-med. grain trace gravel, damp 18.5-20ft SAND, medium to coarse grain pale brown (5YR 5/2), 15-20% pea size gravel, unconsolidated, drying out with depth.			
20	Run 9 2.5/2.5		Ø OVM ≤250 BT		SAA (trace silt/clay)			
	Run 10 2.0/2.5	AAB9482 23-23.5' RAD	Ø OVM ≤250 BT	Box 4 22.5-30ft	22.5-23.5ft SAA 23.5-24.5ft SILT, grayish orange (10YR 7/4), trace organics (roots) trace gravel, dry. 24.5-25ft (No Recovery)	Loss		22.5-25': photo
25	Run 11 2.5/2.5		Ø OVM ≤250 BT		25-27.5ft SAA			
30	Run 12 2.0/2.5	AAB9484 27.5-28.5' Full	Ø OVM ≤250 BT		SAA 29.5-30ft (No Recovery)	Loss		

Prepared by J. Waltersheid Date 29Sept94 Checked By [signature] Date 12 Oct 94

SAND

SILT/CLAY

Gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1574 TA/OU 10/1079 Drill Depth From 30 ft To 50 ft Page 2 of 2

Driller Stewart Bros Box #(s) 5-7 Start Date/Time 29 Sept 94/1115 End Date/Time 29 Sept 94/1620

Drilling Equip./Method Failing F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5		Ø OVM ≤250 βγ	Box 5 of 7 30-36.5 ft	30-32.5 ft SILT, fine grain, consolidated, firm, dry.		Alluvium	
	Run 14 2.0/2.5	AAB7483 33.5-34' VAC	Ø OVM ≤250 βγ		32.5-33 ft SAND fine grain moderate yellow-brown (10YR5/4) 33-34.5 ft med-coarse grain SAND, 10-20% volcanic gravel, 5% clay 34.5-35 ft (no recovery)			Break: 1500 In zone: 1530
35	Run 15 2.5/2.5		Ø OVM ≤250 βγ		35-37.5 ft PUMICE pale orange to off white in color, strong FeOx stain decreasing with depth. Pumice clasts 1-3cm in size, weakly competent, damp drying with depth		Guaje Pumice	
	Run 16 2.5/2.5	AAB7485 37.5-40'	Ø OVM ≤250 βγ		SAA			37.5-40' photo
40	Run 17 2.5/2.5		Ø OVM ≤250 βγ	Box 6 of 7 36.5-45 ft	SAA			
	Run 18 0/2.5		Ø OVM ≤250 βγ		42.5-45 ft (no recovery)	Core Loss		
45	Run 19 2.5/2.5		Ø OVM ≤250 βγ		45-47.5 ft PUMICE competent, gray to off white in color, dry.			45-47.5': photo
	Run 20 2.5/2.5	AAB7487 49-50' Full	Ø OVM ≤250 βγ	Box 7 of 7 45-50 ft	SAA			TD: 1620
50					50 ft Total Depth			

Prepared by J.W. Kershead Date 29 Sept 94 Checked By Keith Faulk Date 12 Oct '94

SAND

SILT/CLAY

gravel

PUMICE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1375 TA/OU 10/1071 Drill Depth From 0 To 30 ft Page 1 of 2

Driller Stewart Bros Box #(s) 1-4 Start Date/Time 28 Sept 94/0730 End Date/Time 28 Sept 94/1130

Drilling Equip./Method Failing F10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 1.5/2.5		SVM <50	Box 1 of 4 0.0-9.0 ft	0-2.5 ft Sandy SILT, dark yellowish brown (10YR 4/2), humus impregnated, trace grass residue, 2.5Y 4/4 ... ; trace coarse gravels/clasts to 5/8 ft; damp		Alluvium	28 Sept 94 Intake: 0730 Drilling: 0735 2.5-5 ft: drilling hole, sample fell out while extracting split spoon
					2.5-5.0 ft (no recovery)	Core Loss		
5	Run 2 0/2.5							
	Run 3 1.5/2.5	AAB9468 5-7.5' F...	SVM <50		5-7.5 ft SAND, medium to coarse grained, moderate yellow brown (10YR 5/4), trace coarse gravels ... damp, unconsolidated			
	Run 4 2.5/2.5		SVM <50		7.5-10 ft SAA			
10	Run 5 2.0/2.5	AAB9467 10-12.5' RAC AAB9468 Dup	SVM <50	Box 2 of 4 9.0-17.5 ft	10-10.5 ft (no recovery) 10.5-12.5 ft SAA	Loss		
	Run 6 2.5/2.5	AAB9469 12.5-15' ...	SVM <50		12.5-13 ft SAA 13-15 ft Gravelly SAND, coarse grained, dark yellowish brown (10YR 4/2), trace ... pebbles, moist, unconsolidated			
15	Run 7 0.7/2.5		SVM <50		15-15.75 ft SAA 15.75-17.5 ft (no recovery)	Core Loss		
	Run 8 1.5/2.5	AAB9470 17.5-19' RAC	SVM <50	Box 3 of 4 17.5-25 ft	17.5-18.75 ft SAA 18.75-19 ft SILT, fine grained, pale yellowish brown (10YR 6/2), dry. 19-20 ft (no recovery)	Loss		
20	Run 9 2.5/2.5		SVM <50		20-22.5 ft Gravelly SAND, medium to coarse grained, moderate yellowish brown (10YR 5/4), gravel consists of tuff and basalt fragments, trace clay, unconsolidated, drying out with depth			
	Run 10 2.5/2.5	AAB9471 22.5-25' RAC	SVM <50		22.5-25 ft SAA			
25	Run 11 2.5/2.5		SVM <50	Box 4 of 4 25-30 ft	25-26.5 ft SAA note: increase in gravel at ... 26.5-27.5 ft SILT, fine grained, pale yellowish brown (10YR 6/2), trace gravel, weakly consolidated, dry			
	Run 12 1.7/2.5	AAB9472 27.5-29.2' RAC	SVM <50		27.5-29.2 ft SAA 29.2-30 ft (no recovery)	Loss		Break: 0932 at 30 ft
30								

Prepared by [illegible] Date 28 Sept 94 Checked By [illegible signature] Date 12 Oct '94

SAND

SILT

Gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 2 of 2

Start Date/Time [illegible] End Date/Time 28 Sept 94/1130

Driller [illegible] Box #(s) [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless Steel Split Spoon Core barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results OVM, ppm	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5		0 OVM 0.25 ppm	[illegible]	30-32.5 ft SAA		Alluvium	In zone: 1013 Drilling: 1017
	Run 14 2.5/2.5	AAB5914 34.2-35' [illegible]	0 OVM 0.25 ppm		32.5-34.8 ft Sand, silt, moderate yellowish brown (10YR 5/4), weakly consolidated, dry 34.8-35 ft SAND [illegible]			
35	Run 15 2.5/2.5		0 OVM 0.25 ppm	[illegible] 35.5-40 ft	35-35.8 ft SAA 35.8-37.5 ft PUMICE, pale orange (10YR 8/4), strong FeOx staining [illegible] pumice margins, [illegible] damp, weakly consolidated		Guaje Pumice	
	Run 16 2.5/2.5	AAB5913 37.5-40' KAO	0 OVM 0.25 ppm		37.5-40 ft SAA			
40	Run 17 2.5/2.5		0 OVM 0.25 ppm	Box 6 [illegible] 40-45 ft	40-42.5 ft SAA note: FeOx decreasing with depth			
	Run 18 2.5/2.5	AAB5915 44.5-45' KAO	0 OVM 0.25 ppm		42.5-45 ft SAA			
45	Run 19 0/2.5			Box 7 45-50 ft	45-47.5 ft (No Recovery)	Core Loss		
	Run 20 2.5/2.5	AAG2976 47.2-50' [illegible]	0 OVM 0.25 ppm		47.5-50 ft SAA (trace FeOx, dry)			TD 1130
50					50 ft Total Depth			out of zone: 1150

Prepared by [illegible] Date 28 Sept 94 Checked By [illegible] Date 20 Oct '94

SAND
SILT
Gravel
PUMICE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 12-1276 TA/OU 12-1279 Drill Depth From 0 To 30 ft Page 1 of 2

Driller Stewart Bros Box #(s) 1-5 Start Date/Time 30 Sept 94/0845 End Date/Time 3 Oct 94/0930

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per Inset / %)	Field Analytical Sample Number AAR #	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		0 OVM ≤250 BY	Box 1 0.0-7.5 ft	0-1.5' Sandy SILT, dk yellowish brown (10YR 4/2), [illegible] organics, moist. 1.5-2.5' [illegible] SAND, <10% gravel, trace organics, weakly consolidated, moist		Alluvium	30 September 94 Install: 0730 rigging down and moving to 12-1276. Drilling 0845
5	Run 2 2.5/2.5	AAB9787 2.5-3.5 Fill	0 OVM ≤250 BY		2.5-5' SAND, med. to coarse grain, dk yellowish brown (10YR 4/2), <10% gravel (<1 cm), moist, trace silt			
	Run 3 2.5/2.5	[illegible]	0 OVM ≤250 BY		SAA			
10	Run 4 2.5/2.5	AAB [illegible] 7.5-10 RAD	0 OVM ≤250 BY	Box 2 7.5-14 ft	SAA 9.5-10' silt/clay, 10-20% gravel			
	Run 5 2.5/2.5		0 OVM ≤250 BY		SAA (12'-13' 20% gravel, 45% silt/clay)			
15	Run 6 2.5/2.5	AAB9789 14.2-15 Fill	0 OVM ≤250 BY		12.5-13' SAA 13-15' SAND, coarse grain, 40% gravel (<[illegible]) [illegible] fragments, damp, trace organics			
	Run 7 2.5/2.5		0 OVM ≤250 BY	Box 3 14.0-21.0 ft	15-17.5' SAND, med-coarse grain, mod yellowish brown (10YR 5/4), ≤10% gravel, trace clay, damp			
20	Run 8 2.5/2.5	AAB7490 17.5-20 AAB9491 [illegible]	0 OVM ≤250 BY		SAA interfingered with [illegible]			Break: 1000 Install: 1045 Drilling: 1047
	Run 9 2.5/2.5		0 OVM ≤250 BY		SAA 5-10% clay, trace silt			
25	Run 10 2.5/2.5	AAB9492 24.5-25 RAD	0 OVM ≤250 BY	Box 4 21.0-27.5 ft	SAA 10-20% gravel (<1.5", obsidian [illegible]) ≤5% clay/silt			
	Run 11 2.5/2.5		0 OVM ≤250 BY		SAA ≤10% gravel, moist to [illegible]			
30	Run 12 0.5/2.5	AAB9493 ~~25-28~~ 27.5-28 RAD	0 OVM ≤250 BY		27.5-28 SILT, fine grain, grayish orange (10YR 7/4) damp 28-30 No Recovery	Core loss		Break: 1130 High winds

Prepared by J. Wattersheid Date 3 Oct 94 Checked By ______ Date ______

sand

silt/clay

gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 15-1276 Drill Depth From 30 ft To 50 ft Page 2 of 2

Driller [illegible] Box #(s) 5-7 Start Date/Time 3 Oct 94/0805 End Date/Time 3 Oct 94/0930

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5		0 ppm [illegible]		SAA		Alluvium	3 Oct 94 Intake: 0805 Drilling. 0810
	Run 14 2.5/2.5	AAK 3774 32.5-35	0 ppm [illegible]		32.5-~~35~~ Sandy Silt, fine grain, [illegible] brown (10YR 5/6) consolidated, clumps [illegible]			
35	Run 15 2.5/2.5		0 ppm [illegible]		SAA 37-37.8 Sand fine to med gr., 20-30% [illegible]			
	Run 16 2.5/2.5	AAK 3775 37.5-38	0 ppm [illegible]		37.8-40 PUMICE, light brown (5YR 5/6), strong Fe staining, [illegible] at contact (sand, gravel, pumice at contact), 1-3 cm in size			
40	Run 17 2.5/2.5		0 ppm [illegible]		SAA. less Fe staining with depth, [illegible] competent core		Cerro Pumice	
	Run 18 2.5/2.5	AAK 3776 44.5-45	0 ppm [illegible]		SAA			
45	Run 19 2.5/2.5		0 ppm [illegible]		SAA, competent			
	Run 20 2.5/2.5	AAK 3777 47-50	0 ppm [illegible]		SAA			0930 T.D.
50					50 T.D.			

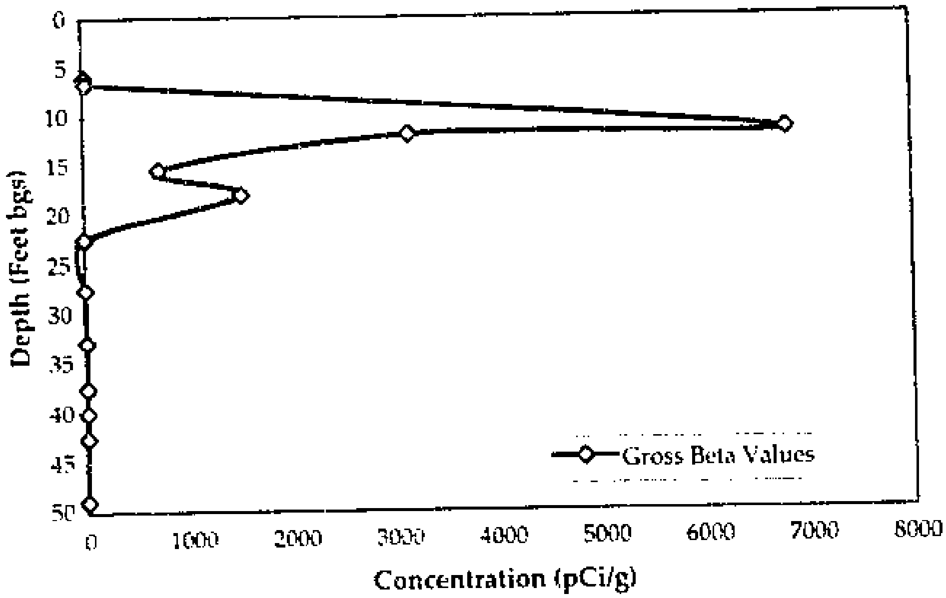
Prepared by J. [illegible] Date 3 Oct 94 Checked By [illegible] Date 12 Oct '94

Sand
S. H
gravel
Pumice

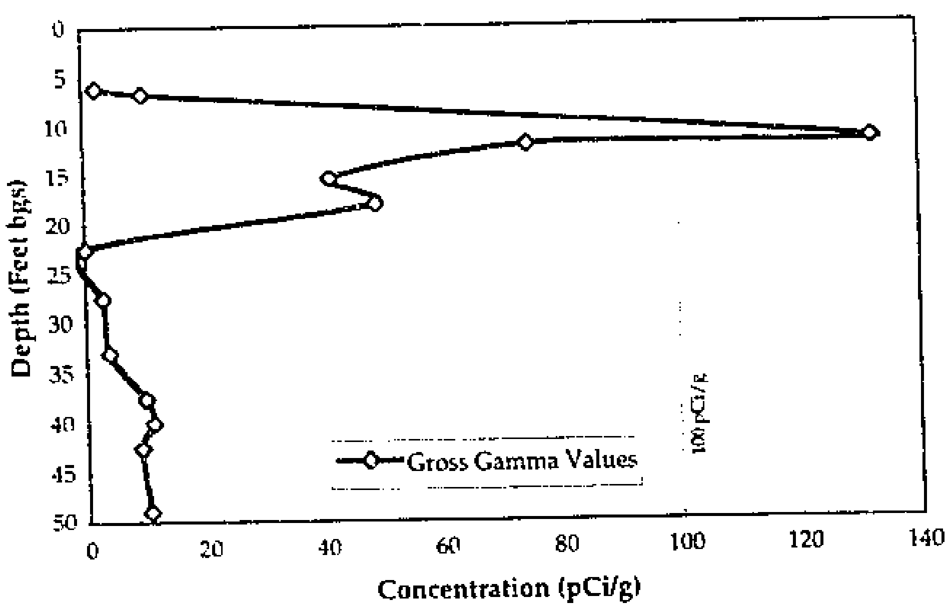
APPENDIX B

GRAPHICAL PRESENTATION OF CONTAMINATED BOREHOLES

Borehole 10-2210
Gross Beta Concentrations

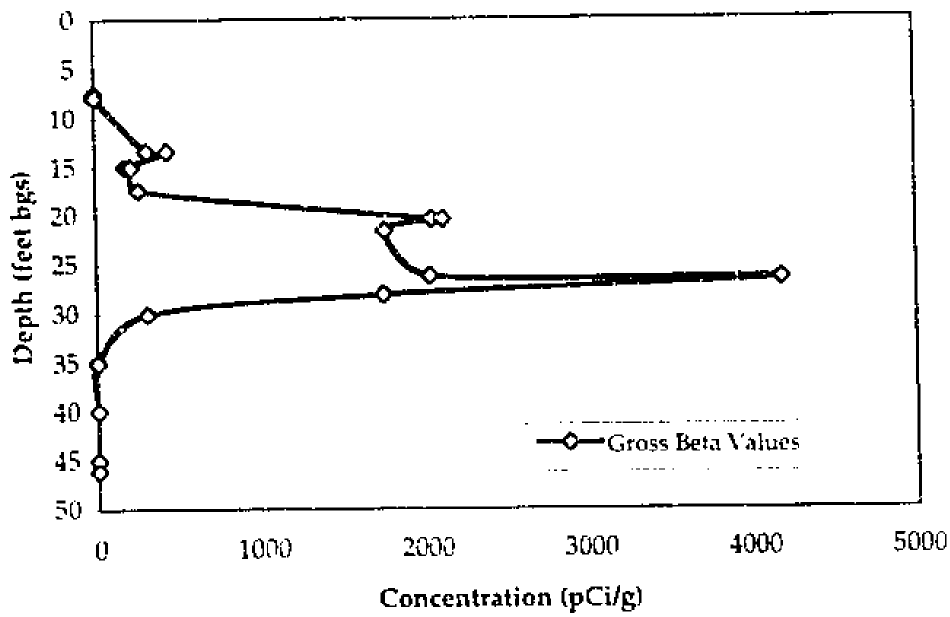


Borehole 10-2210
Gross Gamma Concentrations

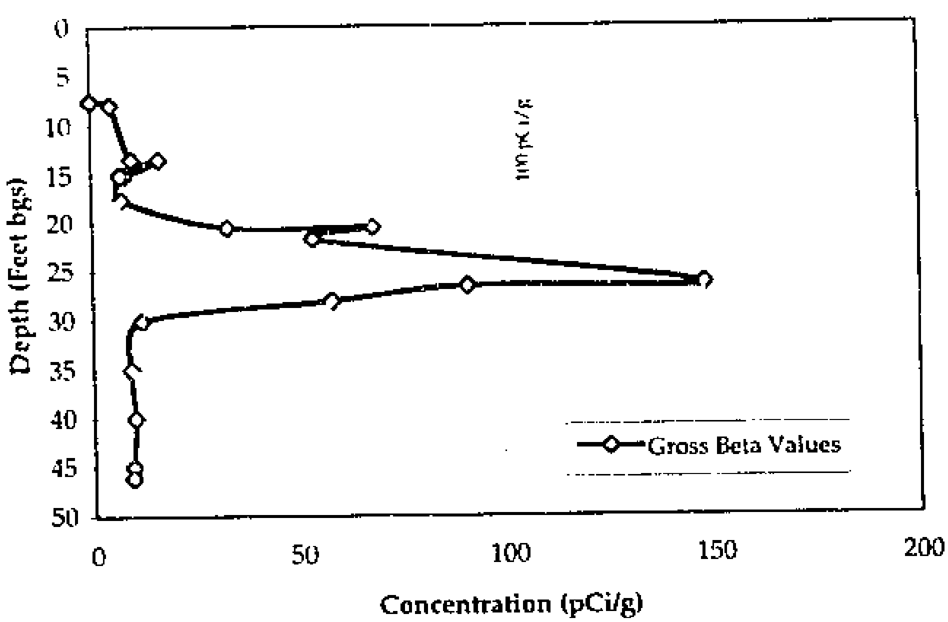


bgs - below ground surface

Borehole 10-1215
Gross Beta Concentrations

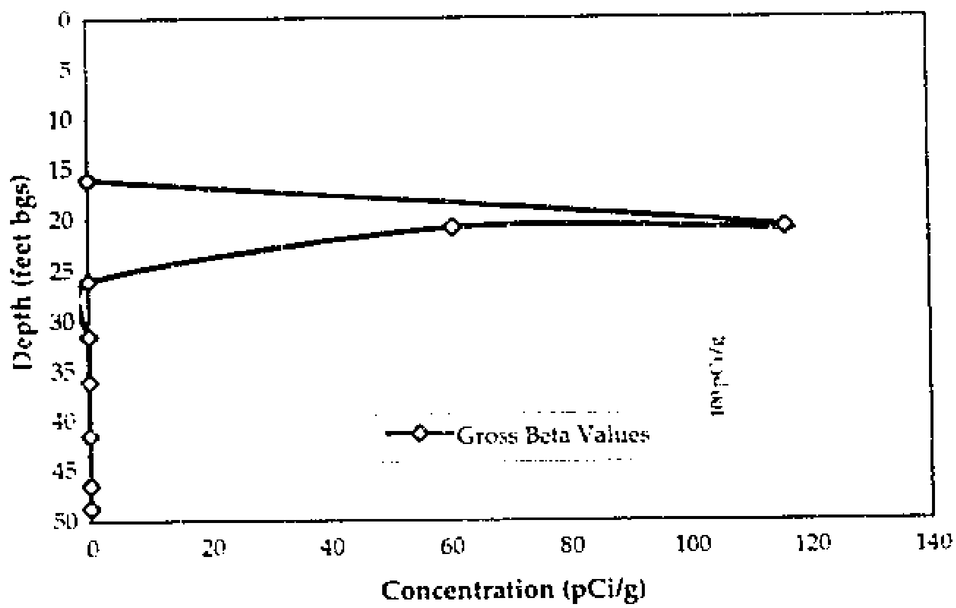


Borehole 10-1215
Gross Gamma Concentrations

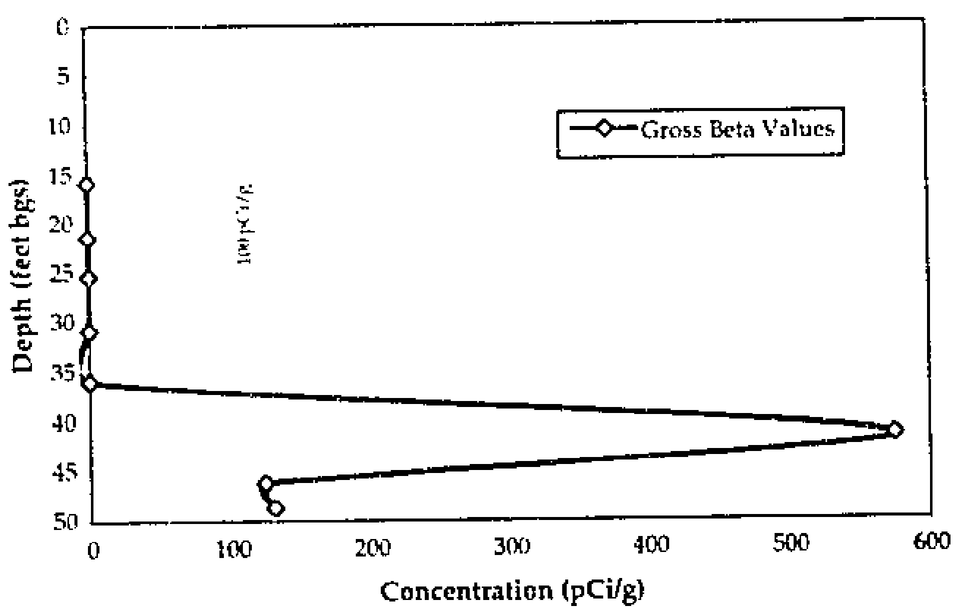


bgs - below ground surface

Borehole 10-1200
Gross Beta Concentrations

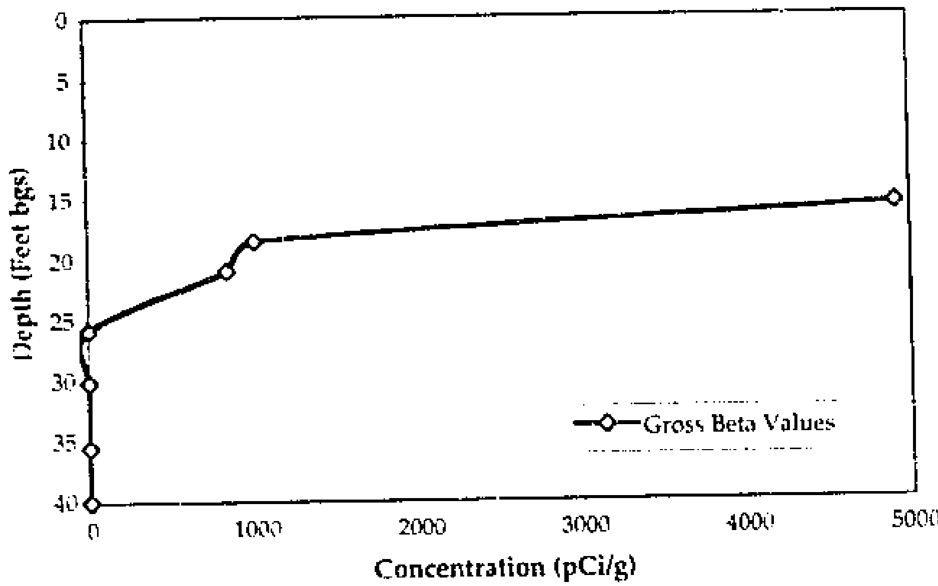


Borehole 10-1202
Gross Beta Concentrations

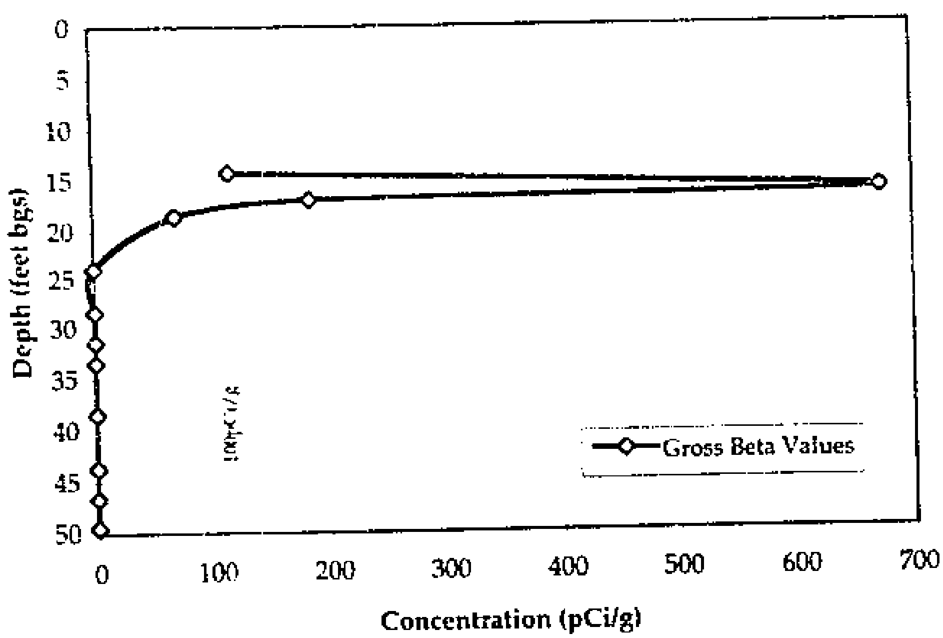


bgs - below ground surface

Borehole 10-1204
Gross Beta Values

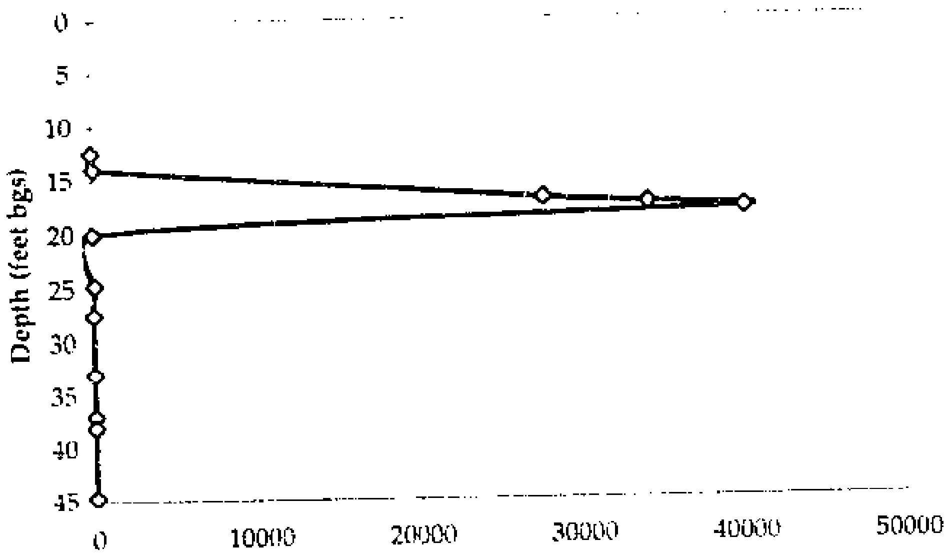


Borehole 10-2211
Gross Beta Concentrations

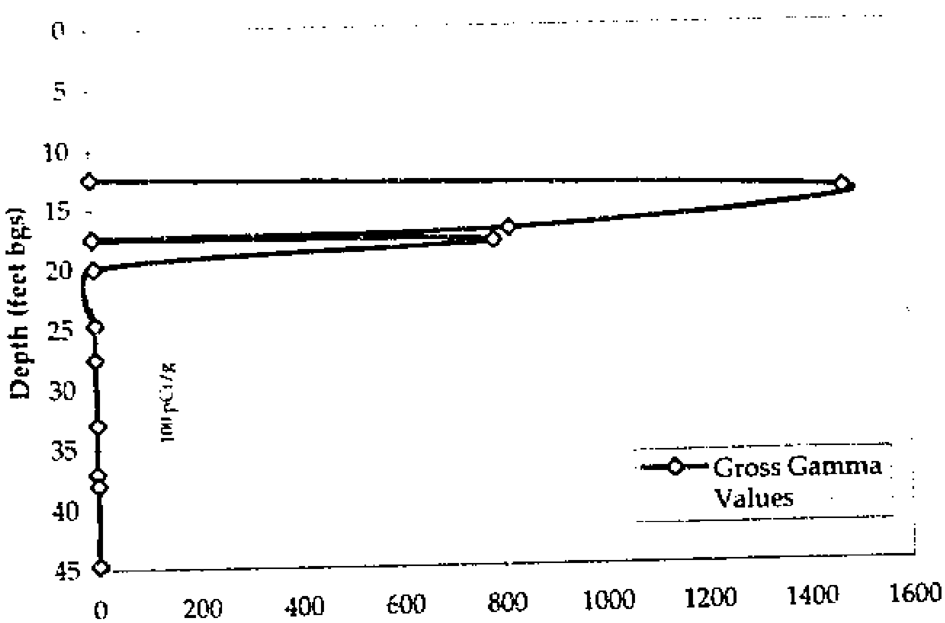


bgs - below ground surface

Borehole 10-2220
Gross Beta Values

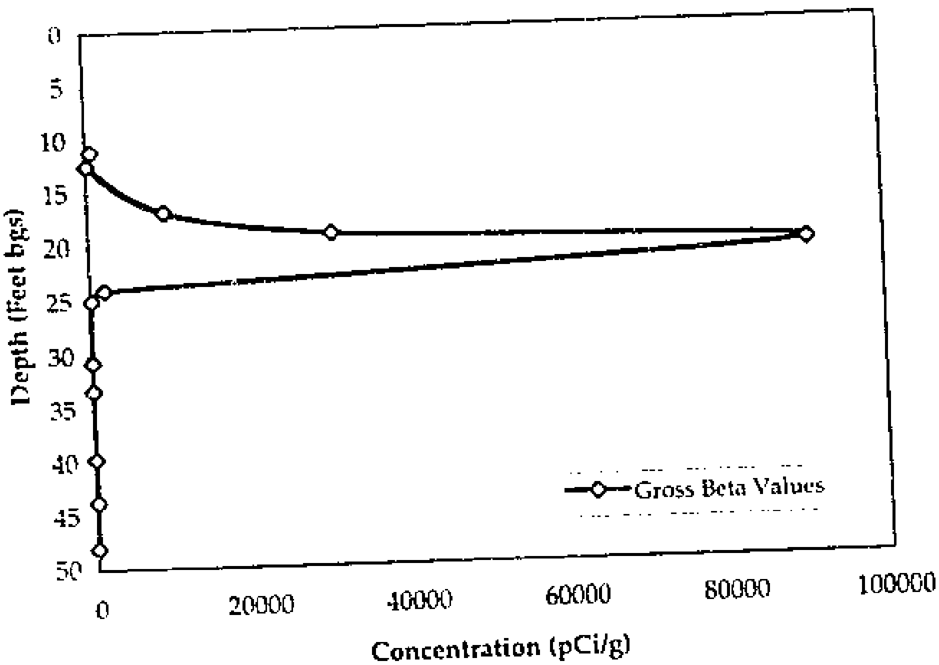


Borehole 10-2220
Gross Gamma Concentrations

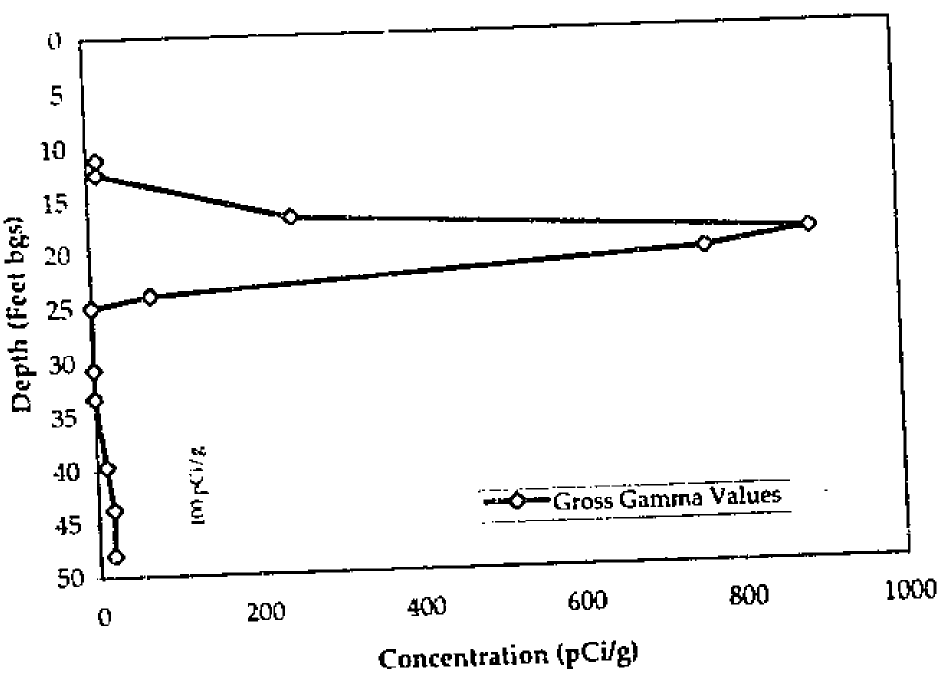


bgs - below ground surface

Borehole 10-1201
Gross Beta Concentrations

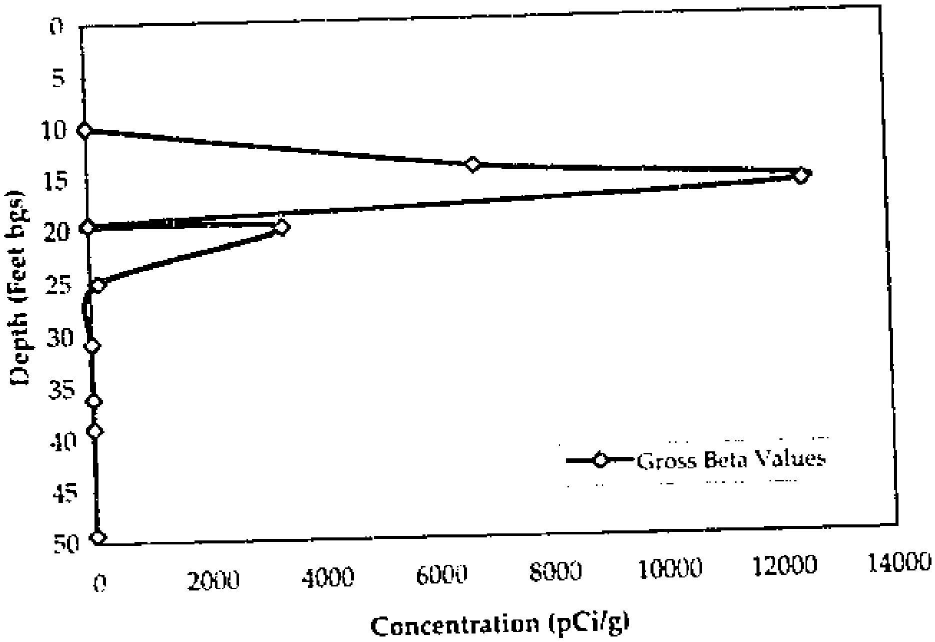


Borehole 10-1201
Gross Gamma Concentrations

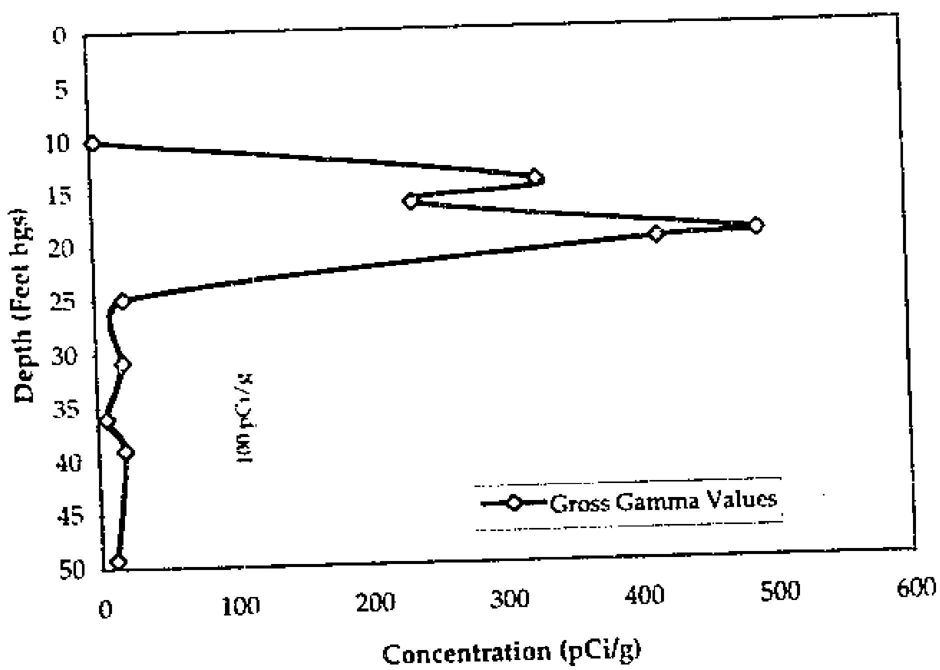


bgs - below ground surface

Borehole 10-1205
Gross Beta Concentration

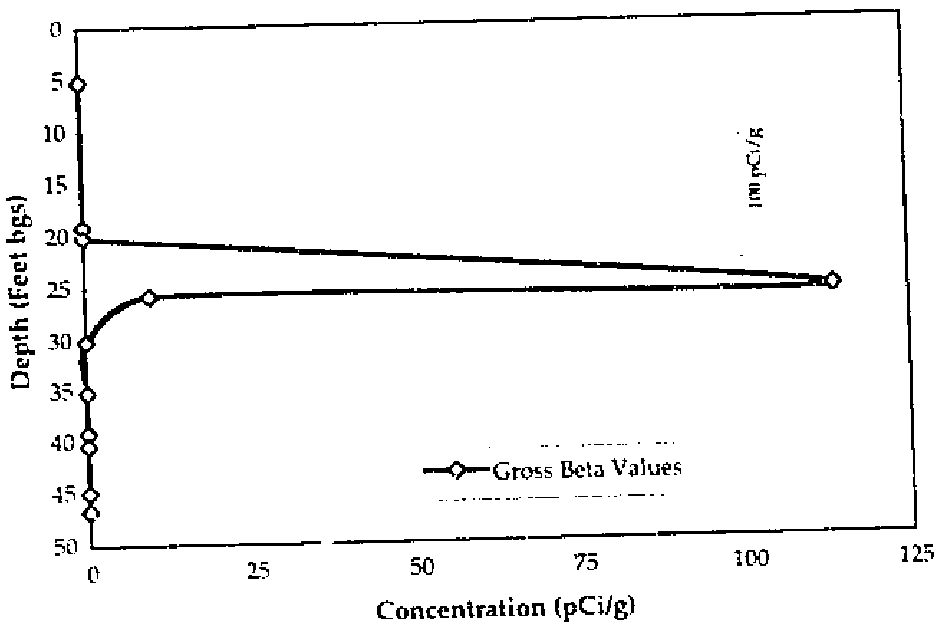


Borehole 10-1205
Gross Gamma Concentrations

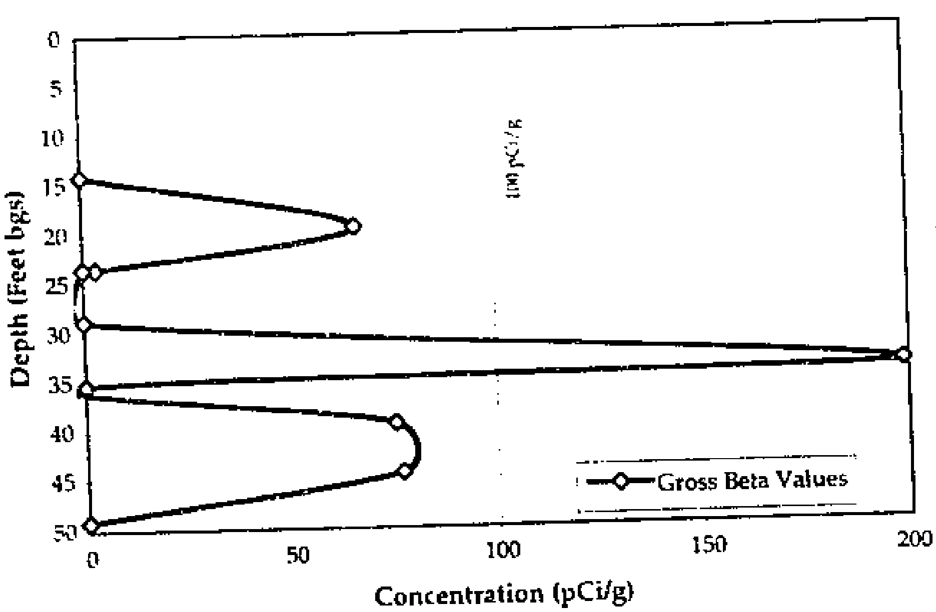


bgs - below ground surface

Borehole 10-1213
Gross Beta Concentrations

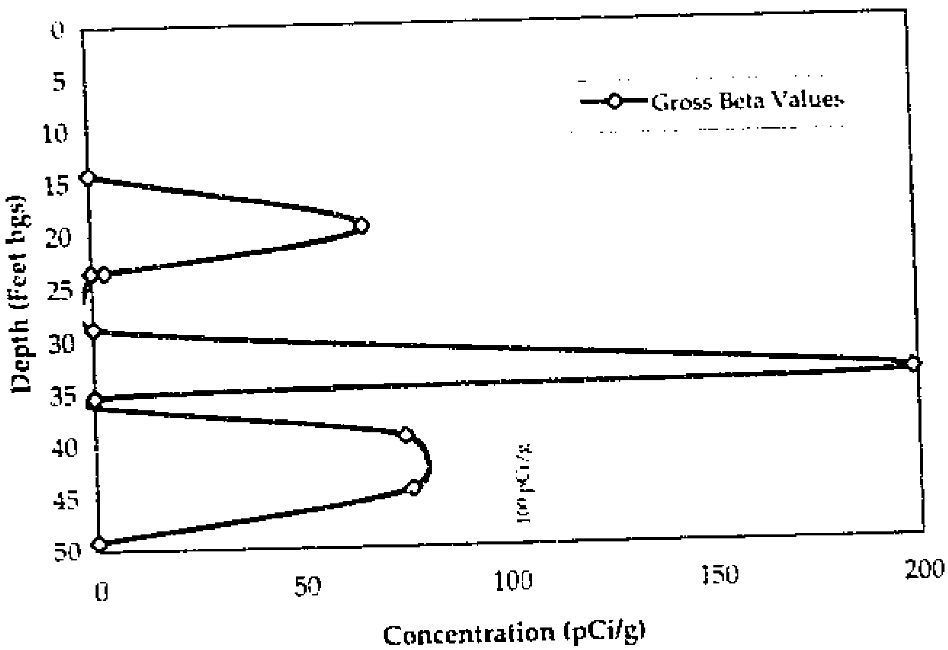


Borehole 10-2221
Gross Beta Concentrations

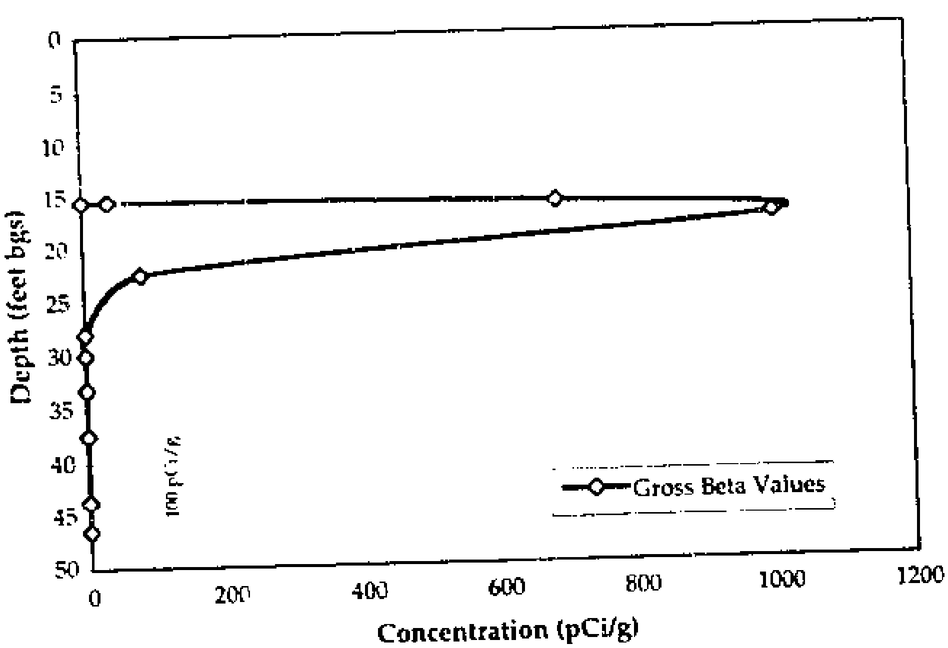


bgs - below ground surface

Borehole 10-2222
Gross Beta Concentrations



Borehole 10-1223
Gross Beta Values



bgs - below ground surface

APPENDIX C

MONITORING WELL CONSTRUCTION DIAGRAM

MONITORING WELL CONSTRUCTION FIELD DATA LOG

FIELD DIAGRAM OF NEUTRON ACCESS TUBE COMPLETION

Los Alamos National Laboratory Environmental Restoration
Well Completion Information Form

Page 1 of 2

Site Work Plan LA-UR-92-850
Technical Area 10
Inclusive Sample Identifier:
Operable Unit 1079
AAB 9498, 9501 to 9511
Signature Aleeck G Faulk, R.G.
Date 9 Dec 94

Owner LANL
Installer EnviroGeller & Stewart Drg. Installation Date 22 Nov 94
Filter Pack Length (ft) 12.9
Well Type Classification M
Formation of Completion (US/RC)) Puye Formation
Well Completion Method F & S
Zone of Completion N/A (Dry Hole)
Casing Elevation (ft MSL) Not yet Surveyed
Open/Screen Depth (FTFD)* 57.5 below top of casing
Casing Depth (ft) 57 below ground surface
Open/Screen Length (ft) 10
Casing Diameter (in.) 4"
Open/Screen Area (in²/ft) 1.26
Seal End Depth (FTFD) 55 below ground surface
Flow Relationship N
Screen Material #20 slot, Sch 40 PVC
Cap Material PVC
Riser Material PVC
Cap Type LC

WELL TYPE CLASSIFICATIONS

M - Monitor Well
P - Production Well
T - Test Well
O - Other (specify) ______

FLOW RELATIONSHIP

U - Upgradient
D - Downgradient
C - Cross Gradient
O - Onsite
N - Not known
B - Background

CAP TYPE

LC - Locking
SL - Slip-on
TR - Threaded
NO - None
SC - Screw-on
OT - Other (specify) ______

WELL COMPLETION METHODS

C- Porous Concrete
F - Gravel Pack
H - Horizontal Galley
O - Open End
P - Perforated/Slotted
S - Screen
T - Sand Front
W - Walled
X - Open
O - Other (specify) ______

CAP MATERIALS

CT - Concrete
CR - Copper
FI - Fiberglass
GI - Galvanized Iron
WI - Wrought Iron
SS - Stainless Steel
OM - Other Material
TE - Teflon
PV - PVC
RK - Rock or Stone
ST - Steel
TI - Tile
CS - Coated Steel
WD - Wood
NO - None
OT - Other (specify)

ZONES OF CONCERN

A - Artesian
C - Confined
H - Acquitard
G - Aquiclude
M - Multisystem
S - Semi-confined
U - Unconsolidated

* FTFD = feet from datum.

Los Alamos National Laboratory Environmental Restoration
Well Completion Information Form (continued)

Site Work Plan LA-UR-92-850

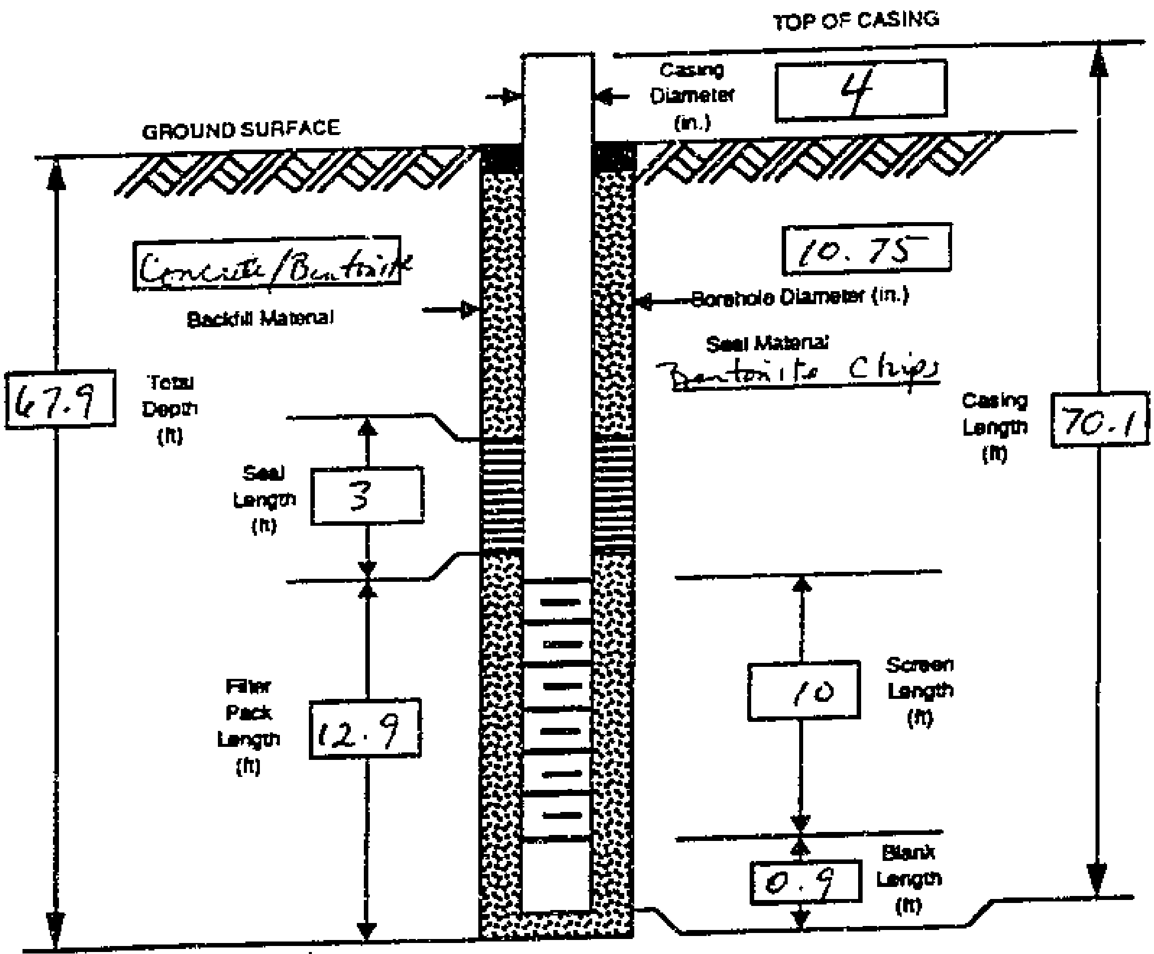
Technical Area 10

Operable Unit 1079

Signature [illegible], RG

Inclusive Sample Identifiers AAS 9498, 9501 to 9511

Date 9 Dec 94



Filter Pack Material 10/20 CSS

Comments

Los Alamos National Laboratory Environmental Restoration Monitor Well Construction Field Data Log

Sheet 1 of 1

Site Work Plan LA-UR-92-850

Inclusive Sample Identifiers AAB 9499, 9501 to 9511

Technical Area 10

Operable Unit 1079

Date 9 Dec 94

Signature [illegible] Faulk, ?G

BOREHOLE SUMMARY

BIT TYPE	HOLE DIAMETER (in.)	END[1] DEPTH (ft)	FLUID TYPE
Flat	10.25	67.9	N/A

CASING SUMMARY

CASING TYPE	DESCRIPTION	DIAM. (in.)	END[2] DEPTH (ft)
P	Sch 40 PVC	4	59.5
S	Sch 40 PVC	4	69.5

P - Protective S - Screen O - Open N - None

[1] Depth from Ground Surface [2] Depth from Top of Casing

WELL CONSTRUCTION

TYPE[1] CODE	DESCRIPTION	END[1] DEPTH (ft)
F	10/20 CSS	67.9
S	Bentonite Chips	55.0
B	Concrete/Bentonite Slurry	52.0

B - Backfill S - Seal F - Filter Pack [1] Depth from Ground Surface

CONSTRUCTION TIME LOG

ACTIVITY	START DATE	START TIME	END TIME
DRILLING	10/4/94	0855	1430
	10/5/94	0810	0915
CASING	11/22/94	1515	1527
FILTER PACK	11/22/94	1527	1617
SEAL	11/22/94	1617	1634
BACKFILL	11/23/94	0850	1100
DEVELOPMENT	N/A		
OTHER Surface Completion	11/28/94	0940	1100

WELL DEVELOPMENT

N/A - Dry Hole

COMMENTS: Borehole FIMAD ID #10-1277

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 ft Page 1 of 3

Driller [illegible] Box #(s) 1-5 Start Date/Time 4 Oct 94/0745 End Date/Time 5 Oct 94/0915

Drilling Equip./Method [illegible] F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results OVM (ppm)	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		0 OVM 5250 β-	Box 1 of 5 0-15 ft	0-2.5 ft Sandy SILT fine grain, moderate yellow brown (10YR5/4), humus layer at surface (needles grass roots) 10-15% [illegible] gravels ([illegible]) damp		Alluvium	4 Oct 94 Start: 0745 Drilling: 0855
	Run 2 2.5/2.5	AAB9498 2.5-3.5' Full Suite ~~AAB9499 Field Blk~~ ~~AAB9500 Rinsate~~	0 OVM 5250 β-		2.5-3.5 ft SAA 3-5 ft SAND med-coarse grain trace organics (roots), 10-30% gravels [illegible] trace [illegible] damp			AAB9498: Full Suite ~~AAB9499 Field Blk~~ PSF ~~AAB9500 Rinsate~~
5	Run 3 2.5/2.5		0 OVM 5250 β-		SAA			
	Run 4 2.5/2.5	AAB9501 9.5-10' RAD	0 OVM 5250 β-	Box 2 of 5 15-15 ft	SAA			
10	Run 5 2.5/2.5		0 OVM 5250 β-		SAA ([illegible] increase in silt/clay, trace roots)			
	Run 6 2.5/2.5	AAB9502 [illegible] RAD AAB9503 Field Blk AAB9504 Rinsate	0 OVM 5250 β-		SAA w/ [illegible] gravel			AAB9502: RAD AAB9503: Field Blk AAB9504: Rinsate
15	Run 7 2.5/2.5		0 OVM 5250 β-	Box 3 of 5 15.5-21 ft	15-17 ft SAA 17-17.5 ft (No Recovery)			
	Run 8 2.5/2.5	AAB9505 19.5-20' RAD	0 OVM 5250 β-		17.5-20 ft SAND med-[illegible] coarse grain moderate yellowish brown 5-10% clay trace coarse grains moist, unconsolidated			
20	Run 9 2.5/2.5		0 OVM 5250 β-		SAA			
	Run 10 2.5/2.5	AAB9506 22.5-23.3' Full, Htc	0 OVM 5250 β-	Box 4 of 5 21-28 ft	22.5-23 ft SAA 23-25 ft Coarse grain SAND, moderate yellow brown (10YR5/4) trace clay 20-30% [illegible] gravel clasts (1-3.5cm) damp			
25	Run 11 2.5/2.5		0 OVM 5250 β-		SAA (clay/silt increasing with depth)			
	Run 12 2.5/2.5	AAB9507 28.5-29' RAD	0 OVM 5250 β-	Box 5 of 5	27.5-28.7 ft SAA 28.7-30 ft SILT, fine grain, consolidated (firm), moderate yellowish brown (10YR5/4), damp.			
30								

Prepared by [illegible] Date 5 Oct 94 Checked By [illegible signature] Date 12 Oct '94

SAND

SILT/CLAY

Gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30ft To 60ft Page 2 of 3

Driller [illegible] Box #(s) 5-7 Start Date/Time 5Oct94/0745 End Date/Time 5Oct94/0915

Drilling Equip /Method [illegible] Hollow Stem Auger Sampling Equip /Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results OVM [illegible]	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5'/2.5		Ø OVM ≤250 Bkg	Box 5 30-35ft	SAA		Alluvium	
	Run 14 2.5'/2.5	AAA9559 34.5-35' FAC	Ø OVM ≤250 Bkg		32.5-35ft [illegible] SILT [illegible] consolidated mod [illegible] brown (5YR 5/4) Trace gravel, damp			
35	Run 15 .5'/2.5		Ø OVM ≤250 Bkg	Box 6 35-42ft	SAA			
	Run 16 2.5'/2.5	AAA9559 38-39' [illegible]	Ø OVM ≤250 Bkg		37.5-38.5ft [illegible] SAND, [illegible] gravel [illegible] damp 38.5-40ft PUMICE [illegible] Fe Ox staining moderately weathered [illegible] pumice [illegible] (10YR [illegible]) [illegible] [illegible] consolidated clay [illegible] Fe Ox staining [illegible] with depth		Guaje Pumice	
40	Run 17 [illegible]/2.5		Ø OVM ≤250 Bkg					
	Run 18 2.5/2.5	AAA9560 44.5-45' FAC	Ø OVM ≤250 Bkg	Box 7 42-63ft	SAA			
45	Run 19 0/2.5				45-47.5ft (No Recovery)	Core Loss		
	Run 20 0/2.5				47.5-50ft (No Recovery)	Core Loss		Break: 1242 (High Winds)
50	Run 21 0/5.0				50-55ft (No Recovery)	Core Loss		In zone: 1400 Drilling: 1405
55	Run 22 0/5.0				55-60ft (No Recovery)	Core Loss		End of day: 1430 (High Winds)
60								

Prepared by J. [illegible] Date 5Oct94 Checked By [signature] Date 12 Oct '94

SAND

SILT/CLAY

Gravel

PUMICE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 3 of 3

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 5 Oct 94/0915

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Spoon Core Barrel

Depth (foot)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
60	[illegible] 3.5/ 93 %	AAB9[illegible] [illegible]	[illegible] OVM [illegible]	[illegible]	60-62.5 ft PUMICE, strong FeOx staining, damp 62-63.5 ft [illegible] CLAY, fine grain, light brown (5YR [illegible]) unconsolidated, [illegible] pumice [illegible], damp	[illegible]	[illegible]	5 Oct 94 [illegible]: 0800 [illegible]: 0810
65	[illegible] 1.5/ [illegible]		[illegible]	[illegible]	SAA		[illegible]	
67.5	[illegible] 1.5/ [illegible]		[illegible]	[illegible]	65-[illegible] ft SAA 66-67.5 ft [illegible] recovery	[illegible]		[illegible] refused [illegible] clay TD: 0915
					67.5 ft Total Depth			

Prepared by [illegible] Date 5 Oct 94 Checked By [illegible] Date 12 Oct 94

PUMICE

CLAY

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 6 OCT 94/ 1200

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1		[illegible]		0-1.5 ft Sand, SILT [illegible] moderate yellowish brown (10YR 5/4) humus at surface, unconsolidated, dry		Alluvium	6 OCT 94
					1.5-2.5 ft No Recovery			
	Run 2	AAB9512	[illegible]		2.5-3.7 ft SAA			AAB9512 Full, HC
5					3.7-5.0 ft (No Recovery)			AAB9513 Field Blk
								AAB9514 Rinsate
	Run 3		[illegible]		5.0-7.5 ft SAND [illegible] trace organics, unconsolidated, trace clay, trace organics, (damp)			[illegible] at 6.2'
	Run 4	AAB9515	[illegible]		SAA			
10		EAC						
	Run 5		[illegible]		SAA			
	Run 6	AAB[illegible]	[illegible]		SAA			
15		EAC						
	Run 7		[illegible]		15-16.5 ft [illegible]			
					16.5-17 ft [illegible] SAND [illegible] trace gravel, trace organics [illegible]			
					17-17.5 ft (No Recovery)			
	Run 8	AAB[illegible]	[illegible]		17.5-20.0 ft [illegible] trace gravel, trace clay [illegible] unconsolidated, moist [illegible]			
20	Run 9		[illegible]		SAA			
	Run 10	AAB9517	[illegible]		SAA			
25		EAC						
	Run 11		[illegible]		25-26.5 ft SAA			
					26.5-27.5 ft SILT [illegible] orange (10YR 7/4) trace organics, consolidated, damp			
					27-27.5 ft (No Recovery)			
	Run 12	AAB9518	[illegible]		27.5-30 ft SAA			Break 1000
30		EAC						

Prepared by [illegible] Date 6 OCT 94 Checked By [illegible] Date 12 Oct '94

SAND

SILT/CLAY

Gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] 78 TA/OU [illegible] Drill Depth From 30ft To 50ft Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time 6 Oct 94/0800 End Date/Time 6 Oct 94/1200

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5		∅ OVM Eberline ∅		SAA. 55% gravel		Alluvium	Intake: 1045
	Run 14 1.2/2.5	AAB7520 33-33.7 Full Hc	∅ OVM Eberline ∅		SAA			
35					33.7-35ft No Recovery			
	Run 15 2.5/2.5		∅ OVM Eberline ∅		35-37.5ft SAND Fine grain, moderate yellow brown (10YR5/4), [illegible] H, trace gravel, consolidated, damp.			
	Run 16 2.5/2.5	AAB7521 38.8-38.4 RAD	∅ OVM Eberline ∅		37.5-39.3ft SAA; gravel clasts at contact			
40					39.3-40ft Pumice, H, Fe Ox staining, decreasing w/ depth, pale yellow orange (10YR8/6), pumice grains 1-3cm in size, 5-10% quartz, [illegible] sand, pumice/clay [illegible] near contact.		Guaje Pumice	
	Run 17 2.5/2.5		∅ OVM Eberline ∅					
	Run 18 2.5/2.5	AAB7522 44.5-45 RAD	∅ OVM Eberline ∅		SAA			
45	Run 19 2.5/2.5		∅ OVM Eberline ∅		SAA decreasing FeOx			
	Run 20 2.5/2.5	AAB7523 49-50 Full Hc	∅ OVM Eberline ∅		SAA			TD: 1200
50					50 TD			

Prepared by [illegible] Date 6 Oct 94 Checked By [illegible signature] Date 12 Oct 94

SAND

SILT/CLAY

Gravel

PUMICE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY — CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 ft Page 1 of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	R-1 2.5/2.5		0 OVM ≤25 BG		0-2.5 Sandy SILT, fine grain, [illegible] brown (10YR 5/4) [illegible]		Alluvium	Initial: 0750 Drilling: 0756 Cloudy, overcast, [illegible] 45°
	R-2 2.5/2.5	AAB[illegible] 2.5-5.0	0 OVM ≤25 BG		2.5-3.5' SAA 3.5-5.0' SAND, [illegible]			
5	R-3 .5/2.5		0 OVM ≤25 BG		5-6.5' SAA 6.5-7.5' No recovery			
	R-4 2.5/2.5	AAB[illegible] 7.5-10	0 OVM ≤25 BG		7.5-10' SAA, [illegible]			
10	R-5 2.5/2.5		0 OVM ≤25 BG		SAA [illegible]			
	R-6 2.5/2.5	AAB[illegible] 12.5-15	0 OVM ≤25 BG		SAA			
15	R-7 2.5/2.5		0 OVM ≤25 BG		SAA [illegible]			
	R-8 2.5/2.5	AAB[illegible] 17.5-20 RAD	0 OVM ≤25 BG		18?-20' SILT, fine grain, [illegible] brown (5YR 5/4), consolidated, damp			
20	R-9 2.5/2.5		0 OVM ≤25 BG		20-21' SAND, fine grain, [illegible] 21-22.5 Sandy SILT, fine grain, [illegible] brown, moist, 5% small gravel			
	R-10 2.5/2.5	AAB[illegible] 22.5-25 RAD	0 OVM ≤25 BG		22.5-25' SILT, fine grain, [illegible] brown, consolidated, damp			Break: 0930
25	R-11 2.5/2.5		0 OVM ≤25 BG		25' SAA			
30	R-12 2.5/2.5	AAB[illegible] 27.5-30 RAD	0 OVM ≤25 BG		SAA		↓	

Prepared by [illegible] Date 7 Oct 94 Checked By [illegible] Date 12 Oct 94

SAND

SILT/CLAY

Gravel

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30.0 To 50.0 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time 7 Oct 94/[illegible] End Date/Time 7 Oct 94/1230

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	2.5/2.5		OVM, SASC, FS	[illegible]	[illegible] SAND, fine grain, [illegible], consolidated			Drilling
	1.5/2.5	AAC[illegible] 33.5-34 RAD	OVM, SASC, FS		33.5-34 SAA		Alluvium	
35	2.5/2.5		OVM, SASC, FS		34-35 [illegible] 35-35.5 SAA 35.5-37.5 SAND, fine grain, [illegible] yellowish brown (10YR 5/4), consolidated, [illegible]			
	2.5/2.5	AA63533 38.5-39 [illegible]	OVM, SASC, FS	[illegible]	37.5-[illegible] SAA [illegible] pumice [illegible] [illegible] pumice, very [illegible] (10YR 8/2), not consolidated, [illegible]			
40	2.5/2.5		OVM, SASC, FS		SAA [illegible]			
	2.5/2.5	AA63534 43.5-45 RAD	OVM, SASC, FS		SAA		Guaje Pumice	
45	2.5/2.5		SASC	[illegible]	SAA, [illegible]			
	2.5/2.5	AA63536 [illegible]	SASC		SAA			T.D. 1230
50					[illegible]			

Prepared by [illegible] Date 7 Oct 94 Checked By [illegible] Date 12 Oct 94

SAND

SILT/CLAY

Gravel

PUMICE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-13.30 TA/OU 10/1072 Drill Depth From 0 To 30 ft Page 1 of 2

Driller Stewart Bros Box #(s) 1-4 Start Date/Time 8 Nov 94/1440 End Date/Time 9 Nov 94/1500

Drilling Equip./Method Failing F10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.0/2.5		0 OVM 100 Bkg	Box 1 of 7 0-7.5 ft	0-0.8 Silty SAND fine grain, dk yellow brown (10YR 4/2) trace gravel (1-2cm), damp; 0.8-2 Sandy SILT, fine grain, trace gravel, damp, [illegible] brown; 2-2.5 No Recovery		Alluvium	8 Nov 94 Drilling 1440
	Run 2 2.5/2.5	AAB 7566 2.5-5.0 RAD	0 OVM 100 Bkg		2.5-5' SILT, fine grain, moderate yellow brown (10YR 5/4) trace gravel (whitish tuff (1-2cm)), damp (drying with depth) + [illegible]			
5	Run 3 2.5/2.5		0 OVM 100 Bkg		5-7.5 SAA			
	Run 4 2.5/2.5	AAB 7567 7.5-10 RAD	0 OVM 100 Bkg	Box 2 of 7 7.5-13.5 ft	7.5-10 SAA			
10	Run 5 2.5/2.5		0 OVM 100 Bkg		10-12.5 SAA			
	Run 6 2.5/2.5	AAB 7570 12.5-15 RAD	0 OVM 100 Bkg		12.5-15' Interbedded SILT and SAND bedding, Sand is fine-medium grain [illegible] [illegible] SILT fine [illegible] [illegible], mod yellow brown (10YR 5/4), trace small [illegible] [illegible], damp			Break 1600
15	Run 7 2.5/2.5		0 OVM 5250 Bkg	Box 3 of 7 13.5-22.5 ft	15-17.5 SAA			9 Nov 94 Inspect 0700 ~~[illegible]~~ [illegible] Drilling 0835
	Run 8 1.3/2.5	AAB 7571 [illegible] AAB 7572 [illegible] AAB 7573 Kinetic 17.5-[illegible]	0 OVM 5250 Bkg		17.5-19.3' SILT fine grain, trace fine gravel (1 cm) damp, trace sand, moderate yellow brown (10YR 5/4); 19.3-20 No Recovery	Core Loss		AAB 7571: Field Sample AAB 7572: Field Blank AAB 7573: Kinetic
20	Run 9 2.5/2.5		0 OVM 5250 Bkg		20-22.5 SAA with slight increase in sand and clay with depth			
	Run 10 2.5/2.5	AAB 7574 22.7-27.2 RAD and AAB 7575 Dup	0 OVM 5250 Bkg	Box 4 of 7 22.5-29.5 ft	22.5-23' SILT, fine grain, [illegible] orange (10YR 7/4). 23-25' TUFF, strong clay alteration throughout, mod. brown matrix [illegible] has been altered to clay, tuff structure is evident, 10YR 6/2, trace volcanic lithics, damp		Transition Zone	
25	Run 11 1.5/2.5		0 OVM 5250 Bkg		25-26 SAA; 26-26.5 TUFF very pale orange (10YR 8/2) weakly competent, very weak clay alteration; 26.5-27.5 No Recovery	Core Loss	Qbt 1	
	Run 12 2.5/2.5	AAB 7576 27.5-27.7 RAD	0 OVM 5250 Bkg		27.5-30 TUFF, very pale orange (10YR 8/2), non welded (soft), [illegible] 5% pumice fragments, qtz and glass shards ≤5% pumice crystals			
30								

Prepared by [signature] Date 9 Nov 94 Checked By [signature] Date 16 Nov 94

SILT

SAND

Gravel

CLAY

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 ft To 50 ft Page 2 of 2

Driller [illegible] Box #(s) 5-7 Start Date/Time 8 Nov 94/1440 End Date/Time 8 Nov 94/1530

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5		[illegible]	Box 5	30-32.5 TUFF very pale orange (10YR 8/2) nonwelded, very soft, ash matrix, 15% qtz, 5% pumice [illegible]			
	Run 14 2.5/2.5	AAA[illegible] 32.5-35 [illegible]	[illegible]		32.5-35 SAA			
35	Run 15 2.5/2.5		[illegible]		35-37.5 TUFF very pale orange (10YR 8/2), nonwelded, weakly competent, increase in pumice, 10% qtz [illegible]			
	Run 16 2.5/2.5	AAA[illegible] 37.5-40 SAA	[illegible]	Box 6	37.5-38 SAA; 38-38.5 ASH very fine grained, [illegible] orange (10YR 8/2), [illegible] fragments (2-3cm); 38.5-40 TUFF SAA competence increase[illegible]		Otowi (Tuff)	Break 1313 Drilling 1350
40	Run 17 2.5/2.5		[illegible]		40-42.5 TUFF very pale orange (10YR 8/2), weakly competent (increase in [illegible]), nonwelded, 10% qtz, 10% pumice, ash matrix			
	Run 18 2.5/2.5	AAA[illegible] 42.5-45 SAA	[illegible]		42.5-45 SAA			
45	Run 19 2.5/2.5		[illegible]	Box 7 45-50 ft	45-47.5 SAA			
	Run 20 2.5/2.5	AAA[illegible] 47.5-50 [illegible]	[illegible]		47.5-49.5 SAA; 49.5-50 PUMICE [illegible] crystals, [illegible]		Guaje (Pumice)	
50					50' Total Depth			TD 1530

Prepared by [signature] Date 8 Nov 94 Checked By Derek Faulk Date 16 Nov 94

TUFF

ASH

PUMICE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1551 TA/OU 10/1079 Drill Depth From 0 To 30ft Page 1 of 2

Driller Stewart Bro. Box #(s) 1-4 Start Date/Time 7 Nov 94/0830 End Date/Time 7 Nov 94/1611

Drilling Equip./Method Failing F10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number AAH #	Field Screening Results OVM, BTC/hr	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		0 OVM ≤250 BG	Box 1 of 7 0-7.5ft	0-1.2' HUMUS layer consists of silt, grasses, roots, moderate yellowish brown (10YR5/4), damp 1.2'-2.5' SILT, trace sand, little gravel (1-3cm), trace roots, damp, unconsolidated, moderate yellowish brown (10YR5/4)		Alluvium	7 Nov 94 Tailgate: 0830 Drilling: 0855
	Run 2 2.5/2.5	AAH 2556 2.5-7.5' Field	0 OVM ≤250 BG		2.5-5 SAA (change to dark) 7.0 but 11.16.94			
5	Run 3 2.5/2.5		0 OVM ≤250 BG		5-7.0 SAA 7-7.5 No Recovery	Loss		
	Run 4 2.5/2.5	AAC 7557 7.5-10 RAC	0 OVM ≤250 BG	Box 2 of 7 7.5-15ft	7.5-8.5 SAA 8.5-10 SILT, 1 one gravel (tuff fragments) (1-3cm) dry, ~~burnt~~ burnt pumice fragment, 0.5 copper wire (shrapnel?)			pumice fragment burnt in fire
10	Run 5 2.5/2.5		0 OVM ≤250 BG		10-10.5 SAA w/ lg tuff fragments 10.5-12.5 SILT fine grain, trace fine sand, trace small tuff fragments, moderate yellowish brown (10YR5/4), dry			
	Run 6 2.5/2.5	AAC 5558 12.5-15 Field	0 OVM ≤250 BG		12.5-14.1' SAA 14.1'-15' Sandy SILT, fine grain, mod yellowish brown (10YR5/4) trace small tuff fragments, dry			Break 1030 Drilling 1115
15	Run 7 2.5/2.5		0 OVM ≤250 BG		15-15.7 SAA 15.7-17' SAND, coarse grain, 20% volcanic gravels, pale yellowish brown (10YR 6/2) trace silt/clay, dry 17-17.5 Silty SAND, fine-med grain, trace gravel, dry, slopes, pale			
	Run 8 2.5/2.5	AAC 9559 17.5-20 RAC	0 OVM ≤250 BG	Box 3 of 7 15-22.5ft	17.5-20 SAA			
20	Run 9 1.7/2.5		0 OVM ≤250 BG		20-20.4 SAA 20.4-21.7 Clayey SAND, fine-med grain, light brown (5YR 5/6) 21.7-22.5' No Recovery	Loss		
	Run 10 2.5/2.5	AAB 9560 22.5-25' RAC AAB 9561 Field Blk AAB 9562 Rinsate	0 OVM ≤250 BG	Box 4 of 7 22.5-30ft	22.5-23.7 SAA 23.7-25' TUFF, lg tuff fragment, ash matrix, 1% qtz, trace pumice, very pale orange (10YR 8/6) 25			AAB 9560: RAD AAB 9561: Field Blk AAB 9562: Rinsate
25	Run 11 2.5/2.5		0 OVM ≤250 BG		25-27.5 SAND, fine-med grain, grayish orange (10YR 7/4), ≤10% small tuff fragments, ≤10% silt, dry			
	Run 12 2.5/2.5	AAB 9563 27.5-30' Field	0 OVM ≤250 BG		27.5-30 TUFF, non welded, non-competent, very pale orange (10YR 8/6), ash matrix (pumice, glass shards) ≤10% qtz ≤10% pumice crystals, dry		Otowi	Break 1300'
30								

Prepared by [signature] Date 7 Nov 94 Checked By [signature] Date 11/16/94

SILT

SAND

Gravel

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 ft To 50 ft Page 2 of 2

Driller [illegible] Box #(s) 5-7 Start Date/Time 7 Nov 94/0930 End Date/Time 7 Nov 94/1611

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	[illegible] 2.5/2.5		0 ppm [illegible]	Box 5 ft 30-37.5 ft	30-32.5 TUFF, non-welded, very weakly competent (SSF), very pale orange (10YR 8/2), ash matrix (pumice/glass shards) trace [illegible] in pumice crystals [illegible]		[illegible] (Tuff)	Drilling 0930
	[illegible] 2.5/2.5	[illegible] RAC	[illegible]		32.5-35 SAA			
35	[illegible] 2.5/2.5		[illegible]		35-37.5 SAA			
	[illegible] 2.5/2.5	[illegible] 37.5-40 RAC	[illegible]	Box 6 ft 37.5-45 ft	37.5-40 TUFF, non-welded, weakly competent, very pale orange (10YR 8/2) ash matrix 10-20%, pumice [illegible] trace lithics			
40	[illegible] 2.5/2.5		[illegible]		40-42.5 SAA			
	[illegible] 2.5/2.5	[illegible] RAC	[illegible]		42.5-45 SAA			
45	[illegible] 2.5/2.5		[illegible]	Box 7 ft 45-50 ft	45-47 SAA competent with depth 47-47.5 No recovery			
	[illegible] 2.5/2.5	[illegible]	[illegible]		47.5-50 TUFF, non-welded competent, very pale orange (10YR 8/2), ash matrix, <10% pumice, <10% xtals, dry			TD 1611
50					50 ft Total Depth			

Prepared by [illegible] Date 7 Nov 94 Checked By [illegible signature] Date 11/16/94

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1253 TA/OU 10/1079 Drill Depth From 0 To 30 ft Page 1 of 2

Driller Stewart Bros. Box #(s) 1-4 Start Date/Time 2 Nov 94/0835 End Date/Time 4 Nov 94/0915

Drilling Equip./Method Failing F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		0 vm ≤250 BG	Box 1 of 4 0-7.5 ft	0-1.4' HUMUS soil, moderate brown (5YR 3/4), high organic content consisting of roots, grass, decaying wood. 1.4-2.5' SILTY sand, ... brown (10YR 4/2) damp. ≤5% roots, trace small gravel, 5-10% clay		Alluvium	2 Nov 94 In Zone 0830 Drilling 0835
5	Run 2 2.5/2.5	AAB 3544 2.5-3.5' Full ms	0 vm ≤250 BG		2.5-5.0' Clayey SILT, damp, ≤5% roots, 5-10% small gravel (...).			
	Run 3 2.5/2.5		0 vm ≤250 BG		5-5.6 SAA 5.6-7.5' SILT, ... (10YR ...) dry, 5-10% small gravel, ≤5% ... roots, fine grain.			
10	Run 4 2.5/2.5	AAB ... RAC 7-10 ...	0 vm ≤250 BG	Box 2 of 4 7.5-16.5 ft	7.5-10 SAA			Break 0910 (...)
	Run 5 2.5/2.5		0 vm ≤250 BG		10-11.8' SAA 11.8-12.5 Sandy SILT fine-med grain sand, trace ... clasts (2-4mm), dry.			In zone 1155 Drilling 1200
15	Run 6 1.5/2.5	AAB ... 12.5-13.5' Full ms	0 vm ≤250 BG		12.5-13 SAA 13-14' SAND fine-med grain, ... brown (10YR 4/2), ≤5% ... clay, trace gravel, dry 14-15 No Recovery	Core loss		
	Run 7 2.5/2.5		0 vm ≤250 BG		15-16.2 SAND fine-med grain, trace gravel, clay 16.2-17.5 SAND fine grain ≤10% clay, damp			
20	Run 8 2.5/2.5	AAB ... 17.5-20' RAC	0 vm ≤250 BG	Box 3 of 4 16-23.5 ft	17.5-18' SAA 18-20 SAND med-coarse grain, 15-20% tuff clasts (2-6cm), 10-15% clay, damp			
	Run 9 2.5/2.5		0 vm ≤250 BG		20-20.7 SAA 20.7-22.5 Sandy SILT, fine grain, ... (10YR ...), trace tuff fragments, decrease in moisture content			
25	Run 10 2.5/2.5	AAB ... 24.5-25 RAC	0 vm ≤250 BG		22.5-25' SAA			
	Run 11 1.7/2.5		0 vm ≤250 BG	Box 4 of 4 23-31 ft	25-26.7' SAND, fine grain, trace tuff fragments, 5-10% silt, slightly damp 26.7-27.5' No Recovery	Core loss		
30	Run 12 2.5/2.5	AAB ... 28-30' Full, ms	0 vm ≤250 BG		27.5-28.7' SAND fine grain, trace tuff fragments, ... 28.7-30' SAA with large tuff fragments			Break 1320

Prepared by [signature] Date 2 Nov 94 Checked By [signature] Date 15 Nov 94

SILT

SAND

Gravel

Sandy SILT

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) 4-7 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	[illegible]		[illegible]		30-32.5 SAND, med. to coarse grain, light brown (5YR 6/...), 20% large tuff fragments (up to 2cm), 5-15% clay, damp		Alluvium	4 Nov 94 [illegible] 0715 [illegible] 0730
	[illegible]	AAG [illegible] AAK [illegible] 32.5-35	[illegible]	[illegible]	32.5-35 TUFF, pale yellow to brown (10YR 6/...), ≤15% [illegible]			Note: sample taken in clay [illegible]
35	[illegible]		[illegible]		35-37 TUFF, [illegible] competent, very soft, [illegible] [illegible]			
					37-37.5' No recovery			
	[illegible]	AAG [illegible] 37.5-40 KAD	[illegible]		37.5-40 TUFF, very pale orange (10YR 8/2), [illegible] ≤15% [illegible], weakly competent [illegible]			
40	[illegible]		[illegible]	[illegible]	40-41.3 ASH, [illegible] (10YR 8/...), non competent, very soft [illegible] 41.3-42.5 TUFF, [illegible] 5-15% [illegible], weakly competent, [illegible]		Otowi (Tuff)	
	[illegible]	AAG [illegible] 42.5-45 KAD	[illegible]		42.5-45 SAA			
45	[illegible]		[illegible]	[illegible]	45-47.5 SAA			
	[illegible]	AAG [illegible] AAG [illegible] 47.5-50 [illegible]	[illegible]		47.5-50 SAA			TD 0715
50					TD [illegible] 50			

Prepared by [illegible] Date [illegible] Checked By [illegible signature] Date 15 Nov 94

SAND

TUFF

ASH

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		[illegible]		[illegible] SILT [illegible]		Alluvium	31 Oct 94 [illegible]
2.5	Run 2 2.5/2.5	AAG [illegible] 2.5-5.0	[illegible]	[illegible]	[illegible] SAA			
5	Run 3 2.5/2.5		[illegible]		[illegible] SAA			
7.5	Run 4 2.5/2.5	AAG [illegible] 7.5-10	[illegible]		[illegible] SAA [illegible]			[illegible]
10	Run 5 2.5/2.5		[illegible]	[illegible]	[illegible] SAA [illegible] SILT [illegible]			
12.5	Run 6 2.5/2.5	AAG [illegible] 12.5-15	[illegible]		[illegible] SAA [illegible]			
15	Run 7 2.5/2.5		[illegible]		[illegible] SILT [illegible]			
17.5	Run 8 2.5/2.5	AAG [illegible] 17.5-20	[illegible]	[illegible]	[illegible] SAA; [illegible]			
20	Run 9 2.5/2.5		[illegible]		[illegible] SILT [illegible]; [illegible]			
22.5	Run 10 2.5/2.5	AAG [illegible] 23.5-23.8?	[illegible]		[illegible] SILT [illegible]; [illegible] TUFF, [illegible]		Otowi?	
25	Run 11 2.5/2.5		[illegible]	[illegible]	[illegible] TUFF, [illegible]			
27.5	Run 12 2.5/2.5	AAG [illegible] 27.5-30?	[illegible]		[illegible] SAA			[illegible]
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 15 Nov-94

SILT

SAND

Gravel

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
[illegible]	[illegible]		[illegible]		[illegible]			[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] SAA			
	[illegible]		[illegible]		[illegible] SAA			
	[illegible]	[illegible]	[illegible]		[illegible] SAA			
	[illegible]		[illegible]	[illegible]	[illegible] SAA			
	[illegible]	[illegible]	[illegible]		[illegible] SAA			
	[illegible]		[illegible]	[illegible]	[illegible] SAA			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] SAA			[illegible]
					[illegible]			

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 15 Nov 94

[illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 10-1254 TA/OU 10/1079 Drill Depth From 0 To 30 ft Page 1 of 2

Driller Stewart Bros Box #(s) 1-4 Start Date/Time 12 Oct 94/1240 End Date/Time 14 Oct 94/0937

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		0 OVM ≤250 [illegible]	Box 1 of 4 0-7.5 ft	0-2.5 ft SILT, fine grain, trace tuff fragments, gray & orange (10YR 7/4) organics (roots) [illegible] [illegible], dry		Alluvium	12 Oct 94 Inzone 1240 Drilling 1245
5	Run 2 2.5/2.5	AAB 9369 2.5-3.5' Full, He	0 OVM ≤250 [illegible]		SAA			
	Run 3 2.5/2.5		0 OVM ≤250 [illegible]		SAA with slight increase in moisture and trace organics (roots)			
10	Run 4 2.5/2.5	AAB 9370 7.5-10' RAD	0 OVM ≤250 [illegible]	Box 2 of 4 7.5-15 ft	7.5-10 ft SILT fine grain, gray to orange, weakly competent, slightly damp			Break: 1330 (gut [illegible]) Drilling 1430
	Run 5 2.5/2.5	AAB 9371 11-12' Full, He	0 OVM ≤250 [illegible]		10-11.5 ft SAA 11.5-12.5 ft Sandy SILT fine grain, dark yellow to brown (10YR 5/6) trace fine sand, damp			
15	Run 6 1.7/2.5	AAB 9331 12.3-13.3' RAD	0 OVM ≤250 [illegible]		12.5-13 ft SAA 13-14.2 ft Silty SAND, fine-medium grain, trace tuff fragments damp 14.2-15 ft (No Recovery)			
	Run 7 1.8/2.5		0 OVM ≤250 [illegible]	Box 3 of 4 15-22.5 ft	15-16.8 ft SAA 16.8-17.5 ft (No Recovery) ~~[illegible]~~ [illegible]			
20	Run 8 2.5/2.5	AAB 9372 (See notes) 18.5-20' RAD	0 OVM ≤250 [illegible]		17.5-18.5 ft SAA 18-20 ft Clay SILT fine grain, dark yellowish brown (10YR 4/2), ≤10% tuff fragments, damp to moist			AAB9372 RAD AAB9373 Field Blk AAB9374 Rinsate End of day 1530
	Run 9 2.5/2.5		0 OVM ≤250 [illegible]		20-22.5 ft Sandy SILT fine-medium grain, 15-20% Clay ≤10% tuff fragments moist [illegible] core			13 Oct 94 Inzone 0750 Drilling 0805
25	Run 10 2.5/2.5	AAB 9375 22.5-23.5' Full, He	0 OVM ≤250 [illegible]	Box 4 of 4 22.5-30 ft	22.5-23 ft SAA 23-25 ft TUFF, fine-medium grained, grayish orange pink (5YR 7/2), 30%, ash matrix, trace lg (4 mm) [illegible] crystals, trace lithics (rhyolite), 10% qtz		Otowi (TUFF)	
	Run 11 2.5/2.5		0 OVM ≤250 [illegible]		SAA			
30	Run 12 2.5/2.5	AAB 9376 27.5-30' RAD	0 OVM ≤250 [illegible]		SAA			

Prepared by [signature] Date 13 Oct 94 Checked By [signature] Date 15 Nov 94

SILT

SAND

Gravel

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 ft To 50 ft Page 2 of 2

Driller Stewart [illegible] Box #(s) 5 - 5 Start Date/Time 13 Oct 94/[illegible] End Date/Time 14 Oct 94/0937

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
30	C-13 2.5/2.5		[illegible]	[illegible]	30-32.5' TUFF, [illegible] (5YR [illegible]), [illegible] 10-25% [illegible] (1mm-3cm), [illegible], trace [illegible]		Qt[illegible] (TUFF)	
	C-14 2.5/2.5	AAB[illegible] 32.5-35' [illegible]	[illegible]		SAA			
35	C-15 2.5/2.5		[illegible]		SAA			Break 1010 Drilling 1015 Break 1100 ([illegible])
	C-16 2.5/2.5	AAB9375 37.5-40' [illegible]	[illegible]	[illegible]	SAA			14 Oct 94 [illegible] 0740 Drilling 0745
40	C-17 1.3/2.5		[illegible]		40-41.3' ASH, [illegible], damp, [illegible] (5YR 7/6) 41.3-42.5' No Recovery			
	C-18 2.5/2.5	AAB9379 42.5-45' [illegible]	[illegible]	[illegible]	42.5-45' TUFF, [illegible] pink (5YR 7/[illegible]), [illegible] 10-25%, [illegible], damp, [illegible] competent.			
45	C-19 2.5/2.5		[illegible]		SAA			
	C-20 2.5/2.5	AAB9385 47.5-50' [illegible]	[illegible]	[illegible]	SAA			TD 0937
50					Total Depth 50 ft			

Prepared by [illegible] Date 14 Oct 94 Checked By Derek Faulk Date 15 Nov 94

TUFF

ASH

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time [illegible] End Date/Time 7 Sep 94 0915

Drilling Equip./Method [illegible] Sampling Equip./Method Stainless Steel Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology-Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 1.3/2.5	NONE	0 ovm [illegible]	[illegible]	Moist, organic rich topsoil, unconsolidated. Poorly sorted noncohesive SILTY SAND.			[illegible] 94. [illegible] winds calm. Started drilling at 0840 hours.
2.5	Run 2 2.5/2.5	AAB5[illegible] [illegible]	0 ovm 250cpm/ β8		2.5-4.0- Angular, unconsolidated, moist SAND with 10% SILT. Moist light brown 5YR5/6. 4.0-5.0- Dry, homogeneous, moderately consolidated, noncohesive SILT [illegible]			
5	Run 3 2.5/2.5	AAB5[illegible] [illegible]	0 ovm [illegible] β8		SAA- 4.0-5.0 [illegible]			
7.5	Run 4 2.5/2.5	AAB5[illegible] 0003541 [illegible] 9-6-99	0 ovm [illegible]	[illegible]	SAA [illegible] to fine downwards		ALLUVIUM	Took a break at 0940 hours
10	Run 5 2.5/2.5	NONE	0 ovm 250cpm/ β8		SAA - Tuff present at 12.2 feet. Tuff [illegible] pink with quartz and feldspar phenocrysts			Returned to core and started drilling at 1045 hours
12.5	Run 6 2.5/2.5	AAB5[illegible] [illegible]	0 ovm 250cpm/ β8		SAA with pumice comprising 5% with small 5-20mm fragments			
15	Run 7 2.5/2.5	NONE	0 ovm 250cpm/ β8		SAA - lightening to grayish orange 10YR 7/4. Tuff encountered at 17 feet [illegible]			
17.5	Run 8 2.5/2.5	AAB5[illegible] 0003544 RAD [illegible]	0 ovm 250cpm/ β8		SAA			
20	Run 9 2.5/2.5	NONE	0 ovm 250cpm/ β8		SAA to 22.0 feet. 22.0-22.5 slightly moist, becoming denser [illegible] possibly ASH. [illegible] lithics [illegible]			
22.5	Run 10 1.5/2.5	[illegible]	0 ovm 250cpm/ β8		Very fine unconsolidated, noncohesive ASH. [illegible] exhibits glassy texture [illegible] Lithics still present along [illegible] crystals. With random 5-10mm pumice fragments			Full - 0003545 (45) Dup - 0003546 F.B 0003547 [illegible] 22.5-23.5 ft
25	Run 11 2.5/2.5	NONE	0 ovm 250cpm/ β8		Fine to medium grained, unconsolidated SANDY ASH. Quartz crystals angular and abundant. Little to no pumice or lithics.			Took lunch break at 1215 hours
27.5	Run 12 2.5/2.5	AAB5689 0003550 Rad [illegible]	0 ovm 250cpm/ β8		27.5-29.0- SAA, finer grained with pumice comprising approximately 10%. 29.0-30.0 - [illegible] consolidated, noncohesive TUFF. [illegible] TUFF 30-40mm [illegible]			
30								

Prepared by [illegible] Date 7 Sep 94 Checked By [illegible] Date 9/6/94

- Full suite:
Gross alpha, beta, gamma spec, moisture, [illegible], [illegible], TAL metals, semivolatiles, and high explosives
- Radiation:
gross alpha, beta, gamma spec, moisture, [illegible]

SILT
SAND
TUFF
ASH
Rhyolite, pumice and other fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50 Page 2 of 2

Driller [illegible] Box #(s) 6-10 Start Date/Time 7 Sep 94 0905 End Date/Time 7 Sep 94 0915

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–32.5	Run 11 2.5 / 2.5	AAB7222 Full 30.0–32.5	0 cpm 200 cpm β?	2 30	Unconsolidated nonstratified, dry ASH, with abundant dark lithics including [illegible] and [illegible]. Matrix [illegible] with [illegible] texture		OTAWI MEMBER of The BANDELIER TUFF	7 Sep 94 Started drilling at 0905 hours
32.5–35	Run 12 2.5 / 2.5	AAB[illegible] RAD 32.5–35	0 cpm 200 cpm β?	7 10 / 30–35	Moderately consolidated, mildly cohesive, ASH, containing abundant small 2-5 mm dark lithics. Matrix fine to very fine grained and grayish orange 10YR 7/4			
35–40	Run 13 5.0 / 5.0	AAB5713 RAD 35–40	0 cpm 200 cpm β?	8 10 / 35–41.5	DAA with occasional light green [illegible] altered with [illegible] glassy tubular pumice fragments			
40–45	Run 14 5.0 / 5.0	AAB5720 RAD 40–45	0 cpm 200 cpm β?	8 10 / 41.5–45.5	DAA			
45–50	Run 17 5.0 / 5.0	AAB5729 Full [illegible] AAB7721 RAD 45–50	0 cpm 200 cpm β?	8 12 / 45.5–50.5	Nonconsolidated, uncohesive "popcorn" TUFF. Matrix composed of 5-50 mm [illegible] pumice fragments that exhibit [illegible] altered and contain 2 mm [illegible]. Matrix also contains abundant dark lithic fragments of rhyolite, pyroxene, amphibole		Base Pumice	Drilling ended at 0915 at depth of 50 feet.

Prepared by [illegible] Date 7 Sep 94 Checked By [illegible] Date [illegible]

ASH

TUFF

Rhyolite Pumice fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per Inst / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5 / 2.5	NONE	20 DUM [illegible]		Dry [illegible] soil sediment. Moist, unconsolidated with abundant roots		ALLUVIUM	Began drilling at 1130 hours. [illegible]
2.5	Run 2 2.5 / 2.5	AAB5490 Rad [illegible]	1.3 cpm [illegible]		Unconsolidated, nonplastic, moist to dry. Moderate Reddish Orange [illegible] SILT SAND. Roots [illegible]			
5	Run 3 2.5 / 2.5	NONE	[illegible]		Fining downwards to a consolidated [illegible] SILT. Last one foot remains approximately 10% clay, 10% SAND and 80% SILT			
7.5	Run 4 2.5 / 2.5	AAB5492 RAD [illegible]	0 cpm [illegible]		Very fine grained, homogeneous SILT. Dry, unconsolidated. [illegible] Roots [illegible]			
10	Run 5 2.5 / 2.5	NONE	0 cpm [illegible]		SAA, becoming slightly consolidated from 12.5			
12.5	Run 6 2.5 / 2.5	AAB5493 RAD	0 cpm [illegible]		SAA, with tuff pebbles abundant 2-5 cm at 13 feet			Took a break at 1050 hours for lunch
15	Run 7 2.5 / 2.5	AAB5494 [illegible]	0 cpm [illegible]		SAA, no tuff encountered			Resumed [illegible] 1410 hours
17.5	Run 8 2.5 / 2.5	AAB5495 RAD	0 cpm [illegible]		SAA, roots abundant throughout core			
20	Run 9 2.5 / 2.5	NONE	0 cpm [illegible]		SAA, becoming more consolidated from 21.5 to 22.5 feet. Also acquiring a lighter sugary texture. Possible ash inclusions			
22.5	Run 10 2.5 / 2.5	AAB5496 [illegible]	0 cpm [illegible]		Continuing to fine downwards becoming a SILT/ASH by 23.5 feet. Very fine grained with a sugary texture.			Silt - Ash Interface
25	Run 11 2.5 / 2.5	NONE	0 cpm [illegible]		Unconsolidated, very fine, moist with 5% pumice fragments from 27.0-27.5. Some small 5-15mm small phenocrysts of quartz and feldspars		ASH	
27.5	Run 12 [illegible] / 2.5	AAB5497 RAD	0 cpm [illegible]		SAA, with few rhyolite and basalt chunks at 29 feet			
30								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

Followings: Description, [illegible] moisture, [illegible] and [illegible]

- Rad [illegible] -

[illegible]

Legend: SILT, SAND, CLAY, ASH, TUFF, [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible] 0650

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5 / 2.5		0 cpm [illegible] 2.5		30.0-31.0 SAA 31.0-32.5 - Consolidated moist [illegible] TUFF [illegible] pumice fragments 10-30mm and abundant [illegible]			
32.5	Run 14 2.5 / 2.5	AAD [illegible] RAD [illegible]	0 cpm [illegible] 2.5		[illegible] ASH [illegible] pumice fragments 10-30mm [illegible]			
35	Run 15 4.2 / 5.0	AAD [illegible] RAD 35-38.5 [illegible]	0 cpm [illegible] 2.6		35.0-36.7 SAA 36.7-40.0 - Consolidated, [illegible] fine grained ASH, [illegible] 40mm [illegible]			Drilling ended at 1600 hours at a depth of 40 feet Sample interval 35.5-38.5
40	Run 16 5.0 / 5.0	AAD 9723 RAD AAD 9724 [illegible] AAD 9725 [illegible] 43.7-44.5	0 cpm [illegible] 2.6		40.0-42.5 Very fine unconsolidated homogeneous ASH with [illegible] pumice fragments [illegible] 42.5-45.0 Consolidated [illegible] ASH with [illegible] pumice [illegible] fragments. Matrix fine grained			8 Sep 94 Beginning drilling at 0740 hours. Skies clear, windcalm, 45°
45	Run 17 2.5 / 2.5		0 cpm [illegible] 2.5		unconsolidated, nonwelded TUFF. Pale white/gray composed of 90% pumice fragments [illegible] 2-4 mm [illegible]			
47.5	Run 18 2.5 / 2.5	[illegible] AAD 1727 [illegible]	0 cpm 220 cpm 2.5		SAA			RAD interval 47.7-48.1 Drilling ended 8 Sep 94 at 0650 hours at a depth of 50 feet
50	50.0 / 50							

Prepared by [illegible] Date 8 Sep 94 Checked By [illegible] Date 9/1/94

ASH

TUFF

Rhyolite, pumice and lithic fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time 12 [illegible] 0735 End Date/Time [illegible]

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5	[illegible]	0 cpm [illegible] Bt	0.0-5.0	Very moist, unconsolidated, heterogeneous SILT / SAND [illegible] fine [illegible] and medium [illegible] throughout the sample		ALLUVIUM	12 Sept 94, Drilling began at 0735 hours [illegible]
2.5	Run 2 2.5/2.5	AAB [illegible] Full 2.5-5.0	0 cpm 150 cpm Bt		[illegible] to dry moderately consolidated non cohesive SILT contains abundant pumice crystals along with a little [illegible]			
5	Run 3 2.5/2.5	None	0 cpm 150 cpm Bt		[illegible] unconsolidated SILT with pumice streaks.			
7.5	Run 4 2.3/2.5	AAB [illegible] RAD 7.5-10.0	0 cpm 250 cpm Bt		Very fine unconsolidated, homogeneous SILT with 5-25 mm pumice fragments [illegible] Distinct Dark Yellow [illegible] 10YR [illegible]			
10	Run 5 2.5/2.5	AAB 9216 [illegible]	0 cpm 275 cpm Bt	10.0-15.0	SAA, with [illegible] tuff cobble from 10.0-10.2			
12.5	Run 6 2.5/2.5	~~[illegible]~~ AAB 9212 [illegible]	300 cpm 250 cpm Bt		SAA			
15	Run 7 2.5/2.5	NONE	0 cpm 300 cpm Bt	15.0-20.0	SAA			
17.5	Run 8 2.5/2.5	AAB 9222 RAD 17.5-15.6	0 cpm 300 cpm Bt		SAA			Took a break at 0930 hours
20	Run 9 2.5/2.5	NONE	0 cpm 250 cpm Bt	20.0-25.0	20.0-21.0 - SAA; 21.0-22.5 Continuing [illegible] becoming ASHY SILT with [illegible] pumice streaks			Returned to the [illegible] at 1050 hours
22.5	Run 10 2.5/2.5	AAB 9201 RAD 22.5-25.0	0 cpm 300 cpm Bt		Very fine grained unconsolidated ASH. Has sugary texture and [illegible] abundant dark [illegible] 2% Pumice, 15% SILT, 83% ASH		TUFF	
25	Run 11 2.5/2.5	NONE	0 cpm 300 cpm Bt	25.0-30.0	SAA, with pumice fragments increasing to 5% of core.			
27.5	Run 12 2.5/2.5	AAB 9204 Full AAB 9205 Dup 27.5-30.0	0 cpm 300 cpm Bt		27.5-29.0 - SAA; 29.0-30.0 - Becoming a moderately consolidated ASH TUFF with abundant 2 mm-4 [illegible] and very [illegible] light [illegible] pumice			
30								

Prepared by [signature] Date [illegible] 94 Checked By [signature] Date [illegible]/94

- Samples:

Full - [illegible] gross gamma, [illegible] moisture, [illegible] uranium, strontium, [illegible] metals

RAD - [illegible] gross gamma, [illegible] moisture [illegible]

SILT

SAND

CLAY

ASH

[illegible] Pumice Tuff fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY — **CORE SAMPLE LOG**

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30' To 50' Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip /Method [illegible] Hollow Stem Auger Sampling Equip /Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30–32.5	Run 13 2.5/2.5	None	90cpm 25cpm βt		Consolidated, noncohesive, very [illegible], dry, [illegible] Coarse 10YR 8/2 TUFF [illegible] Ash with abundant dark lithics Composed [illegible] pumice.			
32.5–35	Run 14 2.5/2.5	AAB[illegible] RAD 34.5–34.5	80cpm 300cpm βt		SAA			
35–37.5	Run 15 2.5/2.5	None	70cpm 200cpm βt		SAA Pumice increasing to 15%			
37.5–40	Run 16 2.5/2.5	AAB5207 RAD 37.5–37.5	80cpm 200cpm βt		SAA			
40–42.5	Run 17 2.5/2.5	None	60cpm 200cpm βt		SAA			
42.5–45	Run 18 2.5/2.5	AAB5208 RAD 43.5–44.5	70cpm 200cpm βt		SAA, [illegible] to fine [illegible] at 44.3 feet becomes unconsolidated very sugary with very little pumice small dark lithics [illegible]			
45–47.5	Run 19 2.5/2.5	None	90cpm 200cpm βt		45.0–46.0 SAA 46.0–47.5 Unconsolidated noncohesive very pumice rich 90% Tuff. Pumice [illegible] [illegible] [illegible] [illegible]			
47.5–50	Run 20 2.5/2.5	AAB5209 Full 48.5–49.5	70cpm 200cpm βt		SAA, [illegible] clearer with more lithics [illegible] [illegible] [illegible] [illegible] pumice [illegible] with [illegible]			12 Apr 94 Drilling [illegible] at 1250 hours [illegible]

Prepared by [illegible] Date [illegible] Checked By [illegible] Date [illegible]

Ash

Rhyolite, Pumice Tuff fragments

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 10-1288 TA/OU 10/1079 Drill Depth From 0 To 30 Page 1 of 2

Driller Stewart Bro. Box #(s) 1-5 Start Date/Time 21 Sept 94/0855 End Date/Time 21 Sept 94/1340

Drilling Equip./Method Failing F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	AAB # Field Analytical Sample Number	Field Screening Results OVM / βγ c/m	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5	~~AAB~~ Jaw Walk	0 OVM ≤250 βγ	Box 1 0-5	0-3.5 Silty Sand soil, brown (5YR 4/4), trace organics, medium to coarse grained, consolidated, moist		Alluvium (bad SI)	21 Sept 94 In zone: 0845 Drilling: 0855
	Run 2 2.5/2.5	AAB9729 4.2-5.0 Full	0 OVM ≤250 βγ		SAA 3.5- Fine grained silt (ash), lt brown (5YR 5/4), compacted, damp, trace gravel, trace pumice.			
5	Run 3 2.5/2.5		0 OVM ≤250 βγ	Box 2 5-10	SAA weathered tuff/ash/silt sand			
	Run 4 2.5/2.5	AAB9730 9.5-10 RAD	0 OVM ≤250 βγ		SAA, dry soil			
10	Run 5 2.5/2.5		0 OVM ≤250 βγ	Box 3 10-15	SAA weathered tuff/ash to soil, moderate comp., orange gray color (5YR 8/4), dry, trace pumice, ≤5% qtz, fine-medium-grain			
	Run 6 2.5/2.5	AAB9731 14.5-15.0 RAD	0 OVM ≤250 βγ		SAA lg pumice cobbles 1-2.5cm, altered, make up ≥ 7% of run.			
15	Run 7 2.5 Full 2.5		0 OVM ≤250 βγ	Box 4 15-22.5	SAA coarse grained with depth, weakly competent, lg pieces of tuff (≤5%), (2.5-5cm), dry			
	Run 8 1.5/2.5	AAB9732 18-18.5 RAD	0 OVM ≤250 βγ		SAA 18.5-20 Core loss	Core loss		
20	Run 9 1.5/2.5		0 OVM ≤250 βγ		Fine grained silt/ash, lt brown (5YR 6/4), soft, dry, trace pumice, ≤5% qtz, trace lithic fragments. 21.5-22.5 core loss			
	Run 10 2.5/2.5	AAB9733 22.5-27.5 Full	0 OVM ≤250 βγ	Box 5 22.5-30	SAA 23.5: sharp contact soil to tuff, ~~bedrock~~ sky blue/gray (5YR 6/1) 23.5-25 Tuff: lt brownish gray, hard, competent, 5-10% qtz, dry			23.5-25 Tuff bedrock, possible tuff contact
25	Run 11 1.5/2.5		0 OVM ≤250 βγ		25- Fine grained tuff/ash soil, ~~med~~ dry, orange gray color (5YR 8/4), ≤5% pumice fragments, dry ~~26-27.5~~ core loss 26.5-27.5	Core loss		
	Run 12 2.5/2.5	AAB9734 29.5-30 RAD	0 OVM ≤250 βγ		SAA grayish orange pink (5YR 7/2), weakly competent, tuff/ash, soft			Lunch: 1110
30								

Prepared by Jeff Whitesel Date 21 Sept 94 Checked By Mark Faulk Date 9-27-94

sand

tuff/ash/silt

silt

tuff

cobbles (pumice/tuff)

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-1288 TA/OU 10/1079 Drill Depth From 30 To 50 Page 2 of 2

Driller Stewart Bros Box #(s) 5-8 Start Date/Time 21 Sept 94/0855 End Date/Time 21 Sept 94/1340

Drilling Equip./Method Failing F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number AAB #	Field Screening Results OVM, βγ CPM	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 15 2.5/2.5		∅ OVM ≤250 βγ	Box 6 Top 30 Bot 36 Feet	Tuff/ash grayish orange pink (5YR 7/2) weakly competent, trace crystals?, <5% pumice fragments, soft friable.		Bandelier	In zone: 1230 Start: 1233
	Run 16 2.5/2.5	AAB4435 32.5-35 RAD	∅ OVM ≤250 βγ		SAA nonwelded tuff/ash			
35	Run 15 2.0/2.5		∅ OVM ≤250 βγ		SAA			
					37-37.5 Core loss			
	Run 16 2.5/2.5	AAB4436 37.5-40 RAD	∅ OVM ≤250 βγ	Box 7 Top 36 Bot 42.5 Feet	SAA			
40	Run 17 2.5/2.5		∅ OVM ≤250 βγ		SAA becoming more competent with depth but still soft			
	Run 18 2.5/2.5	AAB4437 42.5-45 RAD	∅ OVM ≤250 βγ		SAA nonwelded tuff slightly pinker in color (5YR 7/2) becoming harder with depth, <5% lithics, 5-10% qtz, and sanidine?			
45	Run 19 2.5/2.5	AAB4438 46.2-47 Full	∅ OVM 500 βγ	Box 8 Top 42.5 Bot 50 Feet	46.2-47 Transition zone sand/pumice/tuff, clumps			Transition Zone
					47- Pumice bed poorly sorted small 1-2 cm pumice crystals, moist, soft, lt gray (10YR 8/2)			
	Run 20 1.0/2.5	AAB4439 47.8-48.5 Full AAB4441 Blank	∅ OVM ≤250 βγ		48.5-50 Core loss	Core loss		End of hole: 1340
50		AAB4440 Field			50 TD.			

Prepared by Jeff Walterscheid Date 21 Sept 94 Checked By [signature] Date 9-27-94

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 0' To 30' Page ___ of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time 14 Apr 94 0900 End Date/Time 14 Apr 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5	None	0 ppm 2250 cpm βγ		Fine to med. grained unconsolidated SAND & SILT. Mixed heterogeneous with angular sand grains. Moderate Yellowish Brown 10YR 5/4 [illegible]		ALLUVIUM	14 Apr 94 Began drilling 0900 hours
	Run 2 2.0/2.5	AA09224 Full 3341	0 ppm 2000 dpm βγ		Fining down sands, becoming unconsolidated SILT. Grain 2-15 mm pumice/tuff fragments [illegible] moderately common throughout run.			
5	Run 3 1.5/2.5	None	0 ppm 2000 dpm βγ		SAA, with one 7 cm dacite cobble at [illegible]			
	Run 4 1.5/2.5	AA09225 RAD [illegible]	0 ppm 2000 dpm βγ		SAA, becoming more consolidated with the inclusion of 5% clay			Rate was 2000 cpm on the core barrel, [illegible] Returned at 0700 hours
10	Run 5 2.5/2.5	AA09227 Full 11Y-121	0 ppm 2000 dpm βγ		10.0-12.0 Mixed unconsolidated SILT & SAND; 12.0-12.5 Moderately consolidated SILT dry, contains 5 cm pumice fragment			
	Run 6 2.5/2.5	AA09226 RAD [illegible]	0 ppm [illegible]		unconsolidated soft SILT with 25-50 mm pumice fragments. Becomes more consolidated with depth, moderately homogeneous			
15	Run 7 2.5/2.5	None	0 ppm 2500 cpm βγ		SAA			
	Run 8 2.5/2.5	AA09228 RAD [illegible]	0 ppm 3000 dpm βγ		SAA			Took a break at 1120 hours
20	Run 9 2.5/2.5	None	0 ppm [illegible] βγ		SAA			Resumed core sample drilling at 1301 hours
	Run 10 2.5/2.5	AA09229 RAD [illegible]	0 ppm 2250 dpm βγ		Fine grained SILT with rhyolite, pumice and dacite fragments ranging in size from 50 mm-5 cm			Stopped drilling at 1325 hours due to inclement weather.
25	Run 11 2.5/2.5	None	0 ppm 2000 dpm βγ		Continuing to fine becoming an ASH & SILT. Contains 2-4 mm quartz crystals. Becoming brownish orange pink 10YR 5/2 with abundant [illegible] fragments		Qtot	Drilling began again at 1505 hours
30	Run 12 2.5/2.5	AA09238 Full [illegible]	0 ppm 2000 dpm βγ		Fine grained unconsolidated ASH, with 2 mm quartz crystals. Very little pumice or [illegible] fragments			

Prepared by [illegible] Date 14 Apr 94 Checked By [illegible] Date [illegible]

Samples -

Full - [illegible]

[illegible], total uranium, [illegible], TAL metals, semi-volatiles, volatiles

- RAD - [illegible]

Silt
SAND
Ash
Clay
Dacite, Rhyolite, Pumice and [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page [illegible] of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 19 Sep 94 [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 1 2.5 / 2.5	None	0 cpm 300 cpm BI	[illegible]	32.0-32.5 AAA; 32.0-32.5 Abundant Tuff fragments [illegible]		Member of Bandelier Tuff	
32.5	Run 2 2.5 / 2.5	AAA 5230 RAD 325-312	0 cpm 350 cpm BI	[illegible]	Moderately [illegible] Ash Tuff [illegible] abundant [illegible] phenocrysts [illegible]			
35	Run 3 2.5 / 2.5	None	0 cpm 300 cpm BI	[illegible]	AAA [illegible]			
37.5	Run 4 2.5 / 2.5	AAA 5232 RAD 375-37.5	0 cpm 300 cpm BI	[illegible]	37.5-38.0 [illegible] Ash [illegible] abundant [illegible]; 38.0-40.0 AAA [illegible]			
40	Run 5 4.0 / 5.0	AAA 5233 RAD 42.1-42.4	0 cpm 300 cpm BI		AAA			
45	Run 6 5.0 / 5.0	AAA 5234 Full 45.5-49.9	0 cpm 250 cpm BI	[illegible]	45.0-47.5 AAA; 47.5-50.0 unconsolidated, noncohesive, Tuff composed of "popcorn" pumice abundant clast lithics and [illegible] of hornblende [illegible] [illegible] Shear altered [illegible]		Ash [illegible]	Drill rig ended at 16:30 hours at a depth of 50 feet
50								

Prepared by [illegible] Date 19 Sep 94 Checked By [illegible] Date [illegible]

ASH

Dacite, Rhyolite pumice, and lithic fragments

TUFF

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID ________ TA/OU ________ Drill Depth From ____ To ____ Page 1 of 2

Driller ________ Box #(s) ____ Start Date/Time ________ End Date/Time 09 Sept 94 / ____

Drilling Equip./Method ________ Sampling Equip./Method ________

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1, 2.5	None	0.0 cpm		[illegible]		ALLUVIUM	[illegible]
2.5	Run 2, 2.5	[illegible]	[illegible]		[illegible]			
5	Run 3	None	[illegible]		[illegible]			
7.5	Run 4, 2.5	[illegible]	[illegible]		Fining [illegible]			
10	Run 5, 2.5	None	[illegible]		SAA			
12.5	Run 6, 2.5	[illegible]	0.0 cpm		SAA [illegible]			[illegible] 1900
15	Run 7	AAB [illegible]	0.0 [illegible]		[illegible] SILT			
17.5	Run 8, 2.5	[illegible]	0.0 cpm		SAA [illegible] SILT [illegible]			
20	Run 9, 2.5	None	7.0 cpm		[illegible] SILT [illegible]			
22.5	Run 10, 2.5	AAB [illegible]	0.0 cpm		SAA [illegible] ASH and SILT [illegible]		TUFF	
25	Run 11, 2.5	None	7.0 cpm		SAA			
27.5	Run 12, 2.5	AAB [illegible]	7.0 cpm, 3500 dpm		[illegible] ASH [illegible]			[illegible] day at 1505 hours
30								

Prepared by ________ Date 09-09-94 Checked By ________ Date 9/[illegible]/94

SAND

SILT

CLAY

ASH

Pumice, [illegible] and other lithics

[illegible] alpha, beta, gamma [illegible], moisture, total uranium, [illegible], TAL metals, and semi-volatiles

- Radiation

Gross alpha, beta, gamma [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 5[illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) 7 10 Start Date/Time [illegible] End Date/Time [illegible] 0515

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	2.5 / 2.5	None	0 cpm [illegible]	30-35	[illegible] ASH [illegible] SANDY ASH [illegible]		Member [illegible]	[illegible] at 0730 hours
32.5	Run [illegible] 2.5 / 2.5	[illegible] 332.5-33[illegible]	0 cpm [illegible]		[illegible] SAND [illegible]			
35	Run [illegible] 2.5 / 2.5	None	0 cpm [illegible]	35-40	35.0-37.0 SAA 37.0-37.5 [illegible] Ash [illegible]		Bandelier	
37.5	Run [illegible] 2.5 / 2.5	[illegible] 37.5-38[illegible]	0 cpm [illegible]		37.5-38.5 SAA 38.5-40 SAA [illegible]			
40	Run [illegible] 2.5 / 2.5	None	0 cpm [illegible]	40-45	SAA		Tuff	
42.5	Run [illegible] 2.5 / 2.5	[illegible] 43.[illegible]-43.[illegible]	0 cpm [illegible]		42.5-44.5 SAA 44.5-45.0 [illegible] Crystal rich Tuff [illegible]			
45	Run [illegible] 2.5 / 2.5	None	0 cpm [illegible]	45-50	SAA with pumice [illegible] Mafic [illegible] fragmented pumice and [illegible] lithics [illegible]		[illegible] Member	Drilling [illegible] 0515 [illegible] depth 50 [illegible]
47.5	Run [illegible] 2.5 / 2.5	[illegible]	0 cpm [illegible]		SAA, [illegible] from 4[illegible]-5[illegible] feet [illegible]			
50								

Prepared by [illegible] Date 09-09-94 Checked By [illegible] Date 9/[illegible]/94

Ash
SAND
TUFF
Rhyolite/Pumice and other lithics

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page 1 of 2

Driller [illegible] Box #(s) 1-6 Start Date/Time 13 Aug 94 0745 End Date/Time 13 Sep 94 1155

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Steel Split Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5 / 2.2	NONE	300cpm (ammo?) 200cpm/ βγ	[illegible]	0.0-1.0 organic, wet, nonsolidated top soil sediment. 1.0-2.5 Moist, moderately consolidated, SANDY SILT. Light Brown 5 YR 5/6, abundant fine to med grained pumiceous tuff fragments present.		ALLUVIUM	13 Aug 94 Began drilling 0745 hours. [illegible] windsock.
2.5	Run 2 2.5 / 2.5	AAB5211 Full 2.5-3.2	0cpm 225cpm βγ		2.5-3.5 - Very unconsolidated, coarse, angular SAND. 3.5-5.0 - Consolidated, [illegible], very few SILT			
5	Run 3 2.5 / 2.5	NONE	0cpm 200cpm βγ	[illegible]	Consolidated, [illegible], very fine grained SILT. Somewhat homogeneous with few or no inclusions			
7.5	Run 4 2.5 / 2.5	AAB5212 RAD 5.3-8.6	0cpm 225cpm βγ		AAA, becoming finer downwards and less consolidated			
10	Run 5 2.5 / 2.5	NONE	0cpm 225cpm βγ	[illegible]	AAA, with pumice fragments ranging from 5-15mm [illegible]			
12.5	Run 6 2.5 / 2.5	AAB5213 RAD 12.9-13.3	0cpm 225cpm βγ		AAA			
15	Run 7 2.3 / 2.5	AAB5214 Full [illegible]	0cpm 250cpm βγ	[illegible]	AAA, becoming more consolidated downwards. 25mm-4cm pumice fragments that contain abundant lithics. Also, 2cm dacite fragments present.			Took a break at 0914 hours
17.5	Run 8 2.3 / 2.5	AAB5219 RAD 18.9-19.3	0cpm 200cpm βγ		AAA			
20	Run 9 2.5 / 2.5	NONE	0cpm 200cpm βγ	[illegible]	AAA with few to no pumice fragments			Resumed and began drilling at 1000 hours.
22.5	Run 10 2.5 / 2.5	AAB5220 RAD 23.2-24.0	0cpm 200cpm βγ		Continuing to fine downwards becoming unconsolidated. Beginning to notice ASH influence in SILT. 24.0-25.0 Becoming SANDY SILT with 1-2cm dacite and pumice fragments			
25	Run 11 2.5 / 2.5	NONE	0cpm 225cpm βγ	[illegible]	AAA, with 1-2cm tuff fragments		TOTAVI	
27.5	Run 12 2.5 / 2.5	AAB5216 Full 27.2-27.9	0cpm 200cpm βγ		Fining to ASH, Grayish Orange 10 YR 7/4. Very fine grained with 2mm-4cm pumice fragments with 4mm pumice phenocrysts [illegible] matrix very fine grained with few lithics			
30								

Prepared by [signature] Date 13 Sep 94 Checked By [signature] Date 9/20/94

- Samples
Full Suite
[illegible] beta, gamma spec, total uranium, strontium, TAL metals, semivolatiles, volatiles, and high explosives

- Radionuclides
[illegible] alpha, beta, gamma spec, [illegible], semivolatiles

SILT
SAND
ASH
TUFF
Pumice, Rhyolitic dacite fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From 30 To 50 Page 2 of 2

Driller [illegible] Box #(s) 7-10 Start Date/Time 13 Apr 9? 0945 End Date/Time 13 Apr 9? 1155

Drilling Equip./Method [illegible] Hollow Stem Auger Sampling Equip./Method [illegible] Split Barrel

Depth (feet)	Recovery (feet per Inst / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5	None	0 cpm 225 cpm [illegible]	[illegible]	Dry, [illegible] gray [illegible] Orange 10YR 8/2 ASH. [illegible] [illegible] [illegible]		Bandelier Tuff	
32.5	Run 14 2.5/2.5	AAB9217 AAB9217 AAB9217 [illegible]	0 cpm 350 cpm [illegible]	[illegible]	SAA [illegible] more [illegible] at 33.5 feet [illegible]			
35	Run 15 5.0/5.0	AAB9220 RAD 38.4-38.5	0 cpm 200 cpm [illegible]	[illegible]	SAA. Becomes more consolidated at 37.5 feet			
40	Run 16 5.0/5.0	AAB9221 RAD 43.5-43.9	0 cpm 200 cpm [illegible]	[illegible]	SAA			
45	Run 17 5.0/5.0	AAB9222 [illegible] 48.5-49.5	0 cpm 300 cpm [illegible]	[illegible]	SAA - 46.0. 46.0 - 50.0 [illegible] unconsolidated, dry, "popcorn" [illegible] pumice [illegible] [illegible]		[illegible]	Drilling ended at 1155 hours at depth 50 feet
50								

Prepared by [illegible] Date 13 Apr 9? Checked By [illegible] Date 9/?/9?

Ash

Tuff

Rhyolite, [illegible] [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 10-[illegible] TA/OU [illegible] Drill Depth From 0 To 30 Page 1 of 2

Driller [illegible] Box #(s) 1-5 Start Date/Time [illegible] 0945 End Date/Time 4 Aug 94 1530

Drilling Equip./Method [illegible] Stem Auger Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0	95		0 ppm, 20 cpm α		0.0-0.6 - Moist, organic rich topsoil sediment. 0.6-2.5 - Very fine unconsolidated, nonreactive SILT. Moist to dry with as ~2 mm white pumice fragments. [illegible]		Alluvium	4 Sept. 94. Begun drilling at 0945 hours. Skys Clear, winds ~5 mph
2.5	1.0	AAB9435 Full, AAB9436 Dup, 2.5-3.7	0 ppm, 300 cpm βγ	0-7.5 Box 1	Moist fine grained SILT with [illegible] small [illegible] pumice fragments [illegible]			
5	1.9		0 ppm, 225 cpm βγ		SAA, becoming coarser grained downwards. Becoming a SANDY SILT by 6 feet			
7.5	2.5	AAB9437 Rad, AAB9437 Dup, 7.5-[illegible]	0 ppm, 300 cpm βγ	7.5-13.9 Box 2	Continues to coarsen downwards, becomes a Moderate Brown 5YR 4/4 SILTY SAND. [illegible] grains and medium grained. [illegible] at 9 feet [illegible]			
10	1.9	AAB9439 Full, 10-10.[illegible]	0 ppm, 300 cpm βγ		SAA, [illegible] at 11 feet [illegible]			
12.5	1.5	AAB9439 Rad, 13.5-14.2	0 ppm, Top 200 cpm, Bottom 330 cpm		SAA, at 13 feet changing to Pale [illegible] SILT [illegible] fine grained, and unconsolidated. Recovered [illegible]			Encountered [illegible] large clasts cobbles 3-7 cm at 13 feet
15	2.5		0 ppm, 300 cpm βγ	13.9-19.[illegible] Box 3	[illegible] Orange 10YR 7/4 fine grained homogeneous SILT. Becoming [illegible] at 17 feet. Dry			
17.5	2.3	AAB9440 Rad, 17.2-19.[illegible]	0 ppm, 225 cpm βγ		SAA			Took a break at 1130
20	2.5	[illegible]	0 ppm, 225 cpm βγ	19.[illegible]-[illegible] Box 4	SAA, becoming heterogeneous with 2% pumice fragments. Fragments small ~3 mm			
22.5	2.5	AAB9441 RAD, 24.0-24.4	0 ppm, 225 cpm βγ		SAA becoming [illegible] fine [illegible] with less pumice [illegible]			Returned to core and started drilling at 1330 hours
25	2.5	None	0 ppm, 225 cpm βγ	[illegible]-30.0 Box 5	Becoming [illegible] with a [illegible] Changing from silt [illegible] to very fine grained [illegible] ASH. Contains very small [illegible]		Tsh[illegible]	
27.5	2.5	AAB9442 Full, 26.7-29.[illegible]	0 ppm, 300 cpm βγ		Very fine grained unconsolidated ASH. Small pumice crystals [illegible] small dark lithics. [illegible] crystalline Tuff [illegible] 29 feet			
30								

Prepared by [illegible] Date 19 Aug 94 Checked By [illegible] Date 9/[illegible]/94

Samples

- Full - Gross alpha, beta, gamma spec, moisture, total uranium, strontium, TAL metals, semi-volatiles, volatiles and high explosives
- Rad - Gross alpha, beta, gamma spec, moisture, semi-volatiles, TAL metals

SILT

SAND

ASH

Rhyolite, Dacite,

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of [illegible]

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time 19 Sept 94 1530

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 13 2.5/2.5		0 cpm 300 cpm βγ	30.0 - 35.0 [illegible]	Dry consolidated, [illegible] light gray TUFF. Mildly [illegible] pumice [illegible] [illegible] fine pumice [illegible] ASH [illegible]		[illegible]	
32.5	Run 14 2.5/2.5	AAB5243 Rad 33.5-34.2	0 cpm 200 cpm βγ		Change in [illegible], [illegible] ASH and [illegible] fine grained and contains approximately [illegible]			
35	Run 15 2.5/2.5		0 cpm 300 cpm βγ	35.0 - 40.0 [illegible]	Medium consolidated [illegible] ASH [illegible] becomes more [illegible] with depth. Contains [illegible]			
37.5	Run 16 2.5/2.5	AAB5244 Rad [illegible]	0 cpm 225 cpm βγ		SAA, [illegible]			
40	Run 17 5.0/5.0	AAB5245 Rad 43.5-44.2	0 cpm 225 cpm βγ	40.0 - 45.0 [illegible]	[illegible] 42.5 SAA 42.5 - 45.0 SAA [illegible] increased [illegible]			
45	Run 18 5.0/5.0	AAB5246 Full [illegible] 48-49.0	0 cpm 225 cpm βγ	45.0 - 50.0 [illegible]	45.0-47.5 SAA 47.5-50.0 Dry crystal rich, nonwelded, unconsolidated [illegible] TUFF. Contains 10mm-30mm [illegible] pumice with 2mm crystals. Abundant dark lithics, hornblende, [illegible]		[illegible]	19 Sept 94 Drilling ended 1530 hours at a depth of 50 feet.
50								

Prepared by [illegible] Date 19 Sept 94 Checked By [illegible] Date 9/20/94

ASH
TUFF
Angular, Dacite, Pumice and lithic fragments

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To [illegible] Page [illegible] of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology · Petrology · Soil	Graphic Log	Lithologic Unit	Notes
0–12.5					No recovery [illegible]			
12.5–15	Run 1 2.5/2.5	NONE	0 cpm [illegible] BG		Dry, unconsolidated Dusky Brown 5YR 2/2 to Pale Yellowish Orange 10YR 8/6 SILTY SAND. Fine to med grained with [illegible] of small gravel conglomerates			[illegible] 1320 hours [illegible] winds SE 2-5 mph.
15–17.5	Run 2 1.9/2.5	AAB [illegible]	0 cpm 100 cpm BG	[illegible]	Becoming coarser downwards, very unconsolidated SAND. Med.-coarse grained.			
17.5–20	Run 3 2.5/2.5	NONE	0 cpm 100 cpm BG		17.5-19.0 SAA. 19.0-20.0 [illegible] same characteristics as above. 7 cm Pink TUFF fragment [illegible] at 19.5 feet			
20–22.5	Run 4 2.5/2.5	AAB5520 [illegible] 20.0-21.5	0 cpm 100 cpm BG	[illegible]	Very coarse grained and unconsolidated, moist Moderate Brown 5YR 3/4 SAND becoming more cohesive with 20% CLAY inflows [illegible]			
22.5–25	Run 5 2.5/2.5	NONE	0 cpm 100 cpm BG		22.5-24.0 SAA. 24.0-25.0 very moist, cohesive SILTY CLAY with slight ASH influence [illegible] fine grained			[illegible] 1355 hours
25–27.5	Run 6 2.5/2.5	AAB9271 [illegible]	0 cpm 100 cpm BG	[illegible]	Very fine grained, cohesive, consolidated CLAY [illegible] downwards to form a CLAYEY SAND @ 27 feet. 7-10 mm [illegible] pink pumice [illegible] at 27 feet			Resumed [illegible] 1416 hours
27.5–30	Run 7 2.5/2.5	NONE	0 cpm 100 cpm BG	[illegible]	300 [illegible] fine-grained unconsolidated, ASHEY SAND. ASH has [illegible]			

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 Oct 94

Samples -
Full suite - [illegible]
Medium - [illegible]

SILT
SAND
CLAY
ASH
[illegible] and Pumice [illegible]

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID [illegible] TA/OU [illegible] Drill Depth From [illegible] To 50 Page 2 of 2

Driller [illegible] Box #(s) [illegible] Start Date/Time [illegible] End Date/Time [illegible]

Drilling Equip./Method [illegible] Sampling Equip./Method [illegible]

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	Run 9 2.5/2.5	AAB [illegible] RAD 30-31.5	0 cpm [illegible] Bt	[illegible]	SAA [illegible]		Alluvium + Ash	
32.5	Run 9 2.3/2.5	NONE	0 cpm [illegible] Bt	Box [illegible] 32.5 [illegible]	32.5 - 34.0 SAA 34.0-34.7 [illegible] CLAY with [illegible] pumice [illegible]			
35	Run 10 1.5/2.5	AAB [illegible] [illegible]	0 cpm [illegible]		35.0 - 36.3 - Unconsolidated [illegible] ASHEY SILT 36.3-36.4 - [illegible] CLAY [illegible]			
37.5	Run 11 2.5/2.5	NONE	0 cpm [illegible] Bt	Box [illegible] 37.5-[illegible]	SAA 37.5-39.3 Unconsolidated med-coarse [illegible] ASHEY SAND [illegible] 39.3-40 - Moderately [illegible] TUFF			
40	Run 12 2.5/2.5	AAB [illegible] Rad 40-41.5	0 cpm [illegible] Bt		Unconsolidated moderately [illegible] Dark Yellowish [illegible] 10YR [illegible] - Pumice fragments [illegible] welded Pumice [illegible] TUFF		Otowi Member of the Bandelier	
42.5	Run 13 2.5/2.5	NONE	0 cpm [illegible] Bt		SAA			
45	Run 14 2.5/2.5	AAB [illegible] Rad [illegible]	0 cpm [illegible] Bt	[illegible]	SAA			
47.5	Run 15 2.5/2.5	AAB [illegible] [illegible]	0 cpm [illegible] Bt		SAA with pumice fragments [illegible] to [illegible] mm [illegible]			Drill [illegible] at 1630 hours at a total depth 50 feet
50								

Prepared by [illegible] Date [illegible] Checked By [illegible] Date 12 Oct 94

Sand

Clay

Ash

Rhyolite, Andesite or Pumice fragments

Tuff

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 16-1295 TA/OU 16 / 1129 Drill Depth From 0.0 To 30.0 Page 1 of 2

Driller Stewart Brothers Box #(s) 1-4 Start Date/Time 11-11-94 / 1000 End Date/Time 11-14-94 / 1449

Drilling Equip./Method Failing F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number 448 Almost	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	Run 1 2.5/2.5		0.0 OVM <250 BF	0.0	0.0-0.4 Moderate yellowish brown (10YR 5/4) silty sandy gravel [Fill for gravel pad] 0.4-2.5 Dark yellowish brown (10YR 4/2) silty f-m SAND grading downward to f sandy SILT. Trace f gravel. Slightly moist			11/11/94 Overcast, cold. 1000 Enter zone. Rig-set up over borehole location 16-1295. 1035 Start drilling/sampling
	Run 2 2.5/2.5	AAB7551 2.5-3.0 RAD	0.0 OVM <250 BF	Box 1	2.5-5.0 Dark yellowish brown (10YR 4/2) f sandy SILT/silty f SAND with m-c sand throughout. 5%-7% fine angular gravel. Moist			1051 Run 1 retrieved. 1055 Run 2 "
5	Run 3 2.5/2.5		0.0 OVM <250 BF	7.5	5.0-7.5 Dark yellowish brown (10YR 4/2) silty f SAND grading to moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2) f-c SAND, little silt. Trace f gravel. Slightly moist. Angular to subangular sand is primarily rhyolite. Trace iron-oxide staining			1101 Run 3 ". 1111 Run 4 ". 1122 Run 5 ". 1125 Light rain falling. Rig down. Exit zone.
	Run 4 2.5/2.5	AAB9582 7.5-8.0 RAD	0.0 OVM <250 BF		7.5-9.0 SAA 9.0-10.0 From moderate yellowish brown (10YR 5/4) to moderate brown (5YR 4/4) silty f-c SAND. Iron-oxide staining common throughout with some cementation evident			
10	Run 5 2.5/2.5		0.0 OVM <250 BF	Box 2	10.0-12.5 Moderate yellowish brown (10YR 5/4) f sandy SILT. Dry to slightly moist. Color grades to moderate brown (5YR 4/4).			11/14/94 Clear, cold. 0830 Crew in zone, servicing rig
	Run 6 2.5/2.5	AAB9583 12.5-13.0 RAD	0.0 OVM <250 BF	15.0	12.5-15.0 Light brown (5YR 5/6) to moderate brown (5YR 4/4) f sandy SILT. Slightly moist. Altered tuff clasts from 13.5 ft to 12.8 ft. Trace of secondary carbonate (calcite) at 12.8 ft			0917 Resume drilling. 0920 Driller changing swivel. 0926 Resume drilling
15	Run 7 1.3/2.5		0.0 OVM <250 BF		15.0-16.3 SAA 16.3-17.5 Core Loss			0931 Run 6 retrieved. 0944 Run 7 ". 0955 Run 8 "
	Run 8 2.0/2.5	AAB7584 19.0-19.5 RAD	0.0 OVM <250 BF	Box 3	17.5-19.5 Moderate yellowish brown (10YR 5/4) f sandy SILT/ silty f SAND. 3%-10% m-c SAND. Trace f gravel. Dry to slightly moist 19.5-20.0 Core Loss			1005 Run 9 ". Approximately 0.5 ft of material recovered in top of core barrel (slough and lost core from previous run)
20	Run 9 2.5/2.5	~~AAB9585~~	0.0 OVM <250 BF		20.0-21.7 Moderate yellowish brown (10YR 5/4) f sandy SILT. Trace c sand and f gravel. Dry. 21.7-22.5 Pale yellowish brown (10YR 6/2) silty f SAND [ASH]. Little f-c subangular to subrounded rhyolite gravel.			1023 Run 10 retrieved. 1030 Rig down for break. Exit zone.
	Run 10 2.5/2.5	AAB9585 22.5-23.0 RAD	0.0 OVM <250 BF	23.5	22.5-25.0 SAA to 23.5. Increasing pumice fragments (5% to 8%) with depth			1115 Return to zone. 1118 Resume drilling
25	Run 11 1.9/2.5		0.0 OVM <250 BF	Box 4	25.0-26.9 Pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4) f sandy SILT [ASH]. Little m-c sand, little f-c gravel (rounded to subrounded tuff and pumice fragments). Dry. 26.9-27.5 Core loss.			1122 Run 11 retrieved. 1129 Run 12 "
	Run 12 2.5/2.5	AAB9586 29.5-30.0 RAD	0.0 OVM <250 BF	30.0	27.5-27.9 SAA 27.9-28.2 Pale yellowish brown (10YR 6/2) silty f SAND [ASH]. Little c sand. Occasional tuff fragments to 1" dia. Dry 28.2-29.6 Fault m-c SAND, little silt. Trace f gravel. Dry. Loose (sand is ~75% qtz, 15% tuff and 10% felsic minerals) 29.6-30.0 Pale yellowish brown (10YR 6/2) f sandy SILT. Trace c sand and fine gravel. Dry. [ASH]			
30								

Prepared by Ron Bugen Date 11/11-11/14/1994 Checked By Derek Faulk Date 11/15/94

GRAVEL FILL

SAND

SILTY SAND

SANDY SILT

TUFF

PUMICE

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 0-1295 TA/OU 10 / 075 Drill Depth From 30.0 To 50.0 Page 2 of 2

Driller Stewart Brothers Box #(s) 4-7 Start Date/Time 11-11-94 / 1000 End Date/Time 11-14-94 / 1445

Drilling Equip./Method Failing F-10 Hollow Stem Auger Sampling Equip./Method Stainless Steel Split Spoon Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit
30	Run 13 2.5/2.5		0.0 OVM <250 βγ	31.0	30.0 - 32.5 Loose, pale yellowish brown (10 YR 6/2) to moderate yellowish brown (10 YR 5/4) f. sandy SILT increasing downward to a f.-m. SAND with 10% silt. Trace of gravel throughout. Dry.		
	Run 14 2.5/2.5	AAB9587 33.0-33.4 Rad	0.0 OVM <250 βγ		32.5-34.4 SAA 34.4-35.0 Dense, light brownish gray (5 YR 6/1) TUFF. 5%-10% pumice, ~5% lithic material. Friable. Partially welded?		
35	Run 15 2.5/2.5		0.0 OVM <250 βγ		35.0-37.5 Dense, friable very pale orange (10 YR 8/2) to light brownish gray (5 YR 6/1) TUFF. Trace pumice fragments		
	Run 16 2.5/2.5	AAB9593 ~~AAB9588~~ 37.5-40.0 Rad	0.0 OVM <250 βγ		37.5-40.0 SAA		
40	Run 17 2.5/2.5		0.0 OVM <250 βγ		40.0-42.5 SAA. Trace rhyolite fragments to ½" dia.		
	Run 18 2.5/2.5	AAB9589 42.5-43.0 Rad	0.0 OVM <250 βγ		42.5-42.9 SAA 42.9-43.6 pink grey yellowish brown (10 YR 6/2) TUFF. Trace pumice and lithic fragments 43.6-45.0 Friable weakly cemented f. SAND and pumice fragments. Dry. Trace rhyolite fragments.		
45	Run 19 2.5/2.5		0.0 OVM <250 βγ	46.0	45.0-47.5 SAA. Grades to dark yellowish orange (10 YR 6/6) at 47.0 ft due to increasing iron-oxide staining.		
	Run 20 2.5/2.5	AAB9590 49.5-50.0 Rad	0.0 OVM <250 βγ	50.0	47.5-49.3 SAA. Increasing lithic fragments and pumice 49.3-50.0 Light brown (5 YR 5/6) weakly cemented PUMICE. Fine sand- to coarse gravel size pumice fragments cemented by iron oxide stained clay. ~10% lithic fragments. Slightly moist		
50					Total depth of borehole @ 50 feet BGS.		

Notes

11/14/94 (CONT.)

1142 Run 13 retrieved

1150 Driller reports hard drilling after 1 ft of run. Retrieving core barrel to change swivel. Next run will be 1.5 ft. Both runs will comprise Run #14.

1200 Second half of Run 14 retrieved. Full recovery

1210 Run 15 retrieved

1220 Break for lunch.

1300 Re-enter zone.

1305 Resume drilling

1311 Run 16 retrieved

1322 Run 17 "

1331 Run 18 "

1341 Run 19 "

1345 Run 20 "

TD for hole @ 50 ft bgs. Drillers preparing to trip augers.

Prepared by Rich Gueren Date 11-14-1994 Checked By Derek Faulk Date 11/15/94

GRAVEL | SANDY SILT

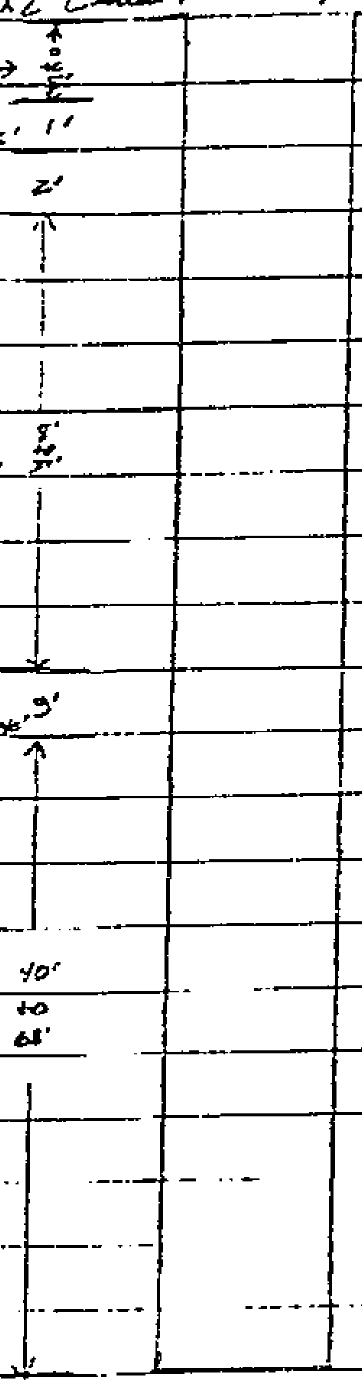
SAND | TUFF

SILTY SAND | PUMICE

Bayo mosture test Hole

Redi Mix Cement

Ground to 5' With 2X2 Cement Pad on top



0 to 5'

Silica sand 10-20 Mesh 5' to 6' 1'

Bentonite hole plug 6' to 8' 2'

Silica sand 10-20 Mesh 8' to 9'

Bentonite hole plug 37 ... 9'

Silica Sand 40' to 68'

10-20 Mesh 40' to 68'

Note: 41 Bags silica s

5 Bags Bentonite pl

aluminum tube 2.5 OD wall.

APPENDIX D

SCREENING RESULTS

BOREHOLES WITH ELEVATED RADIOACTIVITY

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB2847	2.9	0.6	1800	12	510	1.46	<13	<8	89	<4	<4	<3	<4	240	<5	22	13	22
AAB2848	2.57	0.8	2200	17	510	1.75	<13	14	62	<4	<4	<3	<4	400	<5	29	8	23
AAB2849	2.86	0.58	1900	<12	500	1.4	<13	9	66	<4	<4	<3	<4	250	<5	20	10	18
AAB2850	2.56	0.51	2200	<12	730	2.47	<13	9	85	<4	<4	<3	<4	260	<5	28	13	24
AAB2852	3.24	0.42	1400	<12	450	1.37	<13	9	69	<4	<4	<3	<4	260	<5	24	<8	22
AAB2853	3.25	0.34	1100	30	550	1.46	<13	10	77	<4	<4	<3	<4	140	<5	24	<8	21
AAB2854	3.02	0.37	1300	<12	540	1.62	<13	<8	89	<4	<4	<3	<4	170	<5	25	<8	21
AAB2855	3.64	0.32	460	<12	614	1.24	<13	<8	130	<4	<4	<3	<4	64	<5	247	19	56
AAB2862	2.56	0.84	2400	19	440	1.74	<13	13	65	<4	<4	<3	<4	390	<5	20	9	16
AAB2864	2.56	0.43	2400	<12	360	1.57	<13	<8	64	<4	<4	<3	<4	360	<5	22	<8	18
AAB2865	2.6	0.59	2400	<12	460	2.1	<13	11	86	<4	<4	<3	<4	420	<5	28	<8	24
AAB2868	3.36	0.42	1300	<12	460	1.32	<13	8	75	<4	<4	<3	<4	210	<5	26	<8	13
AAB2869	2.6	0.76	2000	<12	600	1.65	<13	13	70	<4	<4	<3	<4	330	<5	38	<8	11
AAB2870	2.62	0.96	2200	<12	430	1.66	<13	8	74	<4	<4	<3	<4	280	<5	26	<8	20
AAB2871	2.95	0.49	1400	<12	500	1.36	<13	<8	75	<4	<4	<3	<4	220	<5	23	<8	15
AAB2872	2.63	0.56	2300	<12	380	1.79	<13	11	69	<4	<4	<3	<4	420	<5	23	<8	21
AAB2873	3.01	0.49	1800	<12	440	1.52	<13	11	66	<4	<4	<3	<4	250	<5	23	<8	18
AAB2874	3.41	0.46	1300	<12	540	1.41	<13	<8	80	<4	<4	<3	<4	220	<5	18	<8	22
AAB2875	3.19	0.4	1200	<12	640	1.67	<13	12	86	<4	<4	<3	<4	170	<5	32	14	32
AAB2876	3.48	0.42	850	<12	620	1.37	<13	11	100	<4	<4	<3	<4	180	<5	36	17	42
AAB2877	3.65	0.23	327	<12	628	1.03	<13	<8	120	<4	<4	<3	<4	35	<5	44	28	48
AAB2877D	3.66	0.24	330	<12	630	1.04	<13	<8	120	<4	<4	<3	<4	36	<5	44	28	48
AAB2878	3.48	0.41	986	<12	505	1.19	<13	<8	75	<4	<4	<3	<4	205	<5	27	14	26
AAB2878D	3.48	0.42	990	<12	510	1.19	<13	<8	76	<4	<4	<3	<4	210	<5	28	14	27
AAB2879	3.18	0.32	630	<12	340	0.84	<13	10	40	<4	<4	<3	<4	180	<5	20	<8	15
AAB2880	3.19	0.46	1000	<12	500	1.27	<13	6	56	<4	<4	<3	<4	240	<5	28	<8	16
AAB2881	2.9	0.44	935	<12	649	1.66	<13	15	112	<4	<4	<3	<4	181	<5	42	8	48
AAB2881D	2.91	0.44	940	<12	650	1.67	<13	16	110	<4	<4	<3	<4	180	<5	42	8	49

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB2886	2.6	0.88	2456	13	406	1.77	<13	<8	61	<4	<4	<3	<4	361	<5	22	<8	15
AAB2687	2.8	1.1	1874	<12	455	1.6	<13	<8	75	<4	<4	<3	<4	224	<5	23	<8	14
AAB2888	3.02	0.59	1279	<12	498	1.3	<13	<8	67	<4	<4	<3	<4	198	<5	27	9	22
AAB2889	2.71	0.69	2096	24	419	2.08	<13	9.6	85	4.3	<4	<3	<4	306	<5	21	14	25
AAB2890	3.33	0.34	1338	<12	490	1.35	<13	<8	64	<4	<4	<3	<4	228	<5	24	10	28
AAB2891	3.49	0.4	1291	<12	503	1.33	<13	9.5	71	4.2	<4	<3	<4	189	<5	19	18	23
AAB2892	3.48	0.33	989	<12	517	1.27	<13	<8	76	<4	<4	<3	<4	94	<5	24	8.5	20
AAB2894	2.81	0.62	1900	<12	520	1.59	<13	<8	65	<4	<4	<3	<4	330	<5	26	<8	17
AAB2895	2.82	0.64	1939	29	563	1.66	<13	16	64	<4	<4	<3	6	255	<5	21	8	22
AAB2896	2.53	0.49	2183	13	477	2.25	13.3	<8	83	<4	<4	<3	<4	216	<5	30	8.2	34
AAB2897	3.17	0.488	1664	<12	503	1.69	<13	9.7	71	<4	<4	<3	<4	263	<5	26	10	25
AAB2898	3.33	0.46	1330	<12	615	1.56	<13	9.7	64	<4	<4	<3	<4	148	<5	28	<5	24
AAB2899	3.42	0.38	909	16	549	1.28	<13	<8	62	<4	<4	<3	<4	167	<5	29	<8	26
AAB2900	3.02	0.23	384	<12	406	0.78	<13	<8	59	<4	<4	<3	<4	47	<5	26	<8	25
AAB2901	3.5	0.26	429	<12	698	1.21	<13	<8	134	<4	<4	<3	<4	91	<5	44	12	51
AAB2902	3.89	0.23	265	<12	701	1.06	<13	<8	123	<4	<4	<3	6	55	<5	49	17	55
AAB2907	3.01	0.61	1729	<12	464	1.45	<13	<8	62	<4	<4	<3	<4	255	<5	20	<8	18
AAB2908	2.61	1.84	2021	18	566	1.7	<13	9	55	4	<4	<3	<4	330	<5	15	<8	14
AAB2909	3.15	0.5	1817	25	566	1.69	<13	15	63	<4	<4	<3	<	258	<5	21	10	19
AAB2910	2.97	0.63	1494	<12	525	1.67	<13	10	68	<4	<4	<3	<4	226	<5	22	8	27
AAB2911	3.45	0.21	678	<12	486	1.21	<13	<8	40	<4	<4	<3	<4	93	<5	14	<8	15
AAB2912	3.15	0.5	893	<12	724	1.45	<13	<8	114	<4	<4	<3	4	311	<5	39	15	52
AAB2913	3.4	0.26	328	<12	727	1.04	<13	9	117	<4	<4	<3	<4	89	<5	44	16	49
AAB2914	3.82	0.22	2238	<12	740	1.08	<13	<8	135	<4	<4	<3	<4	49	<5	45	22	59
AAB2921	2.81	0.51	2343	18	524	1.81	<13	<8	58	<4	<4	<3	4	349	<5	20	9	22
AAB2922	3.08	0.44	1846	<12	496	1.59	<13	<8	59	<4	<4	<3	<4	305	<5	22	<8	19
AAB2923	2.93	0.7	1948	15	507	1.64	<13	9	56	<4	<4	<3	<4	292	<5	26	9	19
AAB2924	3.16	0.51	1490	<12	589	1.48	<13	<8	64	<4	<4	<3	<4	194	<5	26	10	30

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB2925	3.53	0.44	1235	<12	520	1.41	<13	<8	74	<4	<4	<3	<4	217	<5	20	18	23
AAB2926	3.42	0.38	1264	<12	491	1.25	<13	10	71	<4	<4	<3	<4	186	<5	24	8	19
AAB2927	3.42	0.34	626	<12	353	0.78	<13	<8	42	<4	<4	<3	<4	178	<5	19	10	12
AAB2930	2.92	0.51	1578	<12	869	2.39	<13	11	96	<4	<4	<3	<4	197	<5	31	<8	35
AAB2931	3.41	0.26	441	<12	657	1.16	<13	<8	113	<4	<4	<3	<4	48	<5	41	20	49
AAB2932	3.48	0.47	922	16	808	1.52	<13	14	120	<4	<4	<3	<4	121	<5	49	16	54
AAB2936	2.6	0.91	2518	14	469	1.76	<13	<8	63	<4	<4	<3	<4	385	<5	22	<8	22
AAB2937	3.05	0.63	1731	<12	540	1.5	<13	16	52	<4	<4	<3	<4	283	<5	21	<8	23
AAB2938	2.87	0.55	2603	19	607	1.9	<13	9	69	<4	<4	<3	<4	234	<5	26	<8	27
AAB2939	2.9	0.5	1964	27	557	2.03	<13	12	73	6	<4	<3	<4	304	<5	22	11	21
AAB2940	3.5	0.33	898	<12	527	1.21	<13	<8	76	<4	<4	<3	<4	158	<5	26	<8	23
AAB2941	2.42	0.61	1827	22	458	2.89	19	22	89	<4	<4	<3	<4	246	<5	31	<8	37
AAB2942	3.09	0.38	542	<12	949	1.79	<13	<8	169	<4	<4	<3	<4	320	<5	53	8	59
AAB2943	3.75	0.27	378	<12	794	1.2	<13	<8	137	<4	<4	<3	<4	134	<5	52	27	53
AAB2945	3.91	0.26	301	<12	763	1.15	<13	<8	143	<4	<4	<3	<4	55	<5	47	26	45
AAB2950	2.72	0.91	2931	<12	471	1.87	<13	<8	55	<4	<4	<3	<4	402	<5	22	<8	20
AAB2951	2.57	1.25	2654	15	444	1.77	<13	8	46	<4	<4	3	<4	344	<5	24	<8	15
AAB2952	3.2	0.53	1948	17	498	1.7	<13	<8	70	<4	<4	<3	<4	271	<5	24	11	18
AAB2953	3.42	0.51	1758	<12	554	1.61	<13	11	81	<4	<4	<3	<4	244	<5	30	11	31
AAB2954	3.28	0.37	1174	75	577	1.6	30	<8	75	<4	<4	3	4	139	<5	24	11	19
AAB2955	4	0.27	345	<12	776	1.25	<13	<8	133	<4	<4	<3	5	40	<5	45	19	50
AAB2956	3.85	0.27	352	<12	741	1.28	<13	<8	144	<4	<4	<3	<4	27	<5	55	17	44
AAB2957	4.21	0.25	341	<12	812	1.2	<13	<8	141	<4	<4	<3	<4	23	<5	49	21	59
AAB2965	2.39	0.86	2408	22	410	1.66	<13	9	55	<4	<4	<3	<4	331	<5	22	<8	21
AAB2966	2.32	0.82	2361	17	395	1.63	<13	<8	48	<4	<4	<3	<4	331	<5	17	<8	13
AAB2967	2.53	0.72	2536	23	295	1.85	19	9	66	<4	<4	<3	<4	375	<5	19	9	20
AAB2968	3.11	0.44	1425	<12	452	1.37	<13	13	73	<4	<4	<3	<4	254	<5	24	9	27
AAB2969	3.34	0.36	973	<12	574	1.29	<13	<8	65	<4	<4	<3	<4	99	<5	27	<8	27

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB2970	3.14	0.32	979	<12	562	1.37	<13	<8	73	<4	<4	<3	<4	89	<5	28	11	32
AAB2971	2.41	0.66	1881	15	756	3.08	<13	21	134	<4	<4	<3	<4	247	<5	38	9	35
AAB2972	3.25	0.4	798	<12	761	1.73	<13	<8	136	<4	<4	<3	5	88	<5	45	12	54
AAB2976	3.92	0.21	233	<12	694	1.03	<13	<8	119	<4	<4	<3	<4	11	<5	49	30	58
AAB2980	2.43	1.08	2501	<12	414	1.65	<13	<8	49	<4	<4	<3	<4	348	<5	18	<8	18
AAB2981	2.97	0.41	1533	<12	533	1.43	<13	<8	60.8	<4	<4	<3	<4	211	<5	25.2	9.32	15.7
AAB2982	2.43	0.53	2309	<12	509	2.24	<13	19	81	<4	<4	<3	5	353	<5	26	<8	28
AAB2983	2.65	0.49	1868	14.2	505	1.81	<13	<8	72.3	<4	<4	<3	4.62	280	<5	27.1	<8	23.8
AAB2984	2.99	0.46	1755	<12	450	1.57	<13	<8	70.3	<4	<4	<3	<4	208	<5	26.3	<8	22.0
AAB2985	3.05	0.41	1420	<12	490	1.43	<13	12.8	72.3	<4	<4	<3	<4	203	<5	29.3	<8	22.1
AAB2986	3.04	0.36	1173	<12	612	1.53	<13	8.6	78	<4	<4	<3	<4	155	<5	28.5	<8	23.3
AAB2987	3.42	0.24	362	<12	743	1.21	<13	<8	135	<4	<4	<3	<4	111	<5	52.4	17.3	49.7
AAB2992	2.57	0.72	2401	<12	464	1.68	<13	<8	61.5	<4	<4	<3	<4	382	<5	22.1	<8	14.3
AAB2993	2.48	0.89	2605	<12	388	1.65	<13	8.59	55.9	<4	<4	<3	<4	364	<5	25.3	<8	19.5
AAB2994	2.53	0.45	2259	15.6	467	1.69	<13	15.2	50.5	<4	<4	<3	<4	355	<5	19	<8	19
AAB2995	2.58	0.46	2302	21.8	503	1.77	<13	<8	60.7	<4	<4	<3	<4	358	<5	20.8	<8	22.7
AAB2996	2.66	0.56	1762	<12	468	1.91	<13	11	83	<4	<4	<3	<4	371	<5	24.9	9.61	27.6
AAB2997	2.49	0.52	1615	<12	821	3.03	<13	13.8	101	<4	<4	<3	<4	234	<5	44.1	16.3	47
AAB2998	2.69	0.37	649	<12	907	1.88	17.6	12.1	168	<4	<4	<3	<4	240	<5	54.2	19.9	73.7
AAB2999	3.36	0.23	287	<12	775	1.16	<13	<8	143	<4	<4	<3	<4	122	<5	55.3	17.1	62.6
AAB3000	3.89	0.26	291	<12	809	1.19	<13	<8	152	<4	<4	4	<4	81	<5	60	19	70
AAB3006	2.67	0.93	2699	<12	531	1.83	<13	12	59	<4	<4	<3	<4	313	<5	25	<8	15
AAB3007	3.06	0.73	1321	<12	556	1.57	<13	<8	70	<4	<4	<3	5	175	<5	30	<8	28
AAB3007D	3.1	0.91	1762	<12	549	1.79	<13	<8	91	<4	<4	<3	<4	187	<5	35	<8	16
AAB3008	2.59	0.47	2157	<12	513	1.85	<13	10	75	<4	<4	<3	<4	387	<5	22	8	31
AAB3009	2.92	0.38	1454	<12	608	1.67	<13	<8	80	<4	<4	<3	<4	195	<5	20	8	20
AAB3010	2.09	0.64	1912	14	652	3	<13	19	79	<4	<4	<3	<4	338	<5	38	10	42
AAB3011	3	0.39	674	<12	791	1.51	<13	<8	128	<4	<4	<3	<4	193	<5	46	11	54

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB3012	3.37	0.25	428	<12	699	1.17	<13	<8	113	<4	<4	<3	<4	92	<5	51	17	58
AAB3014	3.55	0.23	363	<12	723	1.07	<13	8	126	<4	<4	<3	<4	61	<5	50	22	57
AAB3021	2.67	0.31	2484	148	293	1.85	<13	51	74	<4	<4	<3	<4	327	<5	27	<8	22
AAB3022	2.58	0.32	2601	141	284	1.8	13	45	78	<4	<4	<3	<4	289	<5	28	11	19
AAB3023	3.41	0.31	1411	17	513	1.68	<13	15	109	<4	<4	<3	<4	147	<5	35	11	26
AAB3024	2.75	0.46	2338	14	484	1.89	<13	<8	74	<4	<4	<3	<4	217	<5	23	<8	16
AAB3025	2.84	0.59	2423	<12	522	2.17	<13	15	79	<4	<4	<3	<4	333	<5	27	<8	11
AAB3026	1.36	0.81	1640	<12	689	3.62	13	13	122	<4	<4	<3	<4	346	<5	63	9	75
AAB3027	3.15	0.48	1010	<12	946	1.81	<13	<8	146	<4	<4	<3	<4	171	<5	52	17	51
AAB3028	3.83	0.28	316	<12	759	1.22	<13	<8	149	<4	<4	<3	<4	74	<5	53	20	53
AAB3029	3.75	0.24	273	<12	729	1.07	<13	<8	134	<4	<4	<3	<4	54.6	<5	53.2	19.1	56.4
AAB3035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3040	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3048	3.26	0.38	1295	<12	594	1.52	<13	<8	83	<4	<4	3	<4	139	<5	33	8	27
AAB3049	3.1	0.41	1314	<12	488	1.38	<13	<8	78	<4	<4	<3	4	217	<5	30	<8	22
AAB3050	3.04	0.38	1566	<12	587	1.84	<13	<8	100	<4	<4	<3	<4	198	<5	28	<8	22
AAB3051	2.31	0.88	2377	12	601	2.75	14	8	79	<4	<4	<3	<4	384	<5	31	<8	29
AAB3052	2.51	0.45	2004	14	425	1.67	<13	<8	71	<4	<4	<3	<4	276	<5	24	8	21
AAB3054	3.58	0.35	609	<12	827	1.69	<13	<8	160	<4	<4	<3	5	62	<5	55	24	60
AAB3056	3.49	0.27	393	<12	687	1.24	<13	<8	134	<4	<4	<3	<4	44	<5	52	21	54
AAB3058	3.82	0.25	306	<12	708	1.08	<13	<8	138	<4	<4	<3	<4	32	<5	52	20	51
AAB3061	3.78	0.26	324	<12	698	1.06	<13	<8	132	<4	<4	<3	<4	40	<5	56	27	52

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB3063	3.37	0.35	1267	<12	823	1.61	<13	<8	79	<4	<4	<3	<4	127	<5	36	<8	29
AAB3064	2.98	0.44	1630	18	650	1.85	<13	<8	67	<4	<4	4	<4	187	<5	24	10	27
AAB3065	2.49	1.03	2417	24	640	2.94	14	<8	89	<4	<4	<3	<4	412	<5	26	11	33
AAB3066	2.37	0.55	2142	<12	507	2.01	<13	11	76	<4	<4	<3	<4	240	<5	30	18	25
AAB3067	3.42	0.33	546	<12	717	1.52	14	<8	138	<4	<4	<3	<4	64	<5	54	22	55
AAB3068	2.82	0.51	1128	<12	899	2.54	<13	17	173	<4	<4	<3	<4	159	<5	52	14	60
AAB3070	3.82	0.26	312	<12	744	1.19	<13	<8	143	<4	<4	4	<4	34	<5	51	17	57
AAB3071	3.89	0.24	298	<12	754	1.07	<13	10	132	<4	<4	<3	<4	19	<5	47	28	60
AAB3075	2.73	0.48	1868	16	554	1.78	13	<8	70	<4	<4	<3	<4	191	<5	22	<8	21
AAB3076	2.8	0.5	1936	22	535	1.71	<13	9	79	<4	<4	<3	<4	189	<5	25	<8	23
AAB3077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3078	2.69	0.47	2526	<12	634	1.99	<13	<8	68	<4	<4	<3	5	288	<5	28	<8	27
AAB3079	2.59	0.5	2257	24	338	1.78	<13	9	54	<4	<4	<3	<4	266	<5	21	<8	19
AAB3081	2.48	0.5	1096	<12	1032	2.56	<13	17	160	<4	<4	<3	<4	86	<5	57	13	68
AAB3082	3.54	0.28	428	<12	733	1.33	<13	<8	140	<4	<4	<3	<4	59	<5	44	20	54
AAB3083	3.87	0.24	273	12	707	1.09	17	<8	129	<4	<4	<3	<4	21	<5	50	31	57
AAB3084	3.95	0.24	296	<12	712	1.06	<13	<8	111	<4	<4	<3	<4	15	<5	46	17	59
AAB3088	2.97	0.4	1995	<12	600	1.641	<13	<8	84	<4	<4	<3	<4	144	<5	24	10	31
AAB3089	2.88	0.37	1747	17	580	1.65	<13	12	63	4	<4	<3	<4	173	<5	16	<8	19
AAB3090	2.85	0.4	2389	15	469	1.58	<13	13	62	4	<4	<3	<4	230	<5	17	<8	19
AAB3091	2.49	0.503	2010	<12	461	1.81	<13	<8	74.8	<4	<4	<2	<4	269	<5	26.9	12.5	26.8
AAB6121	3.13	0.33	627	<12	343	0.8	<13	15	42	<4	<4	<3	<4	173	<5	15	<8	9
AAB6123	3.83	0.36	599	<12	629	1.34	<13	<8	127	<4	<4	<3	5	100	<5	42	18	36
AAB6127	3.31	0.45	1331	<12	623	1.54	<13	9	64	<4	<4	<3	<4	154	<5	27	<8	19
AAB6128	3.18	0.43	1551	<12	582	1.64	<13	<8	84	<4	<4	5	<4	181	<5	26	<8	20
AAB6130	2.96	0.64	1679	<12	577	1.57	<13	15	65	<4	<4	<3	<4	290	<5	28	<8	17
AAB6131	3.08	0.72	1639	<12	526	1.61	14	11	60	<4	<4	<3	<4	215	<5	23	18	24
AAB6132	2.75	0.47	2289	<12	408	1.59	14	8	44	<4	<4	<3	5	286	<5	23	<8	15

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6133	3	0.4	1816	<12	550	1.58	<13	10	74	<4	<4	<3	<4	267	<5	22	<8	14
AAB6134	3.43	0.38	1097	<12	514	1.25	<13	<8	74	<4	<4	<3	<4	158	<5	25	<8	21
AAB6135	3.6	0.38	879	<12	490	1.1	13	<8	58	<4	<4	<3	<4	140	<5	21	12	25
AAB6136	3.29	0.36	762	<12	409	0.91	<13	<8	43	<4	<4	<3	<4	170	<5	23	<8	8
AAB6137	3.06	0.379	672	<12	354	0.83	<13	<8	42	<4	<4	<3	<4	166	<5	29	<8	9
AAB6138	2.77	0.44	1040	<12	457	1.43	<13	<8	47	<4	<4	<3	<4	164	<5	22	9	18
AAB6140	3.65	0.26	515	<12	643	1.19	<13	10	115	<4	<4	<3	4	82	<5	40	16	44
AAB6145	3.16	0.45	2040	<12	777	2.08	<13	<8	83	<4	<4	<3	5	210	<5	24	9	25
AAB6146	2.91	0.53	2264	60	897	2.39	24	10	95	<4	<4	<3	<4	256	<5	38	<8	38
AAB6147	2.17	0.72	2381	18	1123	3.81	<13	17	139	<4	<4	<3	<4	267	<5	41	16	54
AAB6150	3.54	0.35	660	<12	963	1.57	<13	<8	172	<4	<4	<3	<4	79	<5	53	17	69
AAB6153	3.98	0.24	327	<12	810	1.2	<13	<8	141	<4	<4	5	<4	22	<5	51	21	58
AAB6154	4.06	0.23	297	<12	763	1.13	<13	<8	150	<4	<4	<3	<4	28	<5	47	27	62
AAB6156	4.11	0.24	294	<12	761	1.11	<13	<8	137	<4	<4	<3	<4	18	<5	50	27	74
AAB6158	3.13	0.47	1853	<12	568	1.63	<13	<8	76	<4	<4	<3	<4	267	<5	27	14	25
AAB6159	3.36	0.37	1520	<12	648	1.62	<13	<8	89	<4	<4	<3	<4	161	<5	30	8	28
AAB6160	2.85	0.61	1816	<12	616	1.7	<13	10	83	<4	<4	<3	<4	303	<5	25	10	36
AAB6161	3.1	0.42	2237	<12	753	1.99	16	<8	85	<4	<4	3	<4	185	<5	26	9	32
AAB6163	2.58	0.54	2661	<12	490	2.31	<13	8	81	<4	<4	<3	<4	363	<5	31	<8	30
AAB6164	3.01	0.57	1140	<12	983	2.57	<13	29	178	<4	<4	<3	<4	138	<5	57	27	71
AAB6165	3.96	0.25	347	<12	767	1.24	<13	12	128	<4	<4	<3	<4	40	<5	55	20	67
AAB6167	4.17	0.25	275	<12	780	1.14	14	<8	146	<4	<4	<3	<4	18	<5	57	23	67
AAB6170	2.72	0.468	2005	20.7	428	1.59	<13	13	52.5	5.74	<4	<3	<4	294	<5	23.3	<8	12.6
AAB6171	2.93	0.47	1957	<12	492	1.65	<13	<8	62	4	<4	<3	<4	293	<5	21	11	21
AAB6172	3.36	0.49	1482	16	634	1.59	14	<8	78	<4	<4	<3	<4	167	<5	33	<8	36
AAB6173	3.79	0.36	1036	<12	636	1.39	<13	9	81	<4	<4	<3	4	143	<5	29	<8	23
AAB6174	3.26	0.44	1333	<12	600	1.46	<13	<8	66	<4	<4	<3	<4	196	<5	28	<8	29
AAB6175	2.91	0.58	1787	16	846	2.27	<13	16	109	4	<4	<3	<4	224	<5	34	<8	37

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se - Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6176	2.94	0.46	2022	<12	513	1.7	<13	<8	59	<4	<4	<3	<4	309	<5	24	<8	24
AAB6177	3.57	0.27	363	<12	731	1.24	<13	<8	124	<4	<4	<3	5	55	<5	49	24	62
AAB6178	3.8	0.23	290	<12	694	1.11	<13	<8	135	<4	<4	<3	<4	25	<5	47	17	48
AAB6179	3.97	0.27	312	<12	763	1.09	<13	10	139	<4	<4	<3	<4	53	<5	51	24	50
AAB6183	2.48	0.46	2017	<12	365	1.51	<13	13.5	53.5	<4	<4	<3	<4	298	<5	22.8	15	18.7
AAB6184	3.12	0.33	1315	<12	595	1.42	<13	<8	72.5	<4	<4	<3	<4	104	<5	26.8	10.7	23.1
AAB6185	3.22	0.36	1127	<12	627	1.54	13.6	8.56	77.1	<4	<4	<3	<4	96.1	<5	28.3	9.11	28.2
AAB6187	2.94	0.37	1564	<12	609	1.56	<13	<8	67.3	<4	<4	<3	<4	178	<5	22.7	<8	17.1
AAB6188	2.27	0.57	2107	24.5	474	2.24	<13	9.68	75	<4	<4	<3	<4	299	<5	26.7	<8	28.6
AAB6189	3.14	0.27	398	<12	725	1.3	<13	17.4	119	<4	<4	<3	<4	53.4	<5	45.5	17.6	59.9
AAB6192	3.57	0.21	258	<12	666	1.06	<13	<8	118	<4	<4	<3	<4	<10	<5	49.6	24.4	69
AAB6195	3.73	0.23	246	<12	674	1.02	<13	<8	125	<4	<4	<3	<4	19.7	<5	50	23.5	72.3
AAB6196	3.89	0.24	271	<12	712	1.04	<13	<8	125	<4	<4	<3	<4	<10	<5	44	16	53
AAB6199	2.7	0.41	1833	14.6	464	1.47	<13	13.8	58.4	<4	<4	<3	<4	239	<5	22.8	9.81	27.6
AAB6200	3.19	0.34	1144	<12	547	1.37	<13	<8	66.8	<4	<4	<3	<4	156	<5	25.7	8.46	23.1
AAB6201	2.65	0.36	1747	19.2	447	1.3	<13	<8	49.4	<4	<4	<3	<4	252	<5	23.2	<8	26.1
AAB6202	2.84	0.97	1925	13.4	638	2.07	<13	11.5	66.4	<4	<4	<3	<4	384	<5	26.6	<8	36.7
AAB6203	2.84	0.85	1878	37.9	595	1.95	22.9	<8	67.5	<4	<4	<3	<4	343	<5	25.8	<8	31.6
AAB6204	1.65	0.7	1386	15.4	542	3.02	20.4	15.4	136	<4	<4	<3	<4	256	<5	45.2	8.4	71.7
AAB6209	3.46	0.3	466	<12	696	1.22	<13	<6	126	<4	<4	<3	<4	72	<5	44	16	49
AAB6210	3.63	0.23	273	<12	682	1.02	<13	<8	123	<4	<4	<3	<4	34	<5	50	23	57
AAB6212	3.79	0.21	273	<12	677	1.01	<13	<8	118	<4	<4	<3	<4	19	<5	48	9	52
AAB6213	3.8	0.24	284	<12	699	1.04	<13	<8	130	<4	<4	<3	<4	7	<5	53	31	62
AAB6216	2.79	0.6	2346	<12	498	1.8	<13	<8	64	<4	<4	3	<4	309	<5	28	<8	34
AAB6217	3.15	0.67	1590	24	610	1.74	<13	<8	88	<4	<4	<3	<4	171	<5	32	<8	34
AAB6218	2.78	0.48	2297	12	592	1.81	<13	10	61	<4	<4	<3	<4	293	<5	28	<8	27
AAB6219	2.76	0.47	2425	16	587	1.81	<13	12	72	<4	<4	4	4	285	<5	27	<8	32
AAB6220	2.86	0.53	1960	<12	981	2.57	23	12	112	<4	<4	3	<4	181	<5	36	9	31

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6221	2.65	0.44	2093	<12	373	1.7	<13	17	69	<4	<4	<3	<4	294	<5	26	<8	25
AAB6223	2.94	0.49	1227	<12	867	1.97	<13	11	144	<4	<4	<3	<4	218	<5	47	20	51
AAB6224	3.54	0.27	395	<12	817	1.35	<13	9	155	<4	<4	<3	<4	63	<5	54	29	53
AAB6225	3.79	0.25	334	<12	762	1.2	<13	<8	142	<4	<4	<3	<4	43	<5	50	24	57
AAB6229	2.71	0.55	2235	15	473	1.76	<13	8	68	<4	<4	3	<4	321	<5	29	<8	26
AAB6230	2.73	0.61	2008	<12	485	1.53	<13	9	64	<4	<4	<3	<4	240	<5	24	<8	25
AAB6233	3	0.38	1512	<12	514	1.44	<13	<8	70	<4	<4	<3	<4	143	<5	24	<8	21
AAB6234	2.63	0.39	2037	<12	449	1.57	<13	<8	66	<4	<4	<3	<4	275	<5	14	<8	22
AAB6234D	2.44	0.5	1217	<12	1028	2.91	<13	17	207	<4	<4	<3	<4	157	<5	70	15	62
AAB6235	2.77	0.44	1496	15	708	1.85	<13	9	96	<4	<4	<3	<4	155	<5	28	<8	25
AAB6236	2.78	0.39	1316	<12	534	1.61	<13	11	76	<4	<4	<3	<4	192	<5	23	10	29
AAB6237	3.03	0.45	961	32	884	1.95	18	19	183	<4	<4	3	<4	149	<5	52	15	54
AAB6238	3.4	0.25	302	<12	748	1.17	<13	<8	127	<4	<4	<3	<4	92	<5	55	25	56
AAB6242	3.47	0.22	262	<12	701	1.09	<13	<8	140	<4	<4	<3	<4	44	<5	46	22	45
AAB6245	2.75	0.82	2338	19	435	1.78	<13	<8	70	<4	<4	<3	<4	296	<5	28	<8	23
AAB6246	2.95	1.02	2560	18	462	1.98	<13	8	69	<4	<4	3	5	329	<5	27	<8	25
AAB6247	3.06	0.6	2065	34	543	1.71	<13	<8	76	<4	<4	<3	<4	223	<5	27	10	34
AAB6248	3.43	0.39	1356	12	615	1.64	<13	<8	84	<4	<4	<3	<4	135	<5	31	13	33
AAB6249	3.12	0.44	1413	69	726	1.86	13	10	83	<4	<4	<3	<4	166	<5	25	<8	25
AAB6250	3.48	0.25	869	<12	559	1.44	<13	<8	63	<4	<4	<3	<4	126	<5	25	<8	22
AAB6252	3.02	0.48	1132	<12	721	1.93	24	<8	105	<4	<4	<3	<4	135	<5	39	<8	41
AAB6253	3.52	0.34	611	<12	735	1.46	<13	<8	130	<4	<4	<3	5	55	<5	45	21	55
AAB6254	3.75	0.25	364	<12	714	1.13	<13	<8	134	<4	<4	<3	<4	33	<5	52	15	58
AAB6255	3.81	0.24	256	<12	748	1.13	13	<8	141	<4	<4	<3	4	18	<5	58	19	62
AAB6259	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6261	2.66	0.566	2311	24.7	413	1.57	<13	10.3	56.8	<4	<4	<3	<4	340	<5	22.4	<8	17.3
AAB6262	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6263	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6265	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6266	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6267	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6269	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6273	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6274	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6275	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6276	3.36	0.36	1400	<12	619	1.58	<13	9	87	<4	<4	<3	<4	116	<5	29	9	27
AAB6277	3.17	0.46	1848	<12	753	2.01	<13	10	92	<4	<4	<3	<4	145	<5	34	8	31
AAB6280	3.06	0.49	1695	<12	791	2.09	<13	<8	105	<4	<4	<3	4	148	<5	41	<8	21
AAB6284	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6285	3.73	0.26	380	<12	771	1.32	<13	<8	145	<4	<4	<3	6	43	<5	55	19	57
AAB6286	4.07	0.26	310	<12	787	1.22	<13	<8	157	<4	<4	<3	<4	29	<5	56	28	60
AAB6287	3.9	0.24	306	<12	723	1.14	<13	8	132	<4	<4	<3	<4	17	<5	52	19	53
AAB6291	2.95	0.54	2198	<12	499	1.68	<13	11	71	<4	<4	<3	<4	245	<5	29	<8	29
AAB6298	3.21	0.56	1335	<12	730	1.59	<13	9.5	107	<4	<4	<3	<4	205	<5	42.2	<8	21.6
AAB6300	3.21	0.57	1720	<12	998	2.13	<13	11.9	91.8	<4	<4	<3	<4	175	<5	31	<8	23.6
AAB6301	3.02	0.477	1195	<12	423	1.43	<13	9.17	69.2	<4	<4	<3	<4	160	<5	27.2	<8	22.5
AAB6302	2.77	0.46	1646	<12	436	1.4	<13	<8	61	<4	<4	<3	<4	237	<5	26	11	23
AAB6303	3.25	0.3	406	<12	816	1.38	<13	<8	155	<4	<4	<3	<4	133	<5	50	25	58
AAB6305	3.55	0.29	351	<12	824	1.29	<13	<8	143	<4	<4	<3	<4	94	<5	52	20	68
AAB6309	2.66	1.07	1904	19	559	1.61	<13	77	99	<4	<4	17	<4	326	<5	32	11	28
AAB6310	2.88	1.36	1684	<12	477	1.53	<13	<8	72	<4	<4	<3	<4	146	<5	23	10	24
AAB6311	2.8	1.02	1573	<12	491	1.51	<13	<8	61	<4	<4	<3	<4	183	<5	25	11	24
AAB6312	3.01	0.53	1725	12	732	1.99	<13	11	92	<4	<4	<3	<4	203	<5	30	<8	30
AAB6314	2.78	0.59	1567	14	860	1.798	<13	<8	85	<4	<4	<3	4	204	<5	33	<8	22
AAB6315	3.52	0.2	569	<12	359	1.186	<13	<8	64	<4	<4	<3	<4	50	<5	26	9	22

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6316	3.73	0.28	319	<12	731	1.19	<13	<8	143	<4	<4	3	<4	43	<5	52	24	62
AAB6316D	3.2	0.4	516	16	760	1.505	<13	12	153	<4	<4	<3	<4	74	<5	53	20	57
AAB6318	3.5	0.3	359	<12	732	1.27	<13	<8	142	<4	<4	<3	<4	47	<5	55	17	56
AAB6318D	3.85	0.23	271	<12	710	1.09	<13	<8	132	<4	<4	<3	<4	18	<5	52	15	59
AAB6319	3.5	0.3	359	<12	732	1.27	<13	<8	142	<4	<4	<3	<4	47	<5	55	17	56
AAB6323	3.29	0.4	1242	<12	603	1.541	<13	<8	87	<4	<4	<3	<4	143	<5	29	11	17
AAB6324	3.34	0.43	1451	<12	644	1.72	<13	15	82	<4	<4	<3	<4	103	<5	31	11	33
AAB6325	3.12	0.38	1363	<12	601	1.51	<13	<8	69	<4	<4	<3	<4	138	<5	29	<8	29
AAB6326	3.15	0.37	1512	<12	707	1.77	<13	<8	76	<4	<4	<3	<4	160	<5	27	14	28
AAB6329	2.53	0.57	1960	22	453	2.32	<13	20	95	5	<4	<3	<4	254	<5	28	15	31
AAB6331	2.91	0.66	1439	<12	816	2.277	<13	16	101	<4	<4	<3	<4	270	<5	43	14	37
AAB6332	3.39	0.28	539	<12	765	1.46	<13	13	142	<4	<4	<3	<4	67	<5	48	14	61
AAB6333	3.66	0.28	306	<12	770	1.16	<13	<8	130	<4	<4	<3	<4	49	<5	49	21	50
AAB6334	3.83	0.25	347	<12	768	1.19	<13	<8	129	<4	<4	3.6	4.1	34	<5	52	23	59
AAB6337	3.19	0.37	1321	28.69	563	1.6	15.5	15.1	75.1	<4	<4	<3	<4	146	<5	31	<8	21
AAB6339	3.39	0.33	1053	<12	647	1.48	<13	<8	76	<4	<4	<3	<4	117	<5	32.8	8.1	24.2
AAB6340	3.14	0.416	1497	<12	690	1.74	<13	<8	86.3	<4	<4	<3	<4	129	<5	34.9	<8	23.4
AAB6341	2.47	0.63	2250	15.4	979	2.82	13.5	8.1	118	<4	<4	3.18	<4	190	<5	38.1	<8	25.7
AAB6342	2.82	0.56	1732	17.3	471	1.63	<13	8.79	85.3	4.39	<4	<3	<4	253	<5	18.9	9.12	9.44
AAB6344	3.17	0.38	666	<12	823	1.75	<13	9.68	151	<4	<4	<3	<4	71.9	<5	50.1	24.1	52.1
AAB6345	3.47	0.28	339	<12	668	1.12	<13	<8	121	4.07	<4	<3	<4	96.4	<5	41.1	17.5	22
AAB6346	3.46	0.252	414	<12	655	1.04	<13	<8	109	<4	<4	<3	5.8	73.8	<5	49.4	21.5	48.2
AAB6347	3.74	0.26	368	<12	733	1.2	<13	<8	136	<4	<4	<3	<4	81	<5	53	17.5	48
AAB6351	3.09	0.715	1756	12.5	507	1.6	<13	<8	64.2	<4	<4	<3	<4	225	<5	22.3	<8	17
AAB6352	3.48	0.35	1205	<12	670	1.55	<13	<8	83.2	<4	<4	<3	<4	98.2	<5	32	10.6	32.6
AAB6356	3.2	0.35	1186	<12	592	1.52	<13	<8	69.9	<4	<4	<3	<4	111	<5	27.4	<8	31.9
AAB6357	2.77	0.522	1831	23	724	2.23	<13	16.2	91.5	<4	<4	<3	<4	183	<5	34.1	11	32.3
AAB6358	2.04	0.75	1643	15.3	663	2.8	<13	10.3	114	<4	<4	<3	<4	189	<5	40	<8	40.6

NA = Not Analyzed

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Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6359	3.17	0.402	860	<12	705	1.45	<13	<8	120	<4	<4	<3	<4	144	<5	46.2	9.93	42.6
AAB6361	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6365	2.83	0.984	2245	<12	495	1.75	<13	<8	68.8	<4	<4	<3	<4	257	<5	27.4	<8	26.1
AAB6366	3.38	0.398	1241	<12	644	1.58	<13	9.95	86.4	<4	<4	<3	<4	104	<5	28.6	<8	22.8
AAB6369	3.37	0.531	2100	12.3	719	2.15	<13	18.5	102	<4	<4	<3	<4	134	<5	26.5	8.19	28
AAB6370	3.34	0.416	1489	<12	676	1.62	<13	12	76.5	<4	<4	<3	<4	147	<5	23.7	9.35	19.4
AAB6372	2.98	0.514	1535	<12	449	1.69	<13	16.5	71.1	<4	<4	<3	<4	151	<5	30.8	10.1	21.2
AAB6373	3.04	0.364	1453	<12	457	1.41	<13	<8	67.4	<4	<4	<3	<4	225	<5	23.7	<8	<8
AAB6374	3.11	0.299	531	<12	766	1.32	<13	8.25	131	<4	<4	<3	<4	170	<5	48.8	30.5	21.1
AAB6375	3.78	0.27	408	<12	760	1.34	<13	<8	164	8.06	<4	<3	<4	105	<5	52.4	18.9	52.5
AAB6377	3.7	0.26	338	<12	798	1.25	<13	13	150	<4	<4	<3	5.06	66.4	<5	79.9	33.4	56.7
AAB6380	3.45	0.55	1035	<12	476	1.26	<13	9.56	54.7	<4	<4	<3	<4	142	<5	20	<8	16.2
AAB6381	3.35	0.41	1377	<12	721	1.6	<13	<8	77	<4	<4	<3	<4	161	<5	36.9	9	23
AAB6382	3.51	0.375	1192	<12	605	1.48	<13	13.1	86.7	<4	<4	<3	<4	118	<5	24.8	<8	15.2
AAB6383	3.69	0.36	1033	<12	710	1.64	<13	<8	69.7	<4	<4	<3	<4	99.1	<5	30.3	12.5	29.6
AAB6385	2.9	0.43	2323	<12	562	1.6	<13	8.6	66.6	<4	<4	<3	<4	299	<5	21.4	8.8	23.4
AAB6386	2.98	0.51	1618	<12	469	1.64	<13	<8	83.3	<4	<4	<3	<4	162	<5	31.5	11.8	29.9
AAB6387	3.03	0.45	1640	<12	933	1.55	<13	13.9	71.6	<4	<4	<3	<4	222	<5	30.3	<8	26.7
AAB6388	30.4	0.288	402	<12	826	1.4	<13	<8	134	<4	<4	<3	<4	91.6	<5	55	17.5	67.7
AAB6389	3.78	0.25	320	<12	804	1.25	<13	8.5	146	<4	<4	<3	<4	64.2	<5	59.7	25.8	61.7
AAB6391	2.75	0.51	2126	<12	469	1.64	<13	11.2	67.2	<4	<4	<3	<4	271	<5	24.8	<8	23.2
AAB6393	3.37	0.35	1183	<12	620	1.48	<13	9.6	73.4	<4	<4	<3	<4	91.5	<5	25.8	12.5	29.2
AAB6394	3.53	0.465	1200	<12	613	1.59	<13	<8	83.3	<4	<4	<3	<4	86.4	<5	32.7	10.7	25.3
AAB6396	2.93	0.42	1715	<12	599	1.7	<13	<8	78.4	<4	<4	<3	<4	225	<5	24.7	12.5	28.7
AAB6397	2.63	0.55	1549	<12	561	1.93	<13	13.7	93.9	<4	<4	<3	<4	163	<5	29.6	9.9	29.7
AAB6398	2.7	0.56	1525	<12	565	1.89	<13	<8	92.2	<4	<4	<3	5.58	190	<5	28	<8	30.5
AAB6399	2.91	0.55	1631	<12	494	1.53	<13	12	72.3	<4	<4	<3	<4	177	<5	25.9	9.9	21.7
AAB6400	3.14	0.43	872	<12	825	1.95	<13	<8	139	<4	<4	<3	<4	69.8	<5	52.8	19.6	54.2

NA = Not Analyzed

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Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6401	3.45	0.336	516	<12	906	1.58	<13	<8	153	<4	<4	<3	<4	81.9	<5	56.2	16	59.6
AAB6402	3.74	0.34	433	<12	797	1.49	<13	<8	152	<4	<4	<3	<4	71.4	<5	57.8	18	60
AAB6406	2.82	0.598	1961	15.4	503	1.55	<13	241	120	5.8	<4	28.3	<4	451	<5	26	21.2	<8
AAB6407	2.75	0.256	2137	26.1	294	1.94	<13	13.4	70.5	5.54	<4	<3	<4	204	<5	27.7	11.5	10.1
AAB6408	3.55	0.179	1305	<12	318	1.8	<13	<8	93	5.14	<4	<3	<4	100.5	<5	34.7	<8	24.2
AAB6411	3.61	0.23	643	<12	429	1.1	<13	<8	36.8	<4	<4	<3	<4	39.3	<5	20.7	<8	20.6
AAB6412	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6417	3.44	0.44	666	<12	810	1.38	<13	<8	117	<4	<4	<3	<4	106	<5	38.6	17.5	38.3
AAB6418	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6419	4.3	0.27	282	<12	718	1.13	<13	<8	130	<4	<4	<3	<4	14	<5	50	25	48
AAB6424	2.99	0.38	1960	23	575	1.72	<13	12	65	<4	<4	<3	<4	163	<5	30	<8	25
AAB6425	2.99	0.42	1339	<12	595	1.63	<13	<8	63	<4	<4	3	<4	159	<5	21	<8	21
AAB6426	3.61	0.19	664	<12	469	1.15	<13	<8	64	<4	<4	<3	<4	75	<5	18	<8	22
AAB6427	2.59	0.54	2290	15	406	2.128	<13	19	77	<4	<4	<3	<4	250	<5	25	45	18
AAB6429	3.4	0.31	450	<12	744	1.37	<13	9	143	<4	<4	<3	<4	46	<5	55	23	59
AAB6430	3.75	0.26	310	<12	694	1.11	<13	<8	143	<4	<4	<3	<4	26	<5	52	20	69
AAB6431	3.95	0.25	311	<12	732	1.11	18	<8	141	<4	<4	<3	<4	14	<5	50	22	62
AAB6433	2.81	0.44	1860	12	807	1.72	<13	<8	82	<4	<4	<3	<4	250	<5	29	8	25
AAB6435	3.17	0.33	1499	14	604	1.58	<13	18	77	<4	<4	<3	<4	113	<5	28	9	27
AAB6436	3.34	0.34	1166	<12	621	1.71	<13	<8	86	<4	<4	<3	<4	161	<5	34	13	28
AAB6437	2.69	0.43	1777	<12	613	1.76	<13	<8	65	<4	<4	<3	<4	224	<5	26	11	32
AAB6438	2.79	0.442	1799	<12	734	1.57	18.2	<8	73.9	<4	<4	<3	4.18	196	<5	30.8	12.9	15.9
AAB6440	3.33	0.33	587	<12	805	1.61	<13	<8	146	<4	<4	<3	<4	81	<5	53	20	54
AAB6441	3.78	0.26	426	<12	735	1.21	<13	<8	124	<4	<4	<3	<4	34	<5	47	19	50
AAB6442	3.9	0.25	285	<12	732	1.11	<13	<8	129	<4	<4	<3	<4	18	<5	47	20	51
AAB6443	3.83	0.25	292	<12	716	1.09	<13	<8	120	<4	<4	<3	<4	16	<5	48	24	52
AAB6448	3.23	0.34	1344	<12	545	1.49	<13	<8	68.1	<4	<4	<3	<4	170	<5	29.5	<5	22.7
AAB6449	2.88	0.369	1722	16.3	434	1.29	<13	<8	43.8	<4	<4	<3	<4	314	<5	19.8	14.7	39.8

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6450	3.27	0.385	1317	<12	604	1.74	<13	13.4	59.9	<4	<4	<3	5.01	166	<5	22.3	12.6	15.9
AAB6451	2.51	0.47	1671	19.4	780	2.25	<13	<8	90.7	<4	<4	<3	<4	233	<5	38.8	15.7	30.4
AAB6456	3.8	0.215	174	<12	640	0.91	<13	<8	117	<4	<4	<3	<4	38.5	<5	41.1	24.6	35.3
AAB6457	4.57	0.271	378	12.3	704	1.2	15.4	<8	151	<4	<4	<3	<4	<10	<5	60	20	58.1
AAB6458	4.09	0.25	267	<12	752	1.09	<13	8.6	141	<4	<4	<3	<4	22.7	<5	48.3	16.8	65.2
AAB6462	3.59	0.365	1273	<12	627	1.54	<13	8.15	88	<4	<4	<3	6.4	132	<5	35.2	<8	27.8
AAB6463	3.04	0.373	1564	17.3	525	1.68	<13	<8	80	<4	<4	<3	<4	210	<5	33.5	8.69	18.2
AAB6463D	3.04	0.424	2159	<12	780	2.4	<13	8.79	104	<4	<4	<3	<4	205	<5	22.7	16.9	13.4
AAB6464	2.71	0.48	2192	<12	537	1.66	<13	<8	66.5	<4	<4	<3	<4	276	<5	22.7	<8	19.4
AAB6466	2.87	0.478	1267	<12	437	1.34	<13	<8	81	5.58	<4	<3	<4	206	<5	25.3	<8	8.24
AAB6467	2.7	0.592	1872	21.6	520	1.77	<13	<8	85.6	<4	<4	<3	<4	282	<5	26.1	9.46	18.5
AAB6468	2.75	0.521	1283	20	800	1.83	<13	<8	129	<4	<4	<3	<4	255	<5	45.4	14.8	38.3
AAB6469	3.52	0.29	387	<12	804	1.4	<13	<8	143	<4	<4	<3	<4	68.2	<5	56.4	19.6	62.5
AAB6470	3.62	0.25	324	<12	640	1.01	<13	<8	120	<4	<4	<3	<4	39.5	<5	42.3	18	37.5
AAB6474	2.92	0.37	1634	<12	529	1.47	<13	<8	61.5	<4	<4	<3	<4	211	<5	28.5	11	27.9
AAB6475	3.29	0.314	1159	16	545	1.36	<13	<8	72.4	<4	<4	<3	<4	126	<5	24.4	<8	16.8
AAB6476	2.7	0.52	1827	<12	537	1.6	<13	8.3	67	<4	<4	<3	<4	230	<5	20.5	<8	16.8
AAB6477	2.84	0.962	2736	15.2	644	3.07	15.2	12.2	106	<4	<4	<3	<4	339	<5	32.9	<8	41
AAB6479	3.04	0.439	1036	<12	822	2.26	-13	<8	173	<4	<4	<3	<4	166	<5	51.9	25.2	45
AAB6480	3.54	0.235	312	<12	652	0.976	2.36	<8	125	<4	<4	<3	<4	53.4	<5	47.9	19.2	39.8
AAB6481	4.04	0.258	314	<12	610	1.07	<13	<8	131	11.5	<4	<3	<4	<10	<5	49.4	19.6	49.4
AAB6482	3.76	0.226	197	<12	615	0.879	<13	<8	113.5	<4	<4	<3	<4	28.8	<5	47.2	11.8	49.2
AAB6486	2.77	0.423	1753	17.4	417	1.39	<13	<8	55.3	<4	<4	<3	<4	253	<5	25.1	<8	21.2
AAB6487	3.22	0.36	1475	27.7	609	1.66	<13	10.4	79	<4	<4	<3	<4	137	<5	31	<8	29.8
AAB6488	3.2	0.5	1387	15.18	790	1.66	<13	10.1	72.9	<4	<4	<3	<4	219	<5	24	<8	13.7
AAB6488D	3.2	0.502	1386	15.2	790	1.66	<13	10.1	72.9	<4	<4	<3	<4	219	<5	24	<8	13.8
AAB6489	2.83	0.42	1783	<12	505	1.7	<13	10.6	75.8	<4	<4	<3	<4	222	<5	28.6	<8	26.2
AAB6490	2.53	0.462	2488	26.1	405	1.7	<13	14.2	49.7	<4	<4	<3	<4	360	<5	23.6	<8	12.9

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6491	3.03	0.356	1216	<12	704	1.82	<13	<8	76.6	<4	<4	<3	<4	202	<5	26.3	15.7	14.7
AAB6495	3.55	0.289	391	<12	749	1.36	<13	10.4	145	<4	<4	<3	<4	60.4	<5	48.9	30.5	48.1
AAB6495D	3.55	0.289	391	<12	749	1.37	<13	10.4	145.4	<4	<4	<3	<4	60.5	<5	49	30.6	48.1
AAB6496	3.91	0.26	335	<12	789	1.24	<13	9.7	133	<4	<4	<3	<4	41.7	<5	50.8	23.3	65.5
AAB6497	3.8	0.253	246	<12	679	1.06	<13	<8	118	<4	<4	<3	<4	23.7	<5	43.5	27.3	22.3
AAB6499	3.79	0.279	535	<12	656	1.13	<13	<8	103.3	4.75	<4	<3	<4	57.6	<5	39.8	27.5	31.7
AAB6502	3.09	0.46	2117	16.3	431	1.7	<13	11.2	71.7	<4	<4	<3	<4	255	<5	25.5	<8	22.3
AAB6503	3	0.5	1957	<12	414	1.67	<13	9.6	69.4	<4	<4	<3	5.06	278	<5	26.7	<8	19.3
AAB6504	3.24	0.5	1994	12.7	479	1.63	<13	9.3	74.8	<4	<4	<3	<4	233	<5	17.6	<8	21.3
AAB6505	3.63	0.43	1204	<12	478	1.31	<13	8.64	54.9	<4	<4	<3	<4	169	<5	25	10.2	30.4
AAB6506	4.09	0.43	635	<12	502	1.17	<13	<8	70.6	<4	<4	<3	<4	74	<5	29.6	12.3	25.4
AAB6507	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6508	3.88	0.41	692	<12	481	1.14	<13	11.3	71.2	<4	<4	<3	<4	78.1	<5	22	8.65	26
AAB6509	3.8	0.35	538	<12	455	1.08	<13	<12	73.3	<4	<4	<3	<4	65.1	<5	24.9	12.4	23.5
AAB6511	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6513	3.15	0.36	1844	16.5	490	1.59	<13	<8	74.2	<4	<4	<3	<4	203	<5	23.4	<8	26.5
AAB6516	3.2	0.47	2273	<12	509	1.84	15.5	<8	60.8	<4	<4	<3	<4	292	<5	26.2	9.6	29.1
AAB6517	3.09	0.5	2195	19.7	468	1.73	<13	15.6	66.3	<4	<4	<3	<4	313	<5	24	<8	18
AAB6518	3.93	0.468	1100	<12	562	1.31	<13	9.19	70.8	<4	<4	<3	<4	113	<5	26.4	<8	21.4
AAB6519	3.79	0.47	924	<12	524	1.18	<13	<8	65.2	<4	<4	<3	<4	203	<5	21.1	11.6	25.4
AAB6521	4	0.42	713	<12	499	1.15	<13	8.2	76.3	<4	<4	<3	<4	92.6	<5	22.5	11.7	25.7
AAB6522	3.45	0.55	1035	<12	476	1.26	<13	9.56	54.7	<4	<4	<3	<4	142	<5	20	<8	16.2
AAB6523	3.83	0.38	639	<12	493	1.14	<13	<8	78.7	<4	<4	<3	<4	48.6	<5	24.2	<8	27.7
AAB6528	3.42	0.327	1454	<12	510	1.53	<13	<8	87.8	<4	<4	<3	<4	203	<5	26.9	13.5	25.4
AAB6529	3.04	0.444	2095	27.4	416	1.48	<13	<8	55.5	5.18	<4	<3	<4	315	<5	20	<8	17.5
AAB6530	3.35	0.497	1997	12.7	420	1.59	<13	19.9	78.5	<4	<4	<3	<4	312	<5	23.4	<8	22.3
AAB6531	4.14	0.461	1302	<12	458	1.41	<13	<8	82.1	<4	<4	<3	<4	199	<5	27.4	12	24.4
AAB6533	4.31	0.4	692	<12	425	1.13	<13	<8	84.7	<4	<4	<3	<4	89.1	<5	22.4	9.19	18.5

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6534	4.06	0.4	676	<12	442	1.12	15.2	<8	84.7	<4	<4	<3	<4	88	<5	28.8	12.5	31.3
AAB6540	3.35	0.383	2062	<12	401	1.61	<13	14.3	75.1	<4	<4	<3	<4	234	<5	27.9	<8	16.4
AAB6541	3.37	0.406	2030	<12	391	1.65	<13	18.4	78.9	<4	<4	<3	<4	251	<5	27.5	<8	25.4
AAB6544	3.27	0.509	2408	16.2	434	1.75	<13	18.7	72.7	<4	<4	<3	<4	353	<5	25.5	12.2	19.5
AAB6545	3.59	0.402	1184	14.8	424	1.17	<13	<8	56.9	<4	<4	<3	<4	189	<5	21.5	<8	21.4
AAB6547	3.6	0.402	799	<12	429	1.03	<13	<8	54.9	<4	<4	<3	<4	126	<5	17.1	13	<8
AAB6548	4.09	0.25	267	<12	752	1.09	<13	8.6	141	<4	<4	<3	<4	22.7	<5	48.3	16.8	65.2
AAB6549	3.77	0.337	555	<12	423	0.971	<13	<8	53.3	<4	<4	<3	<4	69.6	<5	20.6	10.9	13.2
AAB6553	3.75	0.405	558	2.86	419	0.977	<13	<8	69.4	4.22	<4	<3	<4	108	<5	17.7	13.1	<8
AAB6554	2.68	0.477	2123	15.7	448	2.58	<13	<8	93.9	<4	<4	<3	<4	275	<5	29.1	<8	22
AAB6555	2.99	0.449	2060	12.1	501	2.26	17	17.8	77.2	5.18	<4	<3	5.15	244	<5	29	<8	15.3
AAB6556	3.18	0.491	2277	19.5	385	1.75	<13	12.2	71.2	<4	<4	<3	<4	326	<5	23.6	<8	14.9
AAB6557	3.85	0.415	1239	18.6	467	1.33	<13	11.1	73.3	<4	<4	<3	<4	190	<5	27.7	<8	29.1
AAB6559	3.54	0.432	1732	14.4	435	1.46	<13	16.3	73.2	<4	<4	<3	<4	268	<5	26.9	<8	17
AAB6560	4.38	0.415	743	<12	452	1.17	<13	<8	63.9	<4	<4	<3	<4	82.7	<5	33.7	<6	31.7
AAB6561	3.92	0.356	660	<12	411	1.08	<13	<8	78.2	<4	<4	<3	<4	55.9	<5	20.4	<8	17.7
AAB6567	3.36	0.336	1158	<12	467	1.78	<13	<8	64.4	<4	<4	<3	<4	128	<5	23.2	<8	20.4
AAB6568	3.04	0.426	2095	<12	402	1.59	<13	18.1	72.3	<4	<4	<3	<4	313	<5	22.2	8.24	12.5
AAB6570	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6572	3.46	0.5	1972	<12	456	1.58	<13	16.1	72.2	<4	<4	<3	<4	291	<5	30.1	<8	21.1
AAB6573	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6574	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6575	2.73	0.61	1744	21	432	2.01	<13	<8	85	<4	<4	<3	<4	193	<5	22.3	<8	26.3
AAB6576	3.52	0.29	347	<12	765	1.37	<13	<8	139	<4	<4	<3	<4	33.8	<5	50.4	20.8	67.1
AAB6577	3.72	0.28	283	<12	740	1.15	<13	<12	142	<4	<4	<3	<4	33.1	<5	50.2	22.7	61.2
AAB6578	3.81	0.299	306	<12	736	1.79	<13	9.05	128	<4	<4	<3	<4	27.9	<5	51.9	19.6	62.9
AAB6582	3.19	1.19	2055	13.2	477	1.65	<13	11.6	103	<4	<4	<3	5.1	260	<5	30.4	11.1	23.6
AAB6586	3.54	0.504	1388	<12	525	1.49	<13	19	84.9	<4	<4	<3	<4	165	<5	33.8	10.1	30.6

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB6590	3.07	0.422	1066	22.7	457	1.32	<13	<8	78.6	<4	<4	<3	<4	193	<5	29.8	<8	21.4
AAB6591	3.36	0.475	1127	42	547	1.52	<13	<8	55.3	<4	<4	<3	<4	205	<5	22.9	<8	10.3
AAB6592	3.37	0.365	667	13.9	685	1.25	13.7	<8	114	<4	<4	<3	<4	130	<5	36.8	19	25.9
AAB6593	4.18	0.303	483	<12	775	1.41	<13	<8	164	<4	<4	<3	<4	67.6	<5	61.8	20.6	57.2
AAB6596	3.49	0.465	1570	<12	495	1.57	<13	14.04	72.3	<4	<4	<3	<4	168	<5	32.5	<8	14.1
AAB6597	3.77	0.367	967	<12	535	1.34	<13	9.95	85.8	<4	<4	<3	<4	133	<5	32.6	<8	22.6
AAB6598	3.59	0.423	1416	17	596	1.48	<13	<8	78.2	6.21	<4	<3	<4	125	<5	23.1	<8	14.7
AAB6599	3.51	0.472	1277	<12	496	1.38	<13	<8	83.8	4.49	<4	<3	5.03	178	<5	25.2	10.2	22.5
AAB6601	3.23	0.468	1229	<12	796	2.23	<13	<8	150	<4	<4	<3	<4	140	<5	52	<8	57.7
AAB6602	3.75	0.302	507	<12	762	1.47	<13	9.94	161	<4	<4	<3	<4	117	<5	56.2	18.4	52.7
AAB6605	2.65	0.574	2309	41	468	1.77	<13	79	69.6	<4	<4	4.61	<4	397	<5	22.6	<8	13
AAB6606	2.48	0.576	2692	50.8	394	1.95	<13	97.4	71	<4	<4	3.81	4.44	444	<5	21.7	<8	12.7
AAB6607	3.06	0.47	1053	13.3	418	1.41	17	<8	73.5	<4	<4	<3	<4	166	<5	21.7	9.74	15.1
AAB6608	3.11	0.39	994	22.2	529	1.41	<13	25.4	68.8	<4	<4	<3	<4	149	<5	23.5	11.7	20
AAB6609	3.3	0.472	851	13.2	701	1.62	<13	<8	65.4	<4	<4	<3	<4	124	<5	17.9	<8	16.2
AAB6611	3.22	0.425	1211	21.7	747	1.41	<13	10.3	76.8	<4	<4	<3	<4	202	<5	21.5	11.7	19.6
AAB6613	3.37	0.272	308	<12	678	1.25	<13	10.8	129	<4	<4	<3	<4	134	<5	45.6	13.5	48.5
AAB6616	3.16	0.437	1098	14	519	1.72	13.6	9.3	70	<4	<4	<3	<4	136	<5	24.3	<8	21.3
AAB6619	2.93	0.458	1068	<12	377	1.22	<13	<8	60.5	<4	<4	<3	<4	175	<5	19.2	11.5	21.2
AAB6622	3.16	0.413	890	<12	490	1.3	<13	<8	63.7	<4	<4	<3	<4	173	<5	27.7	12.8	20.7
AAB6624	3.35	0.249	370	<12	642	0.986	<13	<8	105	<4	<4	<3	<4	101	<5	35.7	24	37.9
AAB8643	3.17	0.415	752	<12	449	0.955	<13	<8	51.2	<4	<4	<3	<4	206	<5	20.9	<8	10.8
AAB8644	2.74	0.533	1572	24.3	650	1.96	<13	<8	92	<4	<4	<3	<4	234	<5	31.4	<8	28.5
AAB8645	3.2	0.55	2512	<12	452	1.83	21	19.4	69.7	<4	<4	<3	<4	442	<5	27.1	12.2	25.2
AAB8646	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB8648	4.03	0.43	985	<12	433	1.21	<13	12.9	71	<4	<4	<3	<4	137	<5	26.4	9.88	26.4
AAB8649	4.06	0.397	713	<12	415	1.09	<13	8.51	75.1	<4	<4	<3	<4	63.9	<5	24.3	13.1	19.9
AAB8650	4.08	0.344	691	<12	423	1.1	<13	11.1	71.7	<4	<4	<3	<4	50	<5	27.7	<8	23.4

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB8654	3.2	0.303	1401	<12	367	1.27	14.5	9.08	56.4	<4	<4	<3	<4	178	<5	22.9	17.6	18.9
AAB8657	3.39	0.374	1946	<12	463	1.54	<13	11.8	70.6	<4	<4	<3	<4	288	<5	24.1	<8	12.1
AAB8658	3.08	0.406	2199	<12	415	1.62	<13	11.9	63.9	<4	<4	<3	<4	342	<5	22.5	<8	16.3
AAB8659	3.33	0.472	2087	<12	404	1.56	<13	16	72	<4	<4	<3	5.08	278	<5	23.5	<8	19.3
AAB8660	4.06	0.434	1268	0.493	432	1.32	<13	11.6	76.3	5.31	<4	<3	4.06	175	<5	25.3	<8	20.9
AAB8662	3.89	0.397	622	<12	434	0.998	<13	<8	61.9	<4	<4	<3	<4	123	<5	21.9	10.2	16.2
AAB8663	4.04	0.399	660	<12	406	1.09	<13	<8	78.9	<4	<4	<3	<4	109	<5	24.5	10.6	11.9
AAB8664	3.79	0.35	649	<12	402	1.07	<13	8.83	77.9	<4	<4	<3	<4	96.3	<5	24.3	<8	17.3
AAB8669	3.13	0.393	1987	19.1	414	1.55	<13	<8	73.9	<4	<4	<3	<4	278	<5	24.3	<8	15.2
AAB8671	3.39	0.42	2030	<12	430	1.61	<13	12.4	67	<4	<4	<3	5.57	303	<5	27.4	<8	23.4
AAB8672	3.46	0.5	1972	<12	456	1.58	<13	16.1	72.2	<4	<4	<3	<4	291	<5	30.1	<8	21.1
AAB8673	3.84	0.451	1394	10.4	436	1.37	<13	8.15	79.1	6.9	<4	<3	<4	196	<5	25	<8	16.4
AAB8675	4.26	0.423	744	<12	427	1.13	<13	9.05	81.3	<4	<4	<3	<4	96.4	<5	23.8	8.69	23
AAB8676	3.99	0.405	776	<12	423	1.11	<13	<8	73.3	<4	<4	<3	<4	111	<5	24.4	20.7	26.9
AAB8677	4.01	0.397	730	<12	442	1.14	<13	<8	89.7	<4	<4	<3	<4	75.3	<5	26.7	8.38	29.2
AAB8681	3.25	0.379	2004	12.4	362	1.57	<13	12	71.6	<4	<4	<3	<4	287	<5	26.7	<8	29.9
AAB8682	3.42	0.422	1876	<12	409	1.61	<13	8.39	69.9	11	<4	<3	<4	310	<5	32.2	<8	31.5
AAB8683	3.77	0.469	2088	<12	451	1.76	<13	9.64	75.6	<4	<4	<3	<4	252	<5	31.4	9.1	24.6
AAB8684	3.1	0.548	2857	<12	427	1.89	<13	9.38	65.8	<4	<4	<3	<4	377	<5	27.3	13.6	17.8
AAB8689	4.08	0.437	794	<12	460	1.16	14.3	13.2	69.9	<4	<4	<3	<4	130	<5	26.5	12.2	28.9
AAB8690	2.91	0.469	1934	13.2	444	1.6	<13	33	66.6	6.96	<4	<3	<4	306	<5	26.2	<8	25.5
AAB8692	3.42	0.422	1876	<12	409	1.61	<13	8.39	69.9	11	<4	<3	<4	310	<5	32.2	<8	31.5
AAB8692D	2.99	0.405	2114	<12	360	1.66	<13	11.5	67	<4	<4	<3	<4	291	<5	26.2	8.8	20
AAB8693	3.41	0.403	1776	15.7	438	1.64	18.2	8.22	75.1	<4	<4	<3	<4	287	<5	25.6	<8	23.3
AAB8694	2.91	0.517	2669	18.7	506	1.85	16.5	10.6	86.3	<4	<4	<3	<4	369	<5	24.1	<8	16
AAB8695	3.73	0.439	1231	<12	484	1.45	<13	13.5	75	<4	<4	<3	<4	242	<5	24.1	8.17	31.8
AAB8696	3.46	0.482	1595	<12	445	1.45	<13	12.2	69.7	<4	<4	<3	<4	260	<5	21.9	14.8	20.3
AAB8698	3.98	0.4	728	<12	406	1.1	5.47	<8	73.5	<4	<4	<3	<4	86.6	<5	22.7	<8	22.8

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB8699	3.96	0.4	740	<12	407	1.09	<13	<8	68.6	9.31	<4	<3	<4	76.2	<5	23	<8	17.6
AAB8700	2.63	0.625	2374	23.1	561	1.91	<13	<8	64.2	5.36	<4	<3	<4	348	<5	11.9	<8	17.6
AAB8702	2.78	0.397	2145	17.2	416	1.74	<13	9.92	65.8	5.37	<4	<3	<4	278	<5	17.5	16.5	<8
AAB8703	2.98	0.346	1794	13.6	403	1.41	<13	<8	64.7	<4	<4	<3	<4	255.5	<5	21.6	11.9	<8
AAB8704	2.88	0.458	2150	23.8	425	1.56	<13	12.5	62.1	4.69	<4	<3	<4	352	<5	16.4	13.3	<8
AAB8705	3.4	0.442	1279	<12	446	1.21	<13	<8	53.9	4.33	<4	<3	<4	215	<5	16.2	10.7	<8
AAB8706	3.47	0.452	1139	<12	488	1.23	<13	<8	69.2	<4	<4	<3	<4	202	<5	17.5	15.2	<8
AAB8707	3.55	0.418	1306	13.3	453	1.2	<13	<8	55.3	<4	<4	<3	<4	225	<5	19.3	12.5	<8
AAB8708	3.48	0.273	795	<12	488	1.14	<13	<8	66.8	5.25	<4	<3	<4	132	<5	16.6	13.7	<8
AAB8710	4.3	0.433	748.5	<12	452.5	1.19	<13	9.98	80.1	<4	<4	<3	<4	84.3	<5	29.03	9.8	32.7
AAB8711	3.89	0.337	625	<12	435	0.999	<13	<8	69.3	<4	<4	<3	<4	59.8	<5	21.7	16.6	<8
AAB8713	3.48	0.472	927	<12	808	1.31	<13	<8	95.8	<4	<4	<3	<4	188	<5	36.1	29.6	<8
AAB8716	2.9	0.405	1971	19.8	363	1.5	<13	14.9	58.4	4.42	<4	<3	<4	309	<5	20.3	20.1	<8
AAB8717	4.05	0.397	729	<12	468	1.1	<13	13.3	85.7	<4	<4	<3	<4	103	<5	26.4	13.3	23.7
AAB8718	3.95	0.407	751	<12	446	1.1	<13	12.1	80.6	<4	<4	<3	<4	94.4	<5	25.3	10.2	30.9
AAB8720	4.05	0.385	682	<12	469	1.15	<13	<8	81.2	<4	<4	<3	<4	87.5	<5	26.7	8.94	23.5
AAB8721	3.92	0.281	480	<12	601	1.11	<13	12.3	126	4.79	<4	<3	<4	21.7	<5	42.9	17	29
AAB8723	3.95	0.37	699	<12	454	1.1	<13	12.9	78.8	<4	<4	<3	<4	63.8	<5	24.8	11.1	28.1
AAB8726	4.17	0.253	403	<12	648	1.12	<13	13.7	144	<4	<4	<3	<4	11	<5	43.7	21.4	50.3
AAB9201	2.94	0.412	1567	15.4	408	1.37	<13	<8	58.7	<4	<4	<3	<4	240	<5	19.2	<8	13.1
AAB9202	3.1	0.594	3152	12.9	484	2.08	<13	15.2	74.4	<4	<4	<3	<4	409.2	<5	25.9	13.2	23.2
AAB9203	3.98	0.479	1261	<12	457	1.37	14	12.5	78	<4	<4	<3	<4	194	<5	24.6	<8	24.1
AAB9206	3.68	0.397	718	<12	422	0.989	<13	<8	65.9	4.04	<4	<3	<4	106.6	<5	15.4	15.01	<8
AAB9207	3.61	0.384	653	<12	420	0.979	<13	<8	66.1	7.78	<4	<3	<4	95	<5	13.5	19.3	<8
AAB9208	4.11	0.388	685	<12	445	1.17	<13	<8	82.5	6.77	<4	<3	<4	82.5	<5	26.1	14.5	23.5
AAB9212	2.77	0.395	1848	26.7	369	1.52	<13	13.7	65.2	<4	<4	<3	<4	273	<5	20.3	12.8	14.3
AAB9213	3.06	0.401	1419	26.3	389	1.41	<13	<8	59.7	<4	<4	<3	<4	260	<5	27.1	8.55	27.3
AAB9214	2.92	0.442	1796	31	420	1.55	<13	18.5	54.6	<4	<4	<3	<4	338	<5	19.4	<8	16.3

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB9215	3.24	0.444	1137	21.3	414	1.24	<13	<8	59.4	<4	<4	<3	<4	178	<5	23.3	8.89	18.6
AAB9217	3.68	0.376	466	<12	431	0.958	<13	<8	60.5	<4	<4	<3	<4	98.3	<5	22.5	15	19.2
AAB9220	3.74	0.362	567	<12	434	0.976	<13	<8	60.2	<4	<4	<3	<4	91.8	<5	21.5	9.42	15.9
AAB9221	3.62	0.358	531	<12	411	0.947	<13	<8	59.8	<4	<4	<3	<4	89.3	<5	20.6	16	17.6
AAB9225	2.87	0.432	1510	31.2	442	1.41	<13	21	58.6	<4	<4	<3	<4	247	<5	24.8	<8	16.5
AAB9228	2.76	0.505	1934	35.1	459	1.48	<13	11.5	57.8	<4	<4	<3	<4	354	<5	15.4	9.4	15.3
AAB9229	3.51	0.423	995	12.7	422	1.18	<13	<8	57.5	<4	<4	<3	<4	204	<5	16.1	14.6	17.1
AAB9230	3.76	0.388	582	<12	418	0.961	<13	<8	63.4	<4	<4	<3	<4	96	<5	21.4	<8	18.7
AAB9232	3.69	0.371	594	<12	440	0.952	<13	8.73	63.3	<4	<4	<3	<4	87.4	<5	23	18.2	21.8
AAB9233	3.75	0.385	546	<12	434	0.972	<13	9.61	62.5	<4	<4	<3	<4	84.2	<5	20.2	8.84	21.8
AAB9237	2.75	0.566	1948	28.4	521	1.86	<13	<8	65.4	<4	<4	<3	<4	328	<5	27.2	8.4	19.8
AAB9238	2.48	0.738	2211	30.1	374	1.95	<13	<8	44	<4	<4	<3	<4	359	<5	19.9	<8	18
AAB9239	2.69	0.667	1887	19	495	1.71	5.35	31	61	<4	<4	<3	<4	371	<5	22	<8	15.9
AAB9240	2.9	0.523	2129	23.3	398	1.55	15.4	12.9	55.5	<4	<4	<3	<4	353	<5	17.2	<8	11.2
AAB9241	3.41	0.443	1191	16.7	448	1.22	13.4	<8	71.7	<4	<4	<3	<4	215	<5	21.3	<8	14.3
AAB9243	3.82	0.401	592	<12	403	0.932	<13	<8	46.7	<4	<4	<3	<4	101	<5	20	<8	15.8
AAB9244	3.64	0.384	467	<12	409	0.933	<13	10	60.2	<4	<4	<3	<4	86.8	<5	21.9	8.94	19
AAB9245	3.74	0.342	558	<12	452	0.958	<13	<8	66.9	<4	<4	<3	<4	71.7	<5	21.2	17	11.6
AAB9249	3.38	0.198	471	<12	393	0.956	<13	<8	30.6	<4	<4	<3	<4	51.4	<5	23	<8	14.4
AAB9250	2.9	0.451	1321	<12	389	1.28	<13	<8	66.2	<4	<4	<3	<4	189	<5	21	9.24	15.8
AAB9252	2.94	0.422	981	<12	484	1.51	<13	<8	83.9	<4	<4	<3	<4	175	<5	26.8	12.3	23.4
AAB9258	2.74	0.503	1435	29.6	600	2.18	<13	9.02	97.4	<4	<4	<3	<4	190	<5	[illegible]	8.78	16.3
AAB9259	2.86	0.462	1303	18.7	557	2	<13	<8	92.6	<4	<4	<3	<4	179	<5	31.5	12.2	27.2
AAB9261	2.93	0.428	1663	12.4	367	1.46	<13	<8	56.1	<4	<4	<3	<4	246	<5	20.9	8.31	17.1
AAB9264	2.97	0.521	1566	24.3	589	1.83	<13	<8	78.8	<4	<4	<3	<4	239	<5	32.4	9.49	16.9
AAB9266	3.67	0.258	345	<12	665	1.08	<13	<8	118	<4	<4	<3	<4	86.7	<5	46.1	21.1	46.5
AAB9270	2.9	0.453	1248	23.1	578	1.9	<13	<8	101	<4	<4	<3	<4	167	<5	26.6	8.34	19.8
AAB9273	3.56	0.412	1113	29.4	549	1.53	<13	<8	74.8	<4	<4	<3	<4	136	<5	19.3	<8	19.9

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB9275	3.33	0.285	465	<12	771	1.3	<13	<8	137	<4	<4	<3	<4	126	<5	46.7	16.2	47.3
AAB9276	3.36	0.271	275	<12	703	1.15	<13	<8	129	<4	<4	<3	<4	131	<5	47.1	14.6	42.4
AAB9279	3.03	0.43	1646	17.4	606	1.8	<13	8.52	68.9	<4	<4	<3	<4	220	<5	25	<8	15.1
AAB9280	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9282	2.95	0.502	1167	14.3	506	1.53	<13	<8	78.1	<4	<4	<3	<4	196	<5	27.7	11.7	18.7
AAB9284	3.55	0.222	159	<12	589	0.892	<13	10.8	111	<4	<4	<3	<4	32.7	<5	42.9	17.6	45.9
AAB9285	3.54	0.237	371	<12	660	0.982	<13	<8	114	<4	<4	<3	<4	43.6	<5	57.6	17.9	39.2
AAB9288	2.8	0.435	2077	40.3	628	1.49	<13	16.7	54.5	<4	<4	<3	<4	370	<5	21.6	<8	12.5
AAB9290	3.1	0.45	1212	23.6	432	1.39	<13	<8	79.6	<4	<4	<3	<4	256	<5	18.4	12	14.4
AAB9294	3.61	0.228	240	<12	615	0.878	<13	<8	98.2	<4	<4	<3	<4	26.6	<5	40.1	24.6	41.6
AAB9295	3.6	0.23	253	13.7	643	0.967	16.4	<8	116	<4	<4	<3	<4	29.6	<5	43.4	26.9	36.4
AAB9298	2.76	0.423	2542	37.9	750	3.1	<13	<8	104	<4	<4	<3	<4	261	<5	23.7	10	34.4
AAB9299	2.93	0.438	1878	23.8	771	2.32	<13	<8	82.1	<4	<4	<3	<4	256	<5	28.7	<8	22
AAB9305	2.86	0.475	1416	21	473	1.39	<13	8.7	54.5	5.38	<4	<3	<4	246	<5	19.4	<8	13.9
AAB9306	3.67	0.221	198	<12	671	0.919	<13	<8	112	7.81	<4	<3	<4	31.7	<5	39.7	15.4	33.9
AAB9307	3.68	0.232	308	<12	663	0.939	<13	<8	113	<4	<4	<3	<4	18.4	<5	43.9	16.8	35.7
AAB9311	2.57	0.423	1615	25.3	674	1.46	<13	<8	60	<4	<4	<3	<4	311	<5	19.2	<8	16.7
AAB9312	2.84	0.4	1619	22.4	456	1.41	<13	<8	62.5	<4	<4	<3	<4	246	<5	23.2	<8	23.7
AAB9314	2.75	0.537	1854	31.6	379	1.64	14	<8	73.5	<4	<4	<3	<4	294	<5	25.8	<8	16
AAB9316	3.58	0.401	630	<12	493	1.07	<13	8.5	62.7	<4	<4	<3	<4	146	<5	19.9	12.1	22.9
AAB9318	3.05	0.449	1299	14.9	637	1.81	<13	<8	80.6	<4	<4	<3	<4	129	<5	24.4	16	20.8
AAB9321	2.96	0.454	1238	19.6	385	1.37	<13	<8	70.9	<4	<4	<3	<4	199	<5	20.9	11.1	18.1
AAB9323	2.9	0.436	1455	15.9	358	1.32	<13	<8	67	7.15	<4	<3	<4	199	<5	17.9	8.77	21.2
AAB9325	3.52	0.244	328	<12	710	1.1	<13	<8	125	<4	<4	<3	<4	69.4	<5	45.3	27.6	40.4
AAB9328	2.72	0.459	1915	25.1	643	1.95	<13	<8	73.8	<4	<4	<3	<4	292	<5	23.6	<8	17.9
AAB9329	2.95	1.24	2425	27.7	592	2.3	<13	<8	46.6	<4	<4	<3	<4	295	<5	21.9	8.15	16.6
AAB9331	2.56	0.497	1786	26.9	429	1.83	<13	<8	76.3	<4	<4	<3	<4	295	<5	21.9	8.15	16.6
AAB9332	2.4	0.538	2013	30.8	500	1.93	<13	9.36	71	<4	<4	<3	<4	307	<5	22	10.1	19.6

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB9334	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9335	3.71	0.221	149	<12	659	0.97	<13	16.2	108	<4	<4	<3	<4	31.8	<5	45.5	22.8	37.7
AAB9337	3.52	0.252	350	0.596	626	1.03	<13	<8	120	<4	<4	<3	<4	46.9	<5	45.5	24.7	43.8
AAB9345	2.7	0.494	1467	20.2	527	1.69	<13	<8	88.6	<4	<4	<3	<4	245	<5	25.3	<8	17.2
AAB9346	2.87	0.476	1297	14.9	345	1.26	<13	13.4	73.9	<4	<4	<3	<4	198	<5	25.2	<8	19.7
AAB9348	3.14	0.33	644	<12	684	1.36	<13	9.12	98.6	<4	<4	<3	<4	75.9	<5	41.5	17.5	43
AAB9349	3.61	0.273	265	<12	685	1.1	<13	<8	114	<4	<4	<3	<4	62.2	<5	43.6	13.2	44.3
AAB9352	3.45	0.115	394	21.1	357	1.08	<13	<8	57.4	<4	<4	<3	<4	75.4	<5	19.4	8.23	13.8
AAB9353	2.69	0.548	1489	20.8	557	2.16	<13	<8	81.8	6.05	<4	<3	<4	189	<5	22.6	11.1	18.1
AAB9355	3.45	0.282	687	<12	487	1.11	<13	12.3	74.6	<4	<4	<3	<4	105	<5	28.4	<8	18.2
AAB9356	3.39	0.39	796	20.8	487	1.12	<13	<8	71.2	<4	<4	<3	<4	143	<5	27.8	<8	13.4
AAB9358	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9365	2.62	0.468	1458	17.3	507	1.78	<13	<8	70.8	<4	<4	<3	<4	224	<5	25.1	<8	16.1
AAB9366	3.02	0.463	1380	14.2	460	1.3	<13	13.2	71.3	<4	<4	<3	<4	222	<5	25.6	9.06	19.9
AAB9367	2.8	0.519	1427	15.3	879	2.26	<13	<8	109	<4	<4	<3	<4	214	<5	38.5	11.7	37.7
AAB9370	2.61	0.825	2390	35.9	373	1.57	<13	10.5	54.7	<4	<4	<3	<4	356	<5	17.6	<8	10
AAB9371	2.5	0.613	2393	42.7	364	1.56	<13	<8	46.7	<4	<4	<3	<4	350	<5	19.6	<8	15.1
AAB9372	3.01	0.404	1404	14.7	423	1.79	<13	<8	70.8	<4	<4	<3	<4	198	<5	21.1	<8	19.6
AAB9376	3.45	0.373	528	14.3	658	1.16	<13	<8	98.8	<4	<4	<3	<4	86.7	<5	34.7	20.1	32.4
AAB9377	3.68	0.395	565	<12	380	1	<13	<8	58.2	<4	<4	<3	<4	104	<5	20.9	12.9	22.3
AAB9378	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9379	3.83	0.385	621	<12	394	0.975	<13	<8	69.7	<4	<4	<3	<4	70.7	<5	15.9	11.8	22.3
AAB9383	2.5	0.821	2144	26.4	396	1.64	<13	<8	46	<4	<4	<3	<4	362	<5	17.1	<8	10.1
AAB9386	3.16	0.287	1081	16.8	473	1.32	<13	<8	74	<4	<4	<3	<4	153	<5	20	<8	21.3
AAB9387	3.18	0.395	1129	16.2	501	1.43	<13	<8	67.8	<4	<4	<3	<4	164	<5	17.9	<8	11.5
AAB9391	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9393	3.73	0.227	196	18.8	645	0.928	<13	<8	105	<4	<4	<3	<4	32.7	<5	40.9	19	31.8
AAB9398	3.08	0.318	569	<12	750	1.37	<13	9.82	131	<4	<4	<3	<4	154	<5	43.9	23.9	40.4

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB9421	2.65	0.589	1827	38.5	603	2.46	<13	13.5	103	<4	<4	<3	<4	283	<5	32.5	<8	26.3
AAB9423	3.22	0.462	1193	17.7	624	1.62	<13	8.03	70.1	<4	<4	<3	<4	186	<5	21.7	<8	20.3
AAB9425	3.41	0.259	323	<12	674	1.12	<13	<8	111	<4	<4	<3	<4	49.9	<5	48.2	17.6	44.3
AAB9426	3.55	0.274	430	<12	701	1.09	<13	<8	120	<4	<4	<3	<4	85.9	<5	40.5	20.3	43.3
AAB9430	2.7	0.352	1445	13.5	354	1.3	<13	<8	54.5	<4	<4	<3	<4	250	<5	17.6	<8	15.2
AAB9431	2.93	0.433	1395	20.8	459	1.34	<13	12.3	61.1	<4	<4	<3	<4	289	<5	17.2	<8	<8
AAB9432	2.69	0.524	2110	27.6	442	1.53	<13	9.98	56.3	<4	<4	<3	<4	345	<5	19.1	8.21	14.2
AAB9434	3.87	0.396	531	<12	404	0.954	<13	<8	62.2	<4	<4	<3	<4	119	<5	21.8	<8	15.4
AAB9435	3.81	0.379	476	<12	427	0.953	<13	<8	70.2	<4	<4	<3	<4	95	<5	20.1	<8	19.9
AAB9436	3.61	0.385	504	<12	439	0.959	<13	<8	66.9	<4	<4	<3	<4	96.8	<5	22.5	11.5	20.8
AAB9437	3.65	0.348	461	<12	409	0.962	<13	11.3	65.4	<4	<4	<3	<4	64.6	<5	22.5	<8	26.9
AAB9444	3.06	0.336	1021	18	516	1.48	<13	<8	77.1	<4	<4	<3	<4	146	<5	26.9	<8	12.7
AAB9445	3.18	0.359	1185	14.3	552	1.51	14.1	<8	76.1	<4	<4	<3	<4	185	<5	28.2	<8	16.7
AAB9446	2.95	0.468	1458	25.2	552	2.07	<13	<8	91.4	<4	<4	<3	<4	163	<5	30.4	13.7	22.9
AAB9447	3.19	0.323	1063	<12	569	1.37	<13	<8	69.1	<4	<4	<3	<4	157	<5	25.3	<8	20.6
AAB9449	2.83	0.462	1860	22.3	546	1.6	<13	15.2	74.6	<4	<4	<3	<4	292	<5	20	11.8	15.8
AAB9450	2.91	0.471	1613	19.7	490	1.4	<13	<8	58.7	4.71	<4	<3	<4	219	<5	20.7	<8	12
AAB9452	3.15	0.302	603	<12	778	1.12	<13	<8	107	<4	<4	<3	<4	70.6	<5	43.4	25	45
AAB9453	2.91	0.384	1491	27.5	544	1.88	<13	9	75.6	<4	<4	<3	<4	145	<5	32.6	<8	21.4
AAB9456	3.1	0.387	1193	18.7	518	1.58	<13	<8	69.7	<4	<4	<3	<4	168	<5	26	11	16.7
AAB9457	2.99	0.337	1398	15.3	526	1.63	<13	<8	71.8	<4	<4	<3	<4	181	<5	26.1	<8	18.8
AAB9460	2.75	0.49	1852	18.3	432	1.71	<13	10	54.4	<4	<4	<3	<4	311	<5	20.6	<8	15.7
AAB9462	2.93	0.334	1262	<12	443	1.23	<13	<8	49.2	<4	<4	<3	<4	223	<5	21.4	<8	15.6
AAB9463	3.17	0.295	427	<12	653	1.18	<13	<8	119	<4	<4	<3	<4	51.8	<5	43.8	11.1	35.2
AAB9467	2.86	0.447	1468	32.3	558	1.98	<13	<8	81.4	<4	<4	<3	<4	167	<5	32	8.38	20.7
AAB9468	2.69	0.476	1715	36.5	558	2.06	<13	<8	73.7	<4	<4	<3	<4	223	<5	29.3	<8	23.6
AAB9470	3.13	0.321	1125	<12	551	1.41	<13	<8	66.1	<4	<4	<3	<4	172	<5	22.8	<8	17.8
AAB9471	3.04	0.369	1503	25.1	537	1.47	<13	<8	59	<4	<4	<3	<4	193	<5	23.4	<8	10.7

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB9472	2.74	0.52	1897	30.4	538	1.81	<13	<8	72.4	<4	<4	<3	<4	245	<5	24.7	<8	13.7
AAB9473	3.27	0.257	224	<12	628	0.97	<13	<8	106	6.04	<4	<3	<4	30.3	<5	37.7	15.8	45.2
AAB9475	3.31	0.24	340	<12	660	0.934	<13	<8	112	<4	<4	<3	<4	35.2	<5	45.4	12.5	38.7
AAB9478	3.22	0.336	1155	<12	531	1.41	<13	<8	61.8	<4	<4	<3	<4	152	<5	29.9	<8	22
AAB9479	3.06	0.364	1337	21.9	497	1.55	<13	<8	77.6	<4	<4	<3	<4	176	<5	26.5	<8	16.5
AAB9480	2.85	0.426	1976	15.5	588	2.2	<13	9.25	69.1	<4	<4	<3	<4	234	<5	15.6	9.31	20.1
AAB9482	3.05	0.35	1328	22.4	561	1.49	<13	<8	65.8	<4	<4	<3	<4	195	<5	22.8	10	18.8
AAB9483	3.05	0.46	1354	22.1	575	1.52	<13	<8	72.8	<4	<4	<3	<4	178	<5	34.4	8.41	19.4
AAB9485	3.33	0.25	373	<12	644	1.08	<13	9.86	119	<4	<4	<3	<4	41.7	<5	41	22.1	37.3
AAB9486	3.01	0.432	1516	46.4	611	1.66	<13	<8	67.8	4.24	<4	<3	<4	192	<5	25.4	10.2	15.3
AAB9490	2.78	0.441	1723	14.7	431	1.31	<13	<8	58.4	<4	<4	<3	<4	248	<5	17.2	<8	9.67
AAB9491	2.84	0.428	1521	14.7	432	1.26	<13	<8	47.8	<4	<4	<3	<4	230	<5	20.5	8.36	10.3
AAB9492	3.18	0.318	1089	21.2	563	1.35	<13	<8	65.2	<4	<4	<3	<4	152	<5	25.8	<8	15.7
AAB9493	2.9	0.473	1713	38.3	646	1.83	<13	<8	71.3	<4	<4	<3	<4	238	<5	25.5	<8	18.9
AAB9495	2.98	0.395	907	15.9	742	1.6	<13	10.9	101	<4	<4	<3	<4	125	<5	37.2	11	30.3
AAB9496	3.14	0.257	499	<12	647	1.06	<13	<8	105	4.19	<4	<3	<4	64.8	<5	33.8	13	28.4
AAB9501	2.88	0.419	1795	19	602	1.95	<13	<8	78.1	<4	<4	<3	<4	183	<5	23.8	11	17.1
AAB9502	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9505	2.92	0.433	1399	21.9	484	1.62	<13	<8	63.4	4.22	<4	<3	<4	191	<5	26.1	<8	17
AAB9507	2.87	0.469	1833	18.8	564	1.67	<13	<8	74.1	<4	<4	<3	<4	294	<5	24.6	14.1	18.5
AAB9508	2.95	0.402	1200	<12	329	1.19	<13	<8	60.9	<4	<4	<3	<4	181	<5	22.2	<8	21.7
AAB9510	3.36	0.259	380	<12	641	1.1	<13	<8	111	<4	<4	<3	<4	26.5	<5	41.2	16.5	40.7
AAB9515	3.03	0.35	1278	<12	536	1.52	<13	9.98	67.4	<4	<4	<3	<4	161	<5	25.6	<8	16.1
AAB9516	3.2	0.372	1152	16	498	1.43	<13	<8	65.9	<4	<4	<3	<4	175	<5	23.9	8.98	22
AAB9518	3.07	0.37	1123	13.7	545	1.43	<13	<8	65.9	<4	<4	<3	<4	158	<5	28.7	12	24.9
AAB9519	2.7	0.479	1899	23	589	1.6	<13	<8	68.5	4.59	<4	<3	<4	327	<5	17.5	<8	11.7
AAB9519D	2.7	0.479	1899	16	498	1.43	<13	<8	65.9	<4	<4	<3	<4	175	<5	23.9	8.98	22
AAB9521	3.08	0.505	1408	<12	627	1.73	<13	<8	83.9	5.23	<4	<3	<4	203	<5	24.9	<8	19.5

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB9522	3.3	0.222	218	<12	600	0.945	<13	<8	106	<4	<4	<3	<4	34.6	<5	35.5	19.3	35.6
AAB9525	3.03	0.397	1557	22.8	528	1.53	<13	<8	62.3	<4	<4	<3	<4	208	<5	25.7	<8	15.8
AAB9526	3.08	0.438	1343	23.2	756	1.52	<13	<8	59.5	6.96	<4	<3	<4	236.8	<5	29.2	10.7	20.9
AAB9529	2.7	0.458	1778	28.9	453	1.6	<13	<8	55.6	<4	<4	<3	<4	272	<5	27.1	<8	18.9
AAB9530	2.82	0.437	1895	20	486	1.31	<13	<8	62	<4	<4	<3	<4	247	<5	17.4	<8	13.6
AAB9531	2.96	0.401	1506	15.4	590	1.45	<13	<8	52	<4	<4	<3	<4	256	<5	22.4	<8	16.8
AAB9532	2.93	0.416	1618	<12	503	1.32	<13	<8	59.7	<4	<4	<3	<4	232	<5	23.6	<8	17.9
AAB9534	3.43	0.231	168	<12	628	0.91	<13	9.7	101	<4	<4	<3	<4	27.8	<5	39.6	20.8	35.1
AAB9537	2.53	0.521	2167	35.8	362	1.87	<13	<8	58.9	<4	<4	<3	<4	323	<5	24.8	<8	19.7
AAB9538	2.86	0.487	1217	20.5	388	1.55	<13	15.3	59.4	<4	<4	<3	<4	370	<5	20.9	<8	19
AAB9540	3.58	0.383	515	<12	394	1.04	<13	<8	76.4	<4	<4	<3	<4	93.1	<5	20.5	9.03	24.8
AAB9541	3.86	0.408	511	<12	387	1.02	<13	<8	66.6	9.09	<4	<3	<4	74.1	<5	12.6	<8	16.2
AAB9542	3.64	0.402	472	<12	399	0.98	<13	<8	65.5	<4	<4	<3	<4	75.8	<5	19.6	<8	15.6
AAB9545	2.56	0.748	2391	38.6	334	1.68	<13	<8	41.3	<4	<4	<3	<4	374	<5	17.2	<8	17.5
AAB9547	2.49	0.51	2314	37.1	425	1.77	<13	11.1	54.5	7.15	<4	<3	<4	338	<5	23.3	<8	23.9
AAB9548	3.38	0.447	1031	<12	393	1.2	<13	<8	54.8	<4	<4	<3	<4	176	<5	19.8	<8	18
AAB9550	2.11	0.754	1981	49.2	1098	3.47	<13	19.4	134	<4	<4	<3	<4	410	<5	44.9	<8	33.8
AAB9551	3.22	0.271	620	<12	404	1.43	39.5	<8	93.2	4.31	<4	<3	<4	208	<5	33.4	10.7	24.8
AAB9552	3.47	0.423	781	<12	465	1.08	<13	<8	62.5	<4	<4	<3	<4	124	<5	20.9	<8	17.8
AAB9553	3.63	0.427	523	<12	480	0.989	20	<8	57.5	<4	<4	<3	<4	94.1	<5	18	<8	12.3
AAB9557	2.6	0.676	2307	31.8	442	1.67	<13	<8	49.9	<4	<4	3.09	<4	367	<5	20.4	<8	21.3
AAB9559	2.58	0.576	2252	39.9	450	1.72	<13	8.25	55.4	<4	<4	<3	<4	347	<5	23.6	<8	17
AAB9560	2.75	0.589	1681	32.3	393	2.1	<13	15.8	69.7	<4	<4	<3	<4	243	<5	20.4	16.2	17.9
AAB9564	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9565	3.84	0.368	511	<12	439	0.935	<13	<8	55.1	<4	<4	<3	<4	82.8	<5	20.3	<8	19.2
AAB9566	3.86	0.38	642	<12	445	0.952	<13	<8	59.6	<4	<4	<3	<4	82.7	<5	18	<8	21.5
AAB9569	2.54	0.769	2184	37.3	349	1.63	<13	14.5	55.5	<4	<4	<3	<4	352	<5	20.9	<8	10.1
AAB9570	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-1
TA-10
XRF Metals Screening Results

Sample ID	K (%)	Ca (%)	Ti (ppm)	Cr (ppm)	Mn (ppm)	Fe (%)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)	Se (ppm)	Cd (ppm)	Sb (ppm)	Ba (ppm)	Hg (ppm)	Pb (ppm)	U (ppm)	Th (ppm)
AAB9574	2.75	0.513	2093	20.6	414	1.64	<13	11.1	49.4	<4	<4	<3	<4	347	<5	20	12.8	9.73
AAB9575	2.62	0.491	2205	32.6	411	1.67	<13	<8	51.1	<4	<4	<3	<4	362	<5	18.1	8.31	14.2
AAB9577	3.94	0.368	621	<12	397	0.47	<13	11.5	55.5	<4	<4	<3	<4	98.9	<5	11.8	<8	12.1
AAB9578	3.78	0.412	597	<12	400	0.953	<13	<8	52.2	<4	<4	<3	<4	124	<5	21.3	11.4	20.9
AAB9579	3.74	0.377	541	<12	416	0.936	<13	<8	59.5	<4	<4	<3	<4	83.7	<5	18.6	8.2	12.2
AAB9581	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9583	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9584	2.99	0.539	2104	28.3	464	1.5	<13	15.6	50	<4	<4	<3	<4	339	<5	21.1	11.8	12.3
AAB9585	3.63	0.461	1142	12.4	426	1.18	<13	<8	65.7	<4	<4	<3	<4	190	<5	20.6	9.39	17.3
AAB9586	3.65	0.45	1176	18.2	420	1.23	<13	<8	65	<4	<4	<3	<4	202	<5	23.7	<8	17.5
AAB9587	3.36	0.414	1414	21.4	460	1.66	<13	<8	67.5	<4	<4	<3	<4	147	<5	19.9	11.5	20
AAB9588	3.9	0.365	613	<12	436	1	<13	<8	68.3	<4	<4	<3	<4	91.9	<5	20	11	18.6
AAB9589	3.79	0.335	613	3.17	405	0.93	<13	<8	58	<4	<4	<3	<4	63.9	<5	13.8	<8	15.4
AAB9590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

K = Potassium, Ca = Calcium, Ti = Titanium, Cr = Chromium, Mn = Manganese, Fe = Iron, Ni = Nickel, Cu = Copper, Zn = Zinc, As = Arsenic, Se = Selenium, Cd = Cadmium, Sb = Antimony, Ba = Barium, Hg = Mercury, Pb = Lead, U = Uranium, Th = Thorium

Detection Limits: K = 0.01%, Ca = 0.01%, Ti = 30 ppm, Cr = 12 ppm, Mn = 16 ppm, Fe = 0.001%, Ni = 13 ppm, Cu = 8 ppm, Zn = 5 ppm, As = 4 ppm, Se = 4 ppm, Cd = 3 ppm, Sb = 4 ppm, Ba = 10 ppm, Hg = 5 ppm, Pb = 7 ppm, U = 8 ppm, Th = 8 ppm.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB2847	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2848	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2849	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2850	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2852	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2853	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2854	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2855	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2862	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2864	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2865	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2868	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2869	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2870	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2871	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2872	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2873	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2874	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2875	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2876	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2877	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2877D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2878	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2878D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2879	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2880	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2881	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2881D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2886	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2887	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2888	<0.1	<0.1	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2889	<0.1	<0.1	201.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2890	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2891	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB2892	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2894	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB2895	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2896	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2897	<0.1	<0.1	0.148	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2898	<0.1	<0.1	0.2	<0.1	<0.1	0.15	0.15	0.14	0.22	0.28	0.1	<0.1	<0.1	<0.1	<5
AAB2899	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2900	<0.1	<0.1	0.24	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2901	<0.1	<0.1	0.28	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2902	<0.1	<0.1	0.32	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	<5
AAB2907	<0.1	<0.1	0.31	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2908	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2909	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2910	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2911	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2912	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2913	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2914	<0.1	<0.1	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2921	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2922	<0.1	<0.1	.017	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2923	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2924	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2925	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2926	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2927	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2930	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2931	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2932	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2936	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2937	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2938	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2939	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2940	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2941	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB2942	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2943	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2945	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2950	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	2.7	0.9	<0.1	0.4	1.1	<0.1	0.4	18
AAB2951	<0.1	<0.1	0.5	<0.1	<0.1	0.4	0.2	1.1	<0.1	<0.1	<0.1	<0.1	0.2	0.9	<5
AAB2952	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2953	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2954	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2955	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2956	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<10
AAB2957	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<10
AAB2965	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2966	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2967	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2968	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2969	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2970	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2971	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2972	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2976	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2980	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2981	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2982	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2983	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2984	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2985	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2986	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2987	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB2992	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB2993	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB2994	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB2995	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB2996	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB2997	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg. and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB2998	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB2999	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB3000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3006	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	<0.1	<0.1	<0.1	<5
AAB3007	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3007D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3008	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3009	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3011	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3012	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3014	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<5
AAB3023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2	<0.1	<0.1	<0.1	0.3	<5
AAB3024	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3025	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3026	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	<0.1	<0.1	0.2	<0.1	<5
AAB3027	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.6	<0.1	<0.1	<0.1	<0.1	<5
AAB3028	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2	<0.1	<0.1	<0.1	<0.1	<5
AAB3029	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	<0.1	<0.1	<0.1	<0.1	<5
AAB3035	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	<0.1	<0.1	<0.1	<0.1	<5
AAB3036	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1	<0.1	<0.1	<5
AAB3037	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.4	<0.1	<0.1	<0.1	<0.1	<5
AAB3038	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<5
AAB3039	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.7	<0.1	<0.1	<0.1	<0.1	<5
AAB3040	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<5
AAB3041	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<5
AAB3043	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2	<0.1	<0.1	<0.1	<0.1	<5
AAB3048	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1	<0.1	<0.1	<5
AAB3049	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.4	<0.1	<0.1	<0.1	<0.1	<5
AAB3050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Fluoranthene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB3054	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3063	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3064	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3065	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3066	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3067	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3068	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3070	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3071	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3075	<0.1	.29	0.19	<0.1	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB3076	<0.1	<0.1	0.26	<0.1	0.22	0.94	<0.1	0.71	7.5	0.45	2.76	4.14	<0.1	<0.1	10
AAB3077	<0.1	0.25	0.27	<0.1	<0.1	0.87	<0.1	0.86	6.84	0.46	2.45	3.8	<0.1	<0.1	17
AAB3078	<0.1	0.27	0.28	0.11	0.21	1.3	<0.1	1.05	10.4	0.53	3.63	6.16	<0.1	<0.1	20
AAB3079	<0.1	<0.1	0.27	<0.1	<0.1	0.71	<0.1	0.9	5.48	0.27	1.97	3.13	<0.1	<0.1	31
AAB3081	<0.1	0.31	0.23	<0.1	0.21	0.36	<0.1	0.41	2.51	0.15	0.87	0.778	<0.1	<0.1	22
AAB3082	<0.1	<0.1	0.21	<0.1	0.19	0.43	<0.1	0.46	3.26	<0.1	1.06	1.7	<0.1	<0.1	15
AAB3083	<0.1	<0.1	0.32	0.16	<0.1	1.7	<0.1	1.05	10.5	0.46	3.8	5.6	<0.1	<0.1	25
AAB3084	<0.1	<0.1	0.25	<0.1	<0.1	0.18	<0.1	1.79	1.19	<0.1	0.17	<0.1	<0.1	<0.1	10
AAB3088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB3089	<0.1	0.34	0.25	<0.1	0.15	0.71	<0.1	0.31	5.71	0.31	1.7	3.11	<0.1	<0.1	22
AAB3090	<0.1	<0.1	0.19	<0.1	0.2	0.95	<0.1	0.63	7.14	<0.1	2.49	3.45	<0.1	<0.1	25
AAB3091	<0.1	0.26	0.23	<0.1	<0.1	0.35	<0.1	0.14	2.95	2.75	0.84	0.58	<0.1	<0.1	13
AAB6121	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.29	<0.1	<0.1	<5
AAB6123	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6127	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6128	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6130	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6131	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6132	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6133	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6134	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6135	<0.1	<0.1	0.38	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6136	<0.1	<0.1	0.31	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6137	<0.1	<0.1	0.28	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6138	<0.1	<0.1	0.24	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6140	<0.1	<0.1	0.21	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6145	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6146	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6147	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6150	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6153	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	0.22	<0.1	<0.1	<0.1	<0.1	<5
AAB6154	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6156	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6158	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6159	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6160	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6161	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.45	<0.1	<0.1	<0.1	<5
AAB6163	<0.1	<0.1	<0.1	<0.1	0.24	0.41	<0.1	0.64	0.17	0.33	0.37	0.23	<0.1	<0.1	<5
AAB6164	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.24	<0.1	<0.1	<0.1	<5
AAB6165	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.48	<0.1	<0.1	<0.1	<5
AAB6167	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.43	<0.1	<0.1	<0.1	<5
AAB6170	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.34	<0.1	<0.1	<0.1	<5
AAB6171	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB6172	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.31	<0.1	<0.1	<0.1	<5
AAB6173	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.31	<0.1	<0.1	<0.1	<5
AAB6174	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35	<0.1	<0.1	<0.1	<5
AAB6175	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.24	<0.1	<0.1	<0.1	<5
AAB6176	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.33	<0.1	<0.1	<0.1	<5
AAB6177	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.34	<0.1	<0.1	<0.1	<5
AAB6178	<0.1	<0.1	<0.1	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<5
AAB6179	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6183	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6184	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6185	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6187	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6188	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6189	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6192	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6195	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.18	<0.1	<0.1	<0.1	<5
AAB6196	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6199	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	<5
AAB6200	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6201	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.29	<0.1	<0.1	<0.1	<5
AAB6202	<0.1	<0.1	10.2	26.5	0.24	2.4	5.02	4.53	2.64	4.15	0.78	4.7	<0.1	3.06	<5
AAB6203	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.33	<0.1	<0.1	<0.1	<5
AAB6204	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.41	<0.1	<0.1	<0.1	<5
AAB6209	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	<0.1	<0.1	<0.1	<5
AAB6210	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6212	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6213	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6216	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6217	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6218	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6219	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	<0.1	<0.1	<0.1	<5
AAB6220	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6221	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.48	<0.1	<0.1	<0.1	<5
AAB6223	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6224	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	<0.1	<0.1	<0.1	<5
AAB6225	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6229	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6230	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6233	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6234	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6234D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6235	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6236	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6237	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6238	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6242	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	<0.1	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg. and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6245	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6246	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6247	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6248	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6249	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6250	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.18	<0.1	<0.1	<0.1	<5
AAB6252	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	<0.1	<0.1	<0.1	<5
AAB6253	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6254	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6255	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<5
AAB6259	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6260	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6261	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	<0.1	<0.1	<0.1	<0.1	<5
AAB6262	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<5
AAB6263	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6265	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.2	<0.1	<0.1	<0.1	<0.1	<5
AAB6266	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6267	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<5
AAB6269	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<5
AAB6273	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<5
AAB6274	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<5
AAB6275	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6276	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6277	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6280	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6284	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6285	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6286	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6287	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6291	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6298	<0.1	0.26	0.23	<0.1	0.19	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7
AAB6300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6301	<0.1	0.24	0.23	<0.1	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6302	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6303	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6305	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6309	<0.1	0.32	0.25	<0.1	0.21	0.76	<0.1	0.64	6.39	0.67	2.24	3.27	<0.1	<0.1	73
AAB6310	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6311	<0.1	<0.1	0.27	<0.1	<0.1	1.03	<0.1	0.5	8.51	0.47	3.06	4.15	<0.1	<0.1	70
AAB6312	<0.1	0.3	0.25	<0.1	<0.1	1.51	<0.1	1.36	9.37	0.28	3.52	4.82	<0.1	<0.1	50
AAB6314	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6315	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	0.61	4.3	0.34	1.5	2.6	<0.1	<0.1	19
AAB6316	<0.1	0.27	0.28	0.16	<0.1	1.3	<0.1	2.4	12.8	0.4	4.3	6.8	<0.1	<0.1	19
AAB6316D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6318	<0.1	0.37	0.27	<0.1	<0.1	1.7	<0.1	1.5	1.1	0.5	0.21	6.7	<0.1	<0.1	10
AAB6318D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6319	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6323	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6324	<0.1	0.32	0.28	<0.1	0.24	<0.1	<0.1	0.25	0.27	<0.1	<0.1	<0.1	<0.1	<0.1	6
AAB6325	<0.1	0.33	0.26	<0.1	0.2	<0.1	<0.1	0.37	0.46	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6326	<0.1	<0.1	0.25	<0.1	<0.1	<0.1	<0.1	0.56	0.44	<0.1	<0.1	<0.1	<0.1	<0.1	7
AAB6329	<0.1	<0.1	0.29	<0.1	0.21	<0.1	<0.1	0.97	0.9	<0.1	0.14	0.36	<0.1	<0.1	9
AAB6331	<0.1	<0.1	0.29	<0.1	<0.1	<0.1	<0.1	1.21	1.02	<0.1	0.33	0.39	<0.1	<0.1	9
AAB6332	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6333	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6334	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8
AAB6337	<0.1	<0.1	0.26	<0.1	0.18	<0.1	<0.1	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11
AAB6339	<0.1	<0.1	0.257	<0.1	0.18	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10
AAB6340	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6341	<0.1	0.34	0.29	<0.1	0.21	<0.1	<0.1	0.52	0.61	0.61	0.21	<0.1	<0.1	<0.1	17
AAB6342	<0.1	<0.1	0.24	<0.1	<0.1	<0.1	<0.1	0.47	0.75	<0.1	<0.1	<0.1	<0.1	<0.1	13
AAB6344	<0.1	0.28	0.24	<0.1	<0.1	<0.1	<0.1	<0.1	0.89	<0.1	0.26	<0.1	<0.1	<0.1	16
AAB6345	<0.1	0.3	0.25	<0.1	0.2	<0.1	<0.1	0.213	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	12
AAB6346	<0.1	0.27	0.25	<0.1	0.18	0.14	<0.1	0.34	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	14
AAB6347	<0.1	<0.1	0.26	<0.1	<0.1	1.5	<0.1	1.5	10.2	0.5	3.7	5.8	<0.1	<0.1	30
AAB6351	<0.1	<0.1	0.93	<0.1	<0.1	0.27	0.42	<0.1	<0.1	<0.1	<0.1	25.12	<0.1	<0.1	<5
AAB6352	<0.1	<0.1	0.87	<0.1	<0.1	0.24	0.42	0.31	0.16	<0.1	4.11	<0.1	<0.1	<0.1	7
AAB6356	<0.1	0.57	0.81	<0.1	<0.1	0.11	0.55	0.28	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6357	<0.1	<0.1	0.89	<0.1	<0.1	0.25	0.41	0.59	0.33	0.26	<0.1	11.25	<0.1	<0.1	<5
AAB6358	<0.1	<0.1	0.9	<0.1	<0.1	0.25	0.43	<0.1	35	0.25	<0.1	<0.1	<0.1	<0.1	<5
AAB6359	<0.1	<0.1	0.75	<0.1	<0.1	0.28	0.43	<0.1	<0.1	<0.1	<0.1	25.62	<0.1	<0.1	<5
AAB6361	<0.1	<0.1	0.98	<0.1	<0.1	0.26	0.44	<0.1	<0.1	<0.1	2.46	<0.1	<0.1	<0.1	<5
AAB6365	<0.1	0.54	0.76	<0.1	<0.1	0.36	0.49	<0.1	<0.1	<0.1	<0.1	10.11	<0.1	<0.1	<5
AAB6366	<0.1	<0.1	1.18	<0.1	<0.1	0.3	0.49	<0.1	<0.1	<0.1	<0.1	14.16	<0.1	<0.1	<5
AAB6369	<0.1	<0.1	0.96	<0.1	<0.1	0.27	0.46	<0.1	<0.1	<0.1	1.6	<0.1	<0.1	<0.1	<5
AAB6370	<0.1	<0.1	1	<0.1	<0.1	0.31	0.45	<0.1	<0.1	<0.1	3.77	<0.1	<0.1	<0.1	<5
AAB6372	<0.1	<0.1	0.71	<0.1	<0.1	0.32	0.46	<0.1	<0.1	<0.1	<0.1	11.39	<0.1	<0.1	<5
AAB6373	<0.1	<0.1	0.73	<0.1	<0.1	0.31	0.42	<0.1	<0.1	0.24	4.66	<0.1	<0.1	<0.1	<5
AAB6374	<0.1	<0.1	0.94	<0.1	<0.1	0.25	0.48	<0.1	<0.1	<0.1	<0.1	7.54	<0.1	<0.1	<5
AAB6375	<0.1	<0.1	0.74	<0.1	<0.1	0.27	0.42	<0.1	<0.1	<0.1	<0.1	12.69	<0.1	<0.1	6
AAB6377	<0.1	<0.1	0.95	<0.1	<0.1	0.28	0.42	0.33	<0.1	<0.1	<0.1	17.03	<0.1	<0.1	7
AAB6380	<0.1	<0.1	0.85	<0.1	<0.1	0.27	0.43	<0.1	<0.1	<0.1	<0.1	36.21	<0.1	<0.1	<5
AAB6381	<0.1	<0.1	0.84	<0.1	<0.1	0.31	0.44	<0.1	<0.1	0.22	<0.1	0.31	<0.1	<0.1	<5
AAB6382	<0.1	<0.1	0.84	<0.1	<0.1	0.26	0.43	<0.1	<0.1	0.32	<0.1	17.74	<0.1	<0.1	<5
AAB6383	<0.1	<0.1	0.78	<0.1	<0.1	<0.1	0.41	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<0.1	7
AAB6385	<0.1	<0.1	0.82	<0.1	<0.1	0.29	0.42	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7
AAB6386	<0.1	<0.1	1	<0.1	<0.1	0.28	0.43	<0.1	<0.1	0.31	<0.1	43.25	<0.1	<0.1	8
AAB6387	<0.1	<0.1	0.62	<0.1	<0.1	0.32	0.41	<0.1	<0.1	<0.1	<0.1	24.96	<0.1	<0.1	7
AAB6388	<0.1	<0.1	0.87	<0.1	<0.1	0.26	0.43	<0.1	<0.1	<0.1	5.05	<0.1	<0.1	<0.1	<5
AAB6389	<0.1	<0.1	0.87	<0.1	<0.1	0.28	0.43	<0.1	<0.1	<0.1	<0.1	24.79	<0.1	<0.1	<5
AAB6391	<0.1	<0.1	0.828	<0.1	0.358	0.262	<0.1	<0.1	<0.1	<0.1	<0.1	42.6	<0.1	<0.1	<5
AAB6393	<0.1	13.36	1.97	<0.1	0.37	1.15	0.64	2.98	<0.1	2	<0.1	<0.1	<0.1	<0.1	<5
AAB6394	<0.1	<0.1	0.58	<0.1	<0.1	0.25	0.39	<0.1	<0.1	<0.1	<0.1	23.21	<0.1	<0.1	<5
AAB6396	<0.1	<0.1	0.52	<0.1	<0.1	0.22	0.35	<0.1	<0.1	<0.1	<0.1	13.5	<0.1	<0.1	<5
AAB6397	<0.1	11.5	1.81	<0.1	3.8	1.21	0.71	2.99	<0.1	2.02	<0.1	0.74	<0.1	<0.1	<5
AAB6398	<0.1	<0.1	0.4	<0.1	<0.1	0.25	0.29	<0.1	<0.1	<0.1	<0.1	15.69	<0.1	<0.1	<5
AAB6399	<0.1	<0.1	1.6	<0.1	3.98	1.12	0.71	3.13	<0.1	2.12	<0.1	0.91	<0.1	<0.1	<5
AAB6400	<0.1	0.2	<0.1	<0.1	0.65	1	7.5	8328	0.39	6.11	<0.1	4.36	1.1	1.66	<5
AAB6401	<0.1	11.38	1.7	<0.1	3.39	1.7	0.74	2.29	<0.1	2.12	<0.1	1.19	<0.1	<0.1	<5
AAB6402	<0.1	<0.1	1.94	0.41	0.37	1.66	1.77	3.07	<0.1	0.77	18.45	0.79	2.82	2.12	<5
AAB6406	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6407	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6408	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6411	<0.1	<0.1	1.03	<0.1	<0.1	0.26	0.49	<0.1	<0.1	<0.1	5.18	<0.1	<0.1	<0.1	<5
AAB6412	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6417	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6418	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6419	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6424	<0.1	0.3	0.2	<0.1	0.2	<0.1	<0.1	0.29	0.63	<0.1	<0.1	<0.1	<0.1	<0.1	12.52
AAB6425	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6426	<0.1	0.3	0.16	<0.1	0.16	<0.1	<0.1	0.29	0.62	<0.1	<0.1	<0.1	<0.1	<0.1	12.52
AAB6427	<0.1	0.3	0.26	<0.1	<0.1	0.87	<0.1	1.1	7.3	<0.1	2.2	<0.1	<0.1	<0.1	51.7
AAB6429	<0.1	<0.1	<0.1	<0.1	0.17	0.62	<0.1	0.38	5.2	<0.1	<0.1	<0.1	<0.1	<0.1	54
AAB6430	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6431	<0.1	<0.1	0.18	<0.1	0.15	0.62	<0.1	0.2	4.9	<0.1	1.3	2.4	<0.1	<0.1	27
AAB6433	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6435	<0.1	<0.1	0.2	<0.1	0.22	<0.1	<0.1	<0.1	0.75	<0.1	0.17	<0.1	<0.1	<0.1	<5
AAB6436	<0.1	0.3	0.3	<0.1	0.21	<0.1	<0.1	1.3	0.72	<0.1	0.1	0.19	<0.1	<0.1	6
AAB6437	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6438	<0.1	0.3	0.31	<0.1	<0.1	<0.1	<0.1	1.4	1.3	<0.1	0.48	0.55	<0.1	<0.1	7
AAB6440	<0.1	0.28	0.24	<0.1	0.19	0.11	<0.1	0.83	0.7	<0.1	<0.1	0.16	<0.1	<0.1	15
AAB6441	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6442	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6443	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6448	<0.1	0.27	0.23	<0.1	0.22	<0.1	<0.1	0.96	0.92	0.9	0.33	<0.1	<0.1	<0.1	17
AAB6449	<0.1	0.27	0.26	<0.1	0.2	0.12	<0.1	1.95	0.88	<0.1	0.18	0.42	<0.1	<0.1	17
AAB6450	<0.1	0.3	0.25	<0.1	0.127	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10
AAB6451	<0.1	<0.1	0.22	<0.1	<0.1	<0.1	<0.1	1.1	1.01	<0.1	0.26	<0.1	<0.1	<0.1	8
AAB6456	<0.1	0.26	0.19	<0.1	0.15	<0.1	<0.1	0.61	0.54	<0.1	<0.1	<0.1	<0.1	<0.1	7
AAB6457	<0.1	0.26	0.2	<0.1	0.15	<0.1	<0.1	0.46	0.42	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6458	<0.1	11.97	1.99	<0.1	3.79	1	0.65	2.86	<0.1	1.97	<0.1	0.54	<0.1	<0.1	<5
AAB6462	<0.1	<0.1	0.25	<0.1	0.15	<0.1	<0.1	0.33	0.42	<0.1	<0.1	<0.1	<0.1	<0.1	14
AAB6463	<0.1	0.28	0.25	<0.1	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6463D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6464	<0.1	<0.1	0.299	<0.1	0.21	0.43	<0.1	0.9	3.69	0.49	1.41	2.54	<0.1	<0.1	45
AAB6466	<0.1	0.312	0.25	<0.1	0.15	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6467	<0.1	<0.1	0.19	<0.1	0.19	0.11	<0.1	0.53	0.52	0.47	<0.1	<0.1	<0.1	<0.1	16
AAB6468	<0.1	<0.1	0.23	<0.1	0.15	<0.1	<0.1	0.21	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10
AAB6469	<0.1	2.99	0.14	<0.1	2.09	1.2	<0.1	0.768	0.26	1.5	0.51	<0.1	<0.1	<0.1	39
AAB6470	<0.1	0.27	0.26	<0.1	0.2	0.19	<0.1	2.4	1.5	<0.1	0.57	<0.1	<0.1	<0.1	12
AAB6474	<0.1	<0.1	0.92	<0.1	<0.1	0.26	0.42	<0.1	<0.1	<0.1	<0.1	35.8	<0.1	<0.1	8
AAB6475	<0.1	0.58	0.85	<0.1	<0.1	0.45	0.56	0.21	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6476	<0.1	0.5	0.96	<0.1	<0.1	0.25	0.47	<0.1	<0.1	0.23	<0.1	14.71	<0.1	<0.1	<5
AAB6477	<0.1	0.48	0.92	<0.1	<0.1	0.32	0.46	<0.1	<0.1	<0.1	<0.1	7.05	<0.1	<0.1	6
AAB6479	<0.1	<0.1	0.93	<0.1	<0.1	0.3	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6480	<0.1	0.56	1.01	<0.1	<0.1	0.27	0.48	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6481	<0.1	<0.1	0.96	<0.1	<0.1	0.26	0.5	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<5
AAB6482	<0.1	0.54	0.81	<0.1	<0.1	0.29	0.49	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6486	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6487	<0.1	<0.1	0.95	<0.1	<0.1	0.28	0.48	<0.1	<0.1	0.24	<0.1	39.82	<0.1	<0.1	8
AAB6488	<0.1	0.64	1.12	0.4	0.11	1.16	<0.1	0.77	<0.1	<0.1	0.12	<0.1	<0.1	<0.1	<5
AAB6488D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6489	<0.1	<0.1	0.88	<0.1	<0.1	0.25	0.42	<0.1	<0.1	<0.1	<0.1	40.5	<0.1	<0.1	<5
AAB6490	<0.1	<0.1	0.93	<0.1	<0.1	0.24	0.42	<0.1	<0.1	<0.1	<0.1	26.49	<0.1	<0.1	<5
AAB6491	<0.1	0.72	1.1	<0.1	0.28	0.66	0.71	2.28	11.12	0.11	3.6	5.9	<0.1	0.52	35
AAB6495	<0.1	<0.1	0.76	<0.1	<0.1	0.25	0.43	<0.1	<0.1	<0.1	<0.1	38.56	<0.1	<0.1	<5
AAB6495D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6496	<0.1	0.49	0.93	<0.1	<0.1	0.27	0.43	<0.1	<0.1	0.22	3.3	<0.1	<0.1	<0.1	7
AAB6497	<0.1	<0.1	0.92	<0.1	<0.1	0.27	0.43	<0.1	<0.1	0.21	<0.1	16.36	<0.1	<0.1	<5
AAB6499	<0.1	<0.1	0.94	<0.1	<0.1	0.27	0.43	0.27	0.13	0.24	<0.1	<0.1	<0.1	<0.1	<5
AAB6502	<0.1	<0.1	0.82	<0.1	0.36	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6503	<0.1	<0.1	0.89	<0.1	<0.1	0.32	0.46	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6504	<0.1	12.31	2.08	<0.1	3.87	1	0.589	2.86	<0.1	1.93	<0.1	1.18	<0.1	<0.1	36
AAB6505	<0.1	<0.1	0.86	<0.1	<0.1	0.28	0.43	<0.1	<0.1	<0.1	<0.1	26.98	<0.1	<0.1	<5
AAB6506	<0.1	<0.1	2.28	<0.1	0.39	<0.1	0.55	2.95	<0.1	1.9	<0.1	0.69	<0.1	<0.1	<5
AAB6507	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6508	<0.1	<0.1	0.91	<0.1	<0.1	0.26	0.45	<0.1	<0.1	<0.1	<0.1	40.32	<0.1	<0.1	<5
AAB6509	<0.1	<0.1	0.84	<0.1	<0.1	0.25	0.43	<0.1	<0.1	<0.1	<0.1	27.87	<0.1	<0.1	7
AAB6511	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6513	<0.1	<0.1	0.828	<0.1	0.358	0.262	<0.1	<0.1	<0.1	<0.1	<0.1	42.6	<0.1	<0.1	<5

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB6516	<0.1	<0.1	0.82	<0.1	0.35	0.26	<0.1	<0.1	<0.1	<0.1	<0.1	35.88	<0.1	<0.1	6
AAB6517	<0.1	<0.1	0.65	<0.1	<0.1	0.25	0.42	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6
AAB6518	<0.1	<0.1	0.86	<0.1	<0.1	0.27	0.44	<0.1	<0.1	<0.1	<0.1	25.56	<0.1	<0.1	<5
AAB6519	<0.1	<0.1	0.85	<0.1	<0.1	0.27	0.41	<0.1	<0.1	0.87	<0.1	14.36	<0.1	<0.1	<5
AAB6521	<0.1	9.74	<0.1	<0.1	0.3	1	1.42	2.87	<0.1	1.78	<0.1	1.08	<0.1	<0.1	<5
AAB6522	<0.1	13.11	1.77	<0.1	4	1.04	0.7	3.23	<0.1	1.84	<0.1	1.16	<0.1	<0.1	<5
AAB6523	<0.1	<0.1	0.78	<0.1	0.34	0.24	<0.1	<0.1	<0.1	<0.1	<0.1	41.7	<0.1	<0.1	<5
AAB6528	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6529	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6530	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6531	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6533	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6534	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6540	<0.1	8	1.9	1.6	0.8	<0.1	0.45	6.2	0.29	4	<0.1	2	<0.1	<0.1	<5
AAB6541	<0.1	7.59	1.85	1.62	0.785	<0.1	1.27	6.46	<0.1	4.29	<0.1	2.44	<0.1	<0.1	52
AAB6544	<0.1	7.8	1.9	1.6	0.86	<0.1	0.41	6.2	0.26	4.2	<0.1	1.6	<0.1	<0.1	15
AAB6545	<0.1	8.1	1.85	1.7	0.8	<0.1	1.2	6	0.56	4	<0.1	2.2	<0.1	<0.1	<5
AAB6547	<0.1	8.4	1.8	1.7	0.7	<0.1	0.42	5.9	0.29	4	<0.1	2	<0.1	<0.1	<5
AAB6548	<0.1	8.62	1.8	1.7	0.7	<0.1	1.3	5.9	0.61	3.9	<0.1	1.9	<0.1	<0.1	<5
AAB6549	<0.1	6.9	1.6	1.5	0.8	<0.1	0.39	6.3	0.27	4.4	<0.1	2.6	<0.1	<0.1	30
AAB6553	<0.1	18.9	2.6	<0.01	0.41	<0.1	1	4.25	0.24	2.7	<0.1	1.1	<0.1	<0.1	50
AAB6554	<0.1	16.2	2.5	<.01	0.56	<0.1	2.7	4..5	0.3	3.1	<0.1	0.83	<0.1	<0.1	30
AAB6555	<0.1	18.3	2	<.01	0.41	<0.1	1	4.6	0.27	2.9	<0.1	1.7	<0.1	<0.1	32
AAB6556	<0.1	15.6	2	0.44	5.5	<0.1	1	3.9	<0.1	2.88	<0.1	1.2	<0.1	<0.1	43
AAB6557	<0.1	16	2..2	<.01	0.59	<0.1	0.75	4.9	0.27	3.1	<0.1	0.82	<0.1	<0.1	60
AAB6559	<0.1	15	2.4	2.4	0.66	<0.1	1.9	4.9	0.32	3.1	<0.1	1.44	<0.1	<0.1	75
AAB6560	<0.1	19.11	2.54	<0.1	0.552	<0.1	2.53	4.63	0.269	2.96	<0.1	1.76	<0.1	<0.1	89
AAB6561	<0.1	16.8	2.1	<.01	0.55	<0.1	0.87	4.8	0.74	3.3	<0.1	1.1	<0.1	<0.1	96
AAB6567	<0.1	8.98	1.88	1.7	0.7	<0.1	0.4	5.9	0.32	3.8	<0.1	2.3	<0.1	<0.1	<5
AAB6568	<0.1	12	2.22	1.96	0.892	<0.1	1.81	5.37	<0.1	3.48	<0.1	2.1	<0.1	<0.1	96
AAB6570	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6572	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6573	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6574	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatile
AAB6575	<0.1	0.54	0.7	<0.1	<0.1	0.35	0.49	<0.1	<0.1	<0.1	4.16	<0.1	<0.1	<0.1	<5
AAB6576	<0.1	<0.1	0.72	<0.1	<0.1	0.28	0.46	<0.1	<0.1	0.16	2.72	<0.1	<0.1	<0.1	7
AAB6577	<0.1	<0.1	0.66	<0.1	<0.1	0.27	0.48	<0.1	<0.1	<0.1	<0.1	11.22	<0.1	<0.1	<5
AAB6578	<0.1	<0.1	0.7	<0.1	<0.1	0.25	0.47	<0.1	<0.1	0.27	<0.1	31.67	<0.1	<0.1	<5
AAB6582	50.7	0.31	0.13	<0.1	0.48	0.19	<0.1	0.48	<0.1	<0.1	16.8	8.82	<0.1	<0.1	39
AAB6586	<0.1	8.47	1.9	0.271	1.05	<0.1	1.64	8.31	0.82	5.98	<0.1	3.32	<0.1	<0.1	135
AAB6590	<0.1	8.3	2.2	0.3	1.7	<0.1	1.7	8	0.93	5.7	<0.1	3	<0.1	0.98	32
AAB6591	<0.1	8	1.9	0.32	1.1	<0.1	1.7	7.9	0.55	5.5	1.1	3.4	<0.1	<0.1	19
AAB6592	<0.1	8.8	2.1	0.27	0.99	<0.1	1.5	8	0.72	5.3	<0.1	3.1	<0.1	<0.1	20
AAB6593	<0.1	7.9	1.8	0.32	0.97	<0.1	1.6	8.6	0.61	5.7	1.6	3.8	<0.1	<0.1	135
AAB6596	50.6	0.35	0.15	0.21	0.48	0.34	0.51	<0.1	<0.1	<0.1	1.29	0.16	<0.1	0.26	27
AAB6597	<0.1	<0.1	<0.1	<0.1	0.292	0.443	0.614	0.209	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6598	<0.1	0.19	<0.1	<0.1	0.61	0.469	0.108	0.362	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6599	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6601	52.5	0.2	0.16	<0.1	0.71	<0.1	0.41	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	27
AAB6602	<0.1	0.137	<0.1	<0.1	0.542	0.524	0.754	0.245	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6605	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6606	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6607	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6608	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6609	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6611	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB6613	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6616	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7.53	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6619	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8.22	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6622	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8.31	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB6624	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB8643	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6.86	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8644	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8645	<0.1	13.8	2.3	2.2	0.83	<0.1	1.9	5.2	0.29	3.5	<0.1	1.89	<0.1	<0.1	75
AAB8646	<0.1	12.3	1.9	6.4	0.2	<0.1	2.4	3.2	<0.1	2	<0.1	1.5	<0.1	<0.1	<5
AAB8648	<0.1	12.5	2.2	2.1	0.77	<0.1	0.6	5.3	0.34	3.6	<0.1	1.47	<0.1	<0.1	67
AAB8649	<0.1	9.94	2.023	1.9	0.756	<0.1	0.529	5.57	<0.1	3.31	<0.1	1.42	<0.1	<0.1	17
AAB8650	<0.1	10.1	2	1.8	0.8	<0.1	0.67	6.2	0.32	4.2	<0.1	1.9	<0.1	<0.1	<5

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds Screening Results

Sample ID	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Fluoranthene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatile
AAB8654	<0.1	11.2	2.5	0.46	1.2	<0.1	0.82	8.2	2.3	6.3	<0.1	3.6	<0.1	2	61
AAB8657	<0.1	9.7	2.4	<0.1	1.1	<0.1	0.71	7.9	1	5.7	1.5	3.2	0.55	2	23
AAB8656	<0.1	11.4	3	0.33	1.3	0.36	2	8.2	0.76	5.5	1.4	3.7	<0.1	0.97	49
AAB8659	<0.1	10.5	2.2	0.33	1.1	<0.1	1.9	7.9	0.93	5.5	1.67	3.3	<0.1	<0.1	61
AAB8660	<0.1	10.77	2.3	0.37	1.36	<0.1	2.2	8	0.71	5.7	1.5	3.6	<0.1	<0.1	34
AAB8662	<0.1	10.2	2.4	0.3	1.07	<0.1	0.53	7.8	1.5	5.1	1	3.2	<0.1	<0.1	25
AAB8663	<0.1	9.3	2.2	0.3	1.1	0.36	0.54	7.8	0.69	5.3	1.6	2.7	<0.1	<0.1	33
AAB8664	<0.1	9.8	2.5	0.33	1	0.31	0.58	8	0.74	5.5	<0.1	3.5	<0.1	<0.1	59
AAB8669	<0.1	6.95	1.57	0.284	0.955	<0.1	0.564	9.07	1.04	6.09	<0.1	3.64	<0.1	1.41	68
AAB8671	<0.1	5.6	1.48	0.262	0.937	<0.1	0.561	9.29	0.86	6.06	<0.1	3.73	<0.1	<0.1	22
AAB8672	<0.1	6.72	1.9	0.272	0.95	<0.1	0.56	9.3	0.366	6.27	<0.1	3.86	<0.1	<0.1	35
AAB8673	<0.1	4.88	0.934	0.307	0.839	<0.1	0.697	8.24	0.474	0.6	<0.1	2.96	<0.1	<0.1	13
AAB8675	<0.1	5.65	1.52	0.795	0.849	<0.1	0.487	8.38	0.588	5.77	<0.1	3.06	<0.1	<0.1	26
AAB8676	<0.1	4.03	<0.1	1.54	0.855	<0.1	<0.1	8.42	0.571	5.81	<0.1	3.18	<0.1	<0.1	15
AAB8677	<0.1	4.95	1.38	0.323	0.853	<0.1	0.526	8.45	0.473	5.61	<0.1	3.26	<0.1	<0.1	38
AAB8681	<0.1	4.37	1.22	1.5	0.9	<0.1	0.522	8.29	0.871	5.51	<0.1	3.11	<0.1	<0.1	18
AAB8682	<0.1	4.3	1.21	0.253	0.888	<0.1	1.43	8.15	0.519	5.57	<0.1	3.24	<0.1	<0.1	29
AAB8683	<0.1	5.32	1.56	0.283	0.884	<0.1	0.511	8.37	0.45	5.59	<0.1	2.75	<0.1	<0.1	16
AAB8684	<0.1	4.66	1.34	1.41	0.868	<0.1	0.452	8.12	0.415	5.69	<0.1	3.29	<0.1	<0.1	30
AAB8689	<0.1	4.34	1.24	0.244	0.843	<0.1	0.514	8.53	<0.1	5.42	<0.1	3.33	<0.1	<0.1	18
AAB8690	<0.1	0.124	<0.1	<0.1	0.692	0.577	0.647	0.411	<0.1	<0.1	7.37	<0.1	<0.1	<0.1	<5
AAB8692	0.14	<0.1	<0.1	<0.1	0.592	0.259	0.508	0.341	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8692D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB8693	<0.1	0.21	0.144	<0.1	0.413	0.18	0.412	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10
AAB8694	<0.1	0.14	<0.1	<0.1	0.293	0.259	0.508	0.341	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8695	<0.1	0.151	<0.1	<0.1	0.578	0.472	0.611	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8696	0.153	0.127	<0.1	<0.1	0.66	0.205	0.239	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	71.1	18
AAB8698	<0.1	0.18	<0.1	<0.1	0.564	0.306	0.701	0.401	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8699	0.16	0.122	<0.1	<0.1	0.481	0.231	0.414	<0.1	<0.1	<0.1	0.119	0.21	<0.1	<0.1	6
AAB8700	<0.1	0.425	<0.1	<0.1	0.452	0.393	0.138	0.591	<0.1	<0.1	0.033	0.354	<0.1	<0.1	7
AAB8702	<0.1	0.147	<0.1	<0.1	0.292	<0.1	0.723	0.418	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8703	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8704	<0.1	0.2	<0.1	<0.1	0.508	0.515	0.741	0.433	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8705	<0.1	<0.1	<0.1	<0.1	0.589	0.434	0.629	0.406	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatile
AAB8706	<0.1	0.2	<0.1	<0.1	0.365	0.322	0.657	0.337	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8707	<0.1	<0.1	<0.1	<0.1	0.428	0.49	0.575	0.386	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8708	<0.1	1.33	3.38	0.125	<0.1	0.205	1.47	0.139	<0.1	0.483	<0.1	<0.1	<0.1	<0.1	175
AAB8710	<0.1	1.33	3.46	0.125	<0.1	0.24	1.47	0.133	<0.1	0.317	<0.1	<0.1	<0.1	<0.1	253
AAB8711	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11.4	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8713	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.66	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8716	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	13.41	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8717	<0.1	0.11	<0.1	<0.1	0.497	0.388	0.697	0.36	<0.1	<0.1	26.2	<0.1	<0.1	<0.1	<5
AAB8718	<0.1	0.14	<0.1	<0.1	0.618	0.348	0.643	0.445	<0.1	<0.1	7.89	<0.1	<0.1	<0.1	<5
AAB8720	<0.1	0.16	<0.1	<0.1	0.617	0.359	0.565	0.208	<0.1	<0.1	<0.1	0.105	<0.1	<0.1	<5
AAB8721	<0.1	0.148	<0.1	<0.1	0.701	C.509	0.756	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8723	<0.1	0.192	<0.1	<0.1	0.428	0.441	0.736	0.34	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB8726	<0.1	0.145	<0.1	<0.1	0.552	0.27	0.766	0.397	<0.1	<0.1	8.83	<0.1	<0.1	<0.1	<5
AAB9201	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6.27	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9202	<0.1	1.211	2.73	0.165	<0.1	0.688	1.79	1.08	<0.1	0.657	4.7	10.6	<0.1	<0.1	36
AAB9203	<0.1	1.23	2.84	0.102	<0.1	0.266	1.45	0.531	<0.1	0.448	<0.1	31.2	<0.1	<0.1	58
AAB9206	<0.1	1.25	2.94	0.111	<0.1	0.53	1.41	0.347	<0.1	1.35	<0.1	<0.1	<0.1	<0.1	250
AAB9207	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11.5	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9208	<0.1	1.33	3.13	0.119	0.111	1.89	1.46	0.121	<0.1	0.387	<0.1	17.6	<0.1	<0.1	52
AAB9212	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	9.29	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9214	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7.62	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9215	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9217	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.72	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9220	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9225	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9229	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9232	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9233	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.68	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9237	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9238	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) (deno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractab Semivolati
AAB9239	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9240	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9241	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9243	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9244	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11.3	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9245	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11.3	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9249	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9250	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9252	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9258	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9259	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9261	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9264	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.64	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9266	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9270	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9273	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9275	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9276	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9279	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9280	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9282	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9284	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9285	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9288	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9290	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9294	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9295	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	14.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9298	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9299	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9305	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9306	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9307	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9311	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9312	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB9314	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9316	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9318	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9321	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9323	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9325	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9328	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9329	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9331	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9332	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9334	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9335	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9337	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9345	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9346	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9348	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9349	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9352	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9353	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	0.9	<0.1	<0.1	<0.1	<0.1	<5
AAB9355	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	<0.1	<0.1	<0.1	<0.1	<5
AAB9356	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9358	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9365	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9366	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9367	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9370	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9371	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9372	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9376	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9377	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9378	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9379	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9383	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9386	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB9387	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9391	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9393	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9398	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9421	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9423	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	9.57	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9425	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9426	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9430	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9431	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9432	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9434	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9435	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9436	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	12.4	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9437	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9444	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	9.72	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9445	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9446	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9447	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9449	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9450	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9452	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9453	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9456	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9457	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9460	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9462	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9463	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9467	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9468	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9470	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9471	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6.97	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9472	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9473	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds
Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB9475	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9478	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	9.24	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9479	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9480	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9482	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9483	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9485	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.93	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9486	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9490	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9491	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	9.24	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9492	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9493	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9495	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9496	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9501	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9502	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9505	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9507	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9508	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9510	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9515	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9516	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9518	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9519	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9519D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9522	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9525	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9526	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9529	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9530	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9531	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9532	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9534	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed
Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.
Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-2
TA-10
Semi-Volatile Organic Compounds Screening Results

Sample ID	Naphthalene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Fluoran-thene	Anthracene	Pyrene	Benz(A) anthracene	Chrysene	Benzo (B and K) fluoranthene	Benzo(A) pyrene	Dibenz(A,H) Ideno(1,2,3) pyrene	Benzo (G,H,I) perylene	Total Extractable Semivolatiles
AAB9537	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9538	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9540	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9541	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.69	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9542	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9545	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9547	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9548	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9550	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9551	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9552	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9553	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9557	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9559	<0.1	<0.1	2.38	<0.1	<0.1	1.61	2.38	21.88	<0.1	3.33	3.45	<0.1	<0.1	<0.1	97
AAB9560	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.67	3.54	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11
AAB9564	<0.1	<0.1	0.63	<0.1	<0.1	<0.1	0.67	4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	9
AAB9565	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9566	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9569	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9570	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.84	3.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	14
AAB9574	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9575	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9577	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9578	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AAB9579	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5
AAB9581	<0.1	<0.1	<0.1	<0.1	<0.1	1.26	<0.1	1.14	12.8	12.7	9	7.2	<0.1	8.2	119
AAB9583	<0.1	<0.1	<0.1	<0.1	<0.1	0.96	<0.1	3.33	9.6	9.4	6.7	5.5	<0.1	7.3	87
AAB9584	<0.1	<0.1	<0.1	<0.1	<0.1	0.69	<0.1	1.07	5.7	4.1	1.8	<0.1	<0.1	<0.1	46
AAB9585	<0.1	<0.1	<0.1	<0.1	<0.1	1.99	<0.1	0.59	21	20.8	15	12.7	<0.1	14.7	212
AAB9586	<0.1	<0.1	<0.1	<0.1	<0.1	1.18	<0.1	1.16	12.9	12.2	8.7	7.1	<0.1	8.9	130
AAB9587	<0.1	<0.1	<0.1	<0.1	<0.1	0.83	<0.1	2.92	9.59	8.7	5.9	4.6	<0.1	5.7	81
AAB9588	<0.1	<0.1	<0.1	<0.1	<0.1	0.87	<0.1	2.9	10	9.2	6.2	4.8	<0.1	6.2	82
AAB9589	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	<0.1	1.3	19.8	19.6	13.5	11.3	<0.1	13.5	195
AAB9590	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

Detection Limits for all constituents except Total Extractable Semi-Volatile Organics is 0.1 mg/kg.

Total Extractable Semi-Volatile Organics detection limit is 5 mg/kg, and is quantitated as Naphthalene.

Table 7-3
TA-10
MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB2833	-7.34	98.79	-10.55	35.03	-0.86	2.15	pCi/g
AAB2834	-7.34	98.79	-1.51	35.03	1.59	2.15	pCi/g
AAB2835	-7.34	98.79	-7.53	35.03	3.49	2.15	pCi/g
AAB2836	-7.34	98.79	12.05	35.03	3	2.15	pCi/g
AAB2837	-14.7	98.79	1.51	35.03	2.01	2.15	pCi/g
AAB2838	0	98.79	13.56	35.03	1.05	2.15	pCi/g
AAB2839	-14.7	98.79	-9.04	35.03	3.99	2.15	pCi/g
AAB2840	-14.7	98.79	6.03	35.03	-0.65	2.15	pCi/g
AAB2841	-14.7	98.79	0	35.03	3.64	2.15	pCi/g
AAB2842	-14.7	98.79	13.56	35.03	7.17	2.15	pCi/g
AAB2843	-14.7	98.79	-1.51	35.03	7.44	2.15	pCi/g
AAB2844	-14.7	98.79	-19.58	36.18	1.86	2.15	pCi/g
AAB2845	7.34	98.79	3.77	35.03	-2.93	2.15	pCi/g
AAB2846	-7.34	98.79	18.83	35.47	-3.98	2.15	pCi/g
AAB2847	7.34	98.79	5.27	35.03	0.85	2.15	pCi/g
AAB2848	-7.34	98.79	-9.79	35.03	-0.23	2.15	pCi/g
AAB2849	7.34	98.79	14.31	35.03	-0.17	2.15	pCi/g
AAB2850	-7.34	98.79	-15.82	35.03	-5.36	2.15	pCi/g
AAB2851	-7.34	98.79	-2.26	35.03	0.51	2.15	pCi/g
AAB2852	-7.34	98.79	0.75	35.03	-0.31	2.15	pCi/g
AAB2853	7.34	98.79	5.27	35.03	-3.35	2.15	pCi/g
AAB2854	-7.34	98.79	-8.29	35.03	-3.86	2.15	pCi/g
AAB2855	-7.34	98.79	-3.77	35.03	2.39	2.15	pCi/g
AAB2856	7.34	98.79	-6.78	35.03	4.35	2.15	pCi/g
AAB2857	-7.34	98.79	8.29	35.03	5.84	2.15	pCi/g
AAB2861	-14.7	98.79	3.77	35.03	0.55	2.15	pCi/g
AAB2862	-29.35	138.2	9.79	35.03	1.64	2.15	pCi/g
AAB2863	-29.35	138.2	-8.29	35.03	2.59	2.15	pCi/g
AAB2864	-14.7	98.79	-8.29	35.03	-0.6	2.15	pCi/g
AAB2865	-29.35	138.2	-15.82	35.03	-1.76	2.15	pCi/g
AAB2866	-1.22	3.32	-2.23	4.86	-0.18	0.55	pCi/ml
AAB2867	-1.22	3.32	-2.53	4.86	0.23	0.55	pCi/ml
AAB2868	-29.35	138.2	0.75	35.03	3.28	2.15	pCi/g
AAB2869	-58.69	195.44	-18.83	35.47	-2.34	2.15	pCi/g
AAB2870	-58.69	195.44	-15.82	35.03	-1.23	2.15	pCi/g
AAB2871	-29.35	138.2	-3.77	35.03	-0.98	2.15	pCi/g
AAB2872	-58.69	195.44	-24.86	40.76	-3.37	2.15	pCi/g
AAB2873	-44.02	169.26	-11.3	35.03	-4.43	2.15	pCi/g
AAB2874	-44.02	169.26	-9.79	35.03	-6.91	2.15	pCi/g
AAB2875	-58.69	195.44	-20.34	36.87	-9.82	2.15	pCi/g
AAB2876	-29.35	138.2	-9.79	35.03	-1.72	2.15	pCi/g
AAB2877	-29.35	138.2	-11.3	35.03	0.07	2.15	pCi/g
AAB2878	-58.69	195.44	-11.3	35.03	-7.48	2.15	pCi/g
AAB2879	-58.69	195.44	-2.26	35.03	-12.26	2.15	pCi/g
AAB2880	-44.02	169.26	-14.31	35.03	-13.04	2.15	pCi/g
AAB2881	-44.02	169.26	-3.77	35.03	-5.82	2.15	pCi/g
AAB2882	-58.69	195.44	-12.81	35.03	-5.23	2.15	pCi/g
AAB2883	-58.69	195.44	-3.77	35.03	-11.72	2.15	pCi/g

Table 7-3
TA-10
MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB2884	-44.02	169.26	-18.83	35.47	-10.99	2.15	pCi/g
AAB2885	-22.01	119.68	-22.6	38.86	-0.1	2.15	pCi/g
AAB2886	-22.01	119.68	-13.56	35.03	0.97	2.15	pCi/g
AAB2887	22.01	119.68	7.53	35.03	3.6	2.15	pCi/g
AAB2888	-7.34	98.79	7.53	35.03	2.4	2.15	pCi/g
AAB2889	22.01	119.68	10.55	35.03	2.11	2.15	pCi/g
AAB2890	7.34	98.79	12.05	35.03	2.99	2.15	pCi/g
AAB2891	-7.34	98.79	25.61	41.37	4.5	2.15	pCi/g
AAB2892	-7.34	98.79	-9.04	35.03	-1.38	2.15	pCi/g
AAB2893	-58.69	195.44	-20.34	36.87	-12.56	2.15	pCi/g
AAB2894	-58.69	195.44	2.26	35.03	-13.21	2.15	pCi/g
AAB2895	-22.01	119.68	-19.58	36.18	-1.06	2.15	pCi/g
AAB2896	-22.01	119.68	-15.07	35.03	-1.6	2.15	pCi/g
AAB2897	-22.01	119.68	-13.56	35.03	2.01	2.15	pCi/g
AAB2898	-22.01	119.68	-22.6	38.86	-3.74	2.15	pCi/g
AAB2899	-22.01	119.68	-13.56	35.03	-2.57	2.15	pCi/g
AAB2900	-7.34	98.79	15.07	35.03	4.66	2.15	pCi/g
AAB2901	-22.01	119.68	3.01	35.03	7.71	2.15	pCi/g
AAB2902	36.68	154.51	3.01	35.03	10.4	2.15	pCi/g
AAB2903	-7.34	98.79	0	35.03	9.32	2.15	pCi/g
AAB2904	-22.01	119.68	-9.04	35.03	7.6	2.15	pCi/g
AAB2905	-22.01	119.68	-6.03	35.03	-0.37	2.15	pCi/g
AAB2906	7.34	98.79	3.01	35.03	-1.57	2.15	pCi/g
AAB2907	-7.34	98.79	15.07	35.03	1.9	2.15	pCi/g
AAB2908	-7.34	98.79	6.03	35.03	0.99	2.15	pCi/g
AAB2909	-7.34	98.79	1.51	35.03	0.6	2.15	pCi/g
AAB2910	-7.34	98.79	9.04	35.03	1.64	2.15	pCi/g
AAB2911	7.34	98.79	0	35.03	1.28	2.15	pCi/g
AAB2912	-7.34	98.79	0	35.03	4.62	2.15	pCi/g
AAB2913	-7.34	98.79	22.6	38.86	9.35	2.15	pCi/g
AAB2914	51.35	182.82	27.12	42.57	10.37	2.15	pCi/g
AAB2915	-7.34	98.79	21.09	37.54	7.59	2.15	pCi/g
AAB2916	-7.34	98.79	13.56	35.03	-1.5	2.15	pCi/g
AAB2917	-7.34	98.79	12.05	35.03	-1.26	2.15	pCi/g
AAB2918	0	2.02	0.15	4.86	-0.1	0.55	pCi/ml
AAB2919	0	2.02	-0.6	4.86	0.12	0.55	pCi/ml
AAB2920	0	98.79	-9.79	35.03	-2.31	2.15	pCi/g
AAB2921	0	98.79	-3.77	35.03	-1.69	2.15	pCi/g
AAB2922	0	98.79	2.26	35.03	-3.03	2.15	pCi/g
AAB2923	14.67	98.79	6.78	35.03	-3.24	2.15	pCi/g
AAB2924	14.67	98.79	12.81	35.03	-2.15	2.15	pCi/g
AAB2925	0	98.79	-0.75	35.03	-1.33	2.15	pCi/g
AAB2926	14.67	98.79	-0.75	35.03	-2.96	2.15	pCi/g
AAB2927	0	98.79	0.75	35.03	-4.82	2.15	pCi/g
AAB2928	0	98.79	-5.27	35.03	-2.2	2.15	pCi/ml
AAB2929	0	98.79	-8.29	35.03	-2.04	2.15	pCi/ml
AAB2930	-7.34	98.79	3.01	35.03	-3.24	2.15	pCi/g
AAB2931	-7.34	98.79	-7.53	35.03	6.37	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB2932	7.34	98.79	13.56	35.03	4.74	2.15	pCi/g
AAB2933	7.34	98.79	3.01	35.03	5.66	2.15	pCi/g
AAB2934	7.34	98.79	4.52	35.03	1.45	2.15	pCi/g
AAB2935	-7.34	98.79	-13.56	35.03	-2.07	2.15	pCi/g
AAB2936	-7.3	98.79	-6.03	35.03	-1.17	2.15	pCi/g
AAB2937	-7.34	98.79	0	35.03	-1.29	2.15	pCi/g
AAB2938	-7.34	98.79	6.03	35.03	0.71	2.15	pCi/g
AAB2939	-7.34	98.79	-10.55	35.03	0.43	2.15	pCi/g
AAB2940	-7.34	98.79	-3.01	35.03	0.59	2.15	pCi/g
AAB2941	-7.34	98.79	10.55	35.03	-3	2.15	pCi/g
AAB2942	14.67	98.79	0.75	35.03	4.81	2.15	pCi/g
AAB2943	29.35	138.2	8.29	35.03	8.82	2.15	pCi/g
AAB2944	14.67	98.79	36.91	49.66	9.97	2.15	pCi/g
AAB2945	0	98.79	11.3	35.03	10.52	2.15	pCi/g
AAB2946	0	98.79	15.82	35.03	9.24	2.15	pCi/g
AAB2947	0	98.79	8.29	35.03	1.15	2.15	pCi/g
AAB2949	-14.67	98.79	5.27	35.03	1.1	2.15	pCi/g
AAB2950	-14.67	98.79	-12.81	35.03	0.84	2.15	pCi/g
AAB2951	-14.67	98.79	-11.3	35.03	0.32	2.15	pCi/g
AAB2952	0	98.79	2.26	35.03	0.52	2.15	pCi/g
AAB2953	-14.67	98.79	-12.81	35.03	2.57	2.15	pCi/g
AAB2954	-14.67	98.79	-20.34	36.87	-2.06	2.15	pCi/g
AAB2955	-14.67	98.79	-3.77	35.03	6.3	2.15	pCi/g
AAB2956	-14.67	98.79	-14.31	35.03	8.32	2.15	pCi/g
AAB2957	-14.67	98.79	-2.26	35.03	9.1	2.15	pCi/g
AAB2958	-14.67	98.79	-3.77	35.03	8.26	2.15	pCi/g
AAB2959	-14.67	98.79	-6.78	35.03	8.77	2.15	pCi/g
AAB2960	0.2	2.02	0.15	4.86	-0.12	0.55	pCi/ml
AAB2961	0	2.02	-0.3	4.86	-0.03	0.55	pCi/ml
AAB2962	-14.67	98.79	-14.31	35.03	-0.39	2.15	pCi/g
AAB2963	0	98.79	-2.26	35.03	-4.63	2.15	pCi/g
AAB2964	0	98.79	-6.78	35.03	-3.48	2.15	pCi/g
AAB2965	0	98.79	0.75	35.03	-1.93	2.15	pCi/g
AAB2966	0	98.79	3.77	35.03	-1.43	2.15	pCi/g
AAB2967	0	98.79	-8.29	35.03	-0.73	2.15	pCi/g
AAB2968	0	98.79	-5.27	35.03	2.32	2.15	pCi/g
AAB2969	0	98.79	-5.27	35.03	-3.42	2.15	pCi/g
AAB2970	0	98.79	-8.29	35.03	-3.82	2.15	pCi/g
AAB2971	0	98.79	-6.78	35.03	-3.07	2.15	pCi/g
AAB2972	0	98.79	-0.75	35.03	3.78	2.15	pCi/g
AAB2973	0	98.79	-8.29	35.03	2.51	2.15	pCi/g
AAB2974	0	2.02	-0.3	4.86	-0.42	0.55	pCi/ml
AAB2975	0	2.02	-0.3	4.86	-0.1	0.55	pCi/ml
AAB2976	0	98.79	29.38	44.31	5.83	2.15	pCi/g
AAB2977	0	98.79	-9.79	35.03	2.62	2.15	pCi/g
AAB2978	0	98.79	-9.79	35.03	-1.73	2.15	pCi/g
AAB2979	0	98.79	2.26	35.03	0.05	2.15	pCi/g
AAB2980	0	98.79	3.77	35.03	1.71	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB2981	0	98.79	3.77	35.03	0.94	2.15	pCi/g
AAB2982	0	98.79	0.75	35.03	0.39	2.15	pCi/g
AAB2983	0	98.79	-0.75	35.03	1.46	2.15	pCi/g
AAB2984	14.67	98.79	2.26	35.03	2.84	2.15	pCi/g
AAB2985	0	98.79	5.27	35.03	3.31	2.15	pCi/g
AAB2986	0	98.79	33.14	47.06	-0.04	2.15	pCi/g
AAB2987	0	98.79	4.52	35.03	10.3	2.15	pCi/g
AAB2988	0	98.79	9.04	35.03	3.6	2.15	pCi/g
AAB2989	0	98.79	15.07	35.03	7.73	2.15	pCi/g
AAB2990	0	98.79	-9.04	35.03	-0.29	2.15	pCi/g
AAB2991	0	98.79	4.52	35.03	-0.26	2.15	pCi/g
AAB2992	0	98.79	-4.52	35.03	3.16	2.15	pCi/g
AAB2993	0	98.79	-4.52	35.03	1.45	2.15	pCi/g
AAB2994	0	98.79	-9.04	35.03	1.6	2.15	pCi/g
AAB2995	0	98.79	-12.05	35.03	1.44	2.15	pCi/g
AAB2996	0	98.79	-7.53	35.03	2.99	2.15	pCi/g
AAB2997	0	98.79	-1.51	35.03	0.93	2.15	pCi/g
AAB2998	0	98.79	6.03	35.03	5.03	2.15	pCi/g
AAB2999	14.67	98.79	9.04	35.03	8.54	2.15	pCi/g
AAB3000	0	98.79	-12.05	35.03	7.9	2.15	pCi/g
AAB3001	0	98.79	7.53	35.03	7.65	2.15	pCi/g
AAB3002	0	98.79	-6.03	35.03	0.55	2.15	pCi/g
AAB3003	29.35	138.2	-1.51	35.03	1.76	2.15	pCi/g
AAB3004	0	98.79	2.26	35.03	-0.86	2.15	pCi/g
AAB3005	0	98.79	-9.79	35.03	-2.09	2.15	pCi/g
AAB3006	0	98.79	17.33	35.03	-0.8	2.15	pCi/g
AAB3007	0	98.79	-6.78	35.03	-2.66	2.15	pCi/g
AAB3008	14.67	98.79	4.52	35.03	1.99	2.15	pCi/g
AAB3009	0	98.79	0	35.03	1.06	2.15	pCi/g
AAB3010	14.67	98.79	-9.04	35.03	1.16	2.15	pCi/g
AAB3011	0	98.79	-3.01	35.03	6.65	2.15	pCi/g
AAB3012	0	98.79	1.51	35.03	9.34	2.15	pCi/g
AAB3013	0	2.02	0	4.86	-0.99	2.15	pCi/ml
AAB3014	0	98.79	1.51	35.03	11.5	2.15	pCi/g
AAB3015	0	2.02	0.45	4.86	-0.95	2.15	pCi/ml
AAB3016	0	98.79	-15.07	35.03	20.14	2.15	pCi/g
AAB3017	0	98.79	-16.57	35.03	15.26	2.15	pCi/g
AAB3018	0	98.79	-15.07	35.03	10.36	2.15	pCi/g
AAB3019	7.34	98.79	3.77	35.03	3.3	2.15	pCi/g
AAB3021	7.34	98.79	80.6	73.39	4.16	2.15	pCi/g
AAB3022	36.68	154.51	89.64	77.39	2.73	2.15	pCi/g
AAB3023	7.34	98.79	51.98	58.93	0.17	2.15	pCi/g
AAB3024	7.34	98.79	35.4	48.64	3.51	2.15	pCi/g
AAB3025	66.03	207.3	18.83	35.47	5.6	2.15	pCi/g
AAB3026	36.68	154.51	11.3	35.03	3.65	2.15	pCi/g
AAB3027	80.7	229.17	56.49	61.44	10.18	2.15	pCi/g
AAB3028	66.03	207.3	41.43	52.62	12.69	2.15	pCi/g
AAB3029	51.35	182.82	70.05	68.42	11.38	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB3030	51.35	182.82	86.63	76.08	10.77	2.15	pCi/g
AAB3032	-7.34	98.79	50.47	58.07	3.8	2.15	pCi/g
AAB3033	36.68	154.51	-12.81	35.03	3.31	2.15	pCi/g
AAB3034	7.34	98.79	-9.79	35.03	0.72	2.15	pCi/g
AAB3035	7.34	98.79	3.77	35.03	2.15	2.15	pCi/g
AAB3036	7.34	98.79	-18.83	35.47	0.94	2.15	pCi/g
AAB3037	7.34	98.79	17.33	35.03	3.35	2.15	pCi/g
AAB3038	-7.34	98.79	-2.26	35.03	1.58	2.15	pCi/g
AAB3039	-7.34	98.79	-18.83	35.47	-0.25	2.15	pCi/g
AAB3040	-7.34	98.79	26.36	41.97	-1.49	2.15	pCi/g
AAB3041	22.01	119.68	2.26	35.03	6.07	2.15	pCi/g
AAB3042	7.34	98.79	-14.31	35.03	2.67	2.15	pCi/g
AAB3043	22.01	119.68	23.35	39.5	9.7	2.15	pCi/g
AAB3044	22.01	119.68	0.75	35.03	8.09	2.15	pCi/g
AAB3045	7.34	98.79	-15.82	35.03	-1.85	2.15	pCi/g
AAB3046	44.02	169.26	-5.27	35.03	2.86	2.15	pCi/g
AAB3047	14.67	98.79	-5.27	35.03	2.2	2.15	pCi/g
AAB3048	0	98.79	-5.27	35.03	3.05	2.15	pCi/g
AAB3049	-22.01	119.68	-9.04	35.03	2.74	2.15	pCi/g
AAB3050	-14.67	98.79	-29.38	44.31	2.71	2.15	pCi/g
AAB3051	-14.67	98.79	-21.84	38.21	1.89	2.15	pCi/g
AAB3052	0	98.79	-2.26	35.03	4.65	2.15	pCi/g
AAB3053	-0.61	2.35	-0.89	4.86	0.47	0.55	pCi/ml
AAB3054	-14.67	98.79	-30.88	45.43	7.13	2.15	pCi/g
AAB3055	0.2	2.02	-1.49	4.86	0.11	0.55	pCi/ml
AAB3056	44.02	169.26	-11.3	35.03	8.81	2.15	pCi/g
AAB3057	0	98.79	-20.34	36.87	6.14	2.15	pCi/g
AAB3058	44.02	169.26	18.83	35.47	9.7	2.15	pCi/g
AAB3059	14.67	98.79	29.38	44.31	8.22	2.15	pCi/g
AAB3060	29.35	138.2	21.84	38.21	6.68	2.15	pCi/g
AAB3061	14.67	98.79	38.42	50.67	8.86	2.15	pCi/g
AAB3062	0	98.79	7.53	35.03	2.2	2.15	pCi/g
AAB3063	0	98.79	-25.61	41.37	-0.4	2.15	pCi/g
AAB3064	-14.67	98.79	-25.61	41.37	1.5	2.15	pCi/g
AAB3065	0	98.79	-39.17	51.16	0.75	2.15	pCi/g
AAB3066	-14.67	98.79	-30.13	44.87	3.75	2.15	pCi/g
AAB3067	-14.67	98.79	-28.62	43.73	6.82	2.15	pCi/g
AAB3068	0	98.79	-0.75	35.03	5.51	2.15	pCi/g
AAB3069	-14.67	98.79	-29.38	44.31	8.38	2.15	pCi/g
AAB3070	44.02	169.26	12.81	35.03	9.96	2.15	pCi/g
AAB3071	14.67	98.79	-2.26	35.03	9.51	2.15	pCi/g
AAB3072	14.67	98.79	3.77	35.03	8.08	2.15	pCi/g
AAB3073	-14.67	96.79	-44.44	54.5	2.19	2.15	pCi/g
AAB3074	-14.67	98.79	-26.36	41.97	0.12	2.15	pCi/g
AAB3075	14.67	98.79	-9.79	35.03	-1.6	2.15	pCi/g
AAB3076	-14.67	98.79	-30.88	45.43	1.1	2.15	pCi/g
AAB3077	-14.67	98.79	-5.27	35.03	-2.16	2.15	pCi/g
AAB3078	-14.67	98.79	-9.79	35.03	0.85	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB3079	-29.35	138.2	-17.33	35.03	0.38	2.15	pCi/g
AAB3080	-29.35	138.2	-8.29	35.03	3.82	2.15	pCi/g
AAB3081	-29.35	138.2	-39.92	51.65	4.54	2.15	pCi/g
AAB3082	0	98.79	20.34	36.87	8.87	2.15	pCi/g
AAB3083	0	98.79	29.38	44.31	9.44	2.15	pCi/g
AAB3084	-14.67	98.79	-2.26	35.03	8.19	2.15	pCi/g
AAB3085	0	98.79	14.31	35.03	7.7	2.15	pCi/g
AAB3086	0	98.79	0.75	35.03	7.5	2.15	pCi/g
AAB3087	-7.34	98.79	-14.31	35.03	0.71	2.15	pCi/g
AAB3088	-7.34	98.79	-2.26	35.03	-0.08	2.15	pCi/g
AAB3089	7.34	98.79	-18.83	35.47	2.04	2.15	pCi/g
AAB3090	-22.01	119.68	-12.81	35.03	1.22	2.15	pCi/g
AAB3091	-7.34	98.79	-29.38	44.31	0.91	2.15	pCi/g
AAB3092	0.2	2.02	0.74	4.86	0.05	0.55	pCi/ml
AAB6121	-22.01	119.68	-6.03	35.03	-1.96	2.15	pCi/g
AAB6122	7.34	98.79	10.55	35.03	4.73	2.15	pCi/g
AAB6123	-7.34	98.79	15.07	35.03	4.84	2.15	pCi/g
AAB6124	7.34	98.79	13.56	35.03	5.77	2.15	pCi/g
AAB6125	0	98.79	-3.77	35.03	0.28	2.15	pCi/g
AAB6126	0	98.79	3.77	35.03	-0.07	2.15	pCi/g
AAB6127	0	98.79	5.27	35.03	-0.61	2.15	pCi/g
AAB6128	-7.34	98.79	3.01	35.03	-0.58	2.15	pCi/g
AAB6129	-7.34	98.79	24.1	40.13	0.22	2.15	pCi/g
AAB6130	-7.34	98.79	6.03	35.03	-0.79	2.15	pCi/g
AAB6131	-7.34	98.79	9.04	35.03	0.58	2.15	pCi/g
AAB6132	-7.34	98.79	-3.01	35.03	-1.84	2.15	pCi/g
AAB6133	22.01	119.68	12.05	35.03	-0.33	2.15	pCi/g
AAB6134	-7.34	98.79	7.53	35.03	1.72	2.15	pCi/g
AAB6135	-7.34	98.79	1.51	35.03	0.37	2.15	pCi/g
AAB6136	-7.34	98.79	3.01	35.03	-2.61	2.15	pCi/g
AAB6137	-7.34	98.79	-9.04	35.03	-2.2	2.15	pCi/g
AAB6138	-7.34	98.79	15.07	35.03	-2.4	2.15	pCi/g
AAB6139	-7.34	98.79	15.07	35.03	1.46	2.15	pCi/g
AAB6140	-7.34	98.79	16.57	35.03	6.31	2.15	pCi/g
AAB6141	0	2.02	-1.04	4.86	4.9	2.15	pCi/g
AAB6142	7.34	98.79	9.04	35.03	0.06	0.55	pCi/ml
AAB6143	0	2.02	-0.3	4.86	-0.63	2.15	pCi/g
AAB6144	0	98.79	-2.26	35.03	0.26	0.55	pCi/ml
AAB6145	7.34	98.79	-5.27	35.03	-0.53	2.15	pCi/g
AAB6146	-7.34	98.79	-2.26	35.03	0.43	2.15	pCi/g
AAB6147	-0.41	2.02	-1.19	4.86	2.81	2.15	pCi/g
AAB6148	0.2	2.02	4728.43	176.77	0	0.55	pCi/ml
AAB6149	-7.34	98.79	-5.27	35.03	-0.09	0.55	pCi/ml
AAB6150	-22.01	119.68	-9.79	35.03	9.51	2.15	pCi/g
AAB6151	-22.01	119.68	-2.26	35.03	8.25	2.15	pCi/g
AAB6152	-7.34	98.79	-6.78	35.03	7.55	2.15	pCi/g
AAB6153	-7.34	98.79	-0.75	35.03	13.13	2.15	pCi/g
AAB6154	-22.01	119.68	-0.75	35.03	12.8	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6155	-7.34	98.79	8.29	35.03	11.16	2.15	pCi/g
AAB6156	-22.01	119.68	-15.82	35.03	12.18	2.15	pCi/g
AAB6157	7.34	98.79	2.26	35.03	-0.9	2.15	pCi/g
AAB6158	-7.34	98.79	0.75	35.03	4.89	2.15	pCi/g
AAB6159	-7.34	98.79	-18.83	35.47	4.07	2.15	pCi/g
AAB6160	-7.34	98.79	-14.31	35.03	4.96	2.15	pCi/g
AAB6161	-22.01	119.68	-9.79	35.03	2.96	2.15	pCi/g
AAB6162	7.34	98.79	-11.3	35.03	0.43	2.15	pCi/g
AAB6163	-7.34	98.79	2.26	35.03	4.52	2.15	pCi/g
AAB6164	-7.34	98.79	-9.79	35.03	8.02	2.15	pCi/g
AAB6165	-7.34	98.79	12.81	35.03	10.14	2.15	pCi/g
AAB6166	-7.34	98.79	-12.81	35.03	9.29	2.15	pCi/g
AAB6167	-22.01	119.68	3.77	35.03	9.45	2.15	pCi/g
AAB6168	-7.34	98.79	-26.36	41.97	7.83	2.15	pCi/g
AAB6169	7.34	98.79	-11.3	35.03	3.23	2.15	pCi/g
AAB6170	-7.34	98.79	-27.87	43.16	2.96	2.15	pCi/g
AAB6171	-7.34	98.79	-18.83	35.47	3.82	2.15	pCi/g
AAB6172	-7.34	98.79	-15.82	35.03	3.25	2.15	pCi/g
AAB6173	7.34	98.79	-17.33	35.03	2.8	2.15	pCi/g
AAB6174	-7.34	98.79	-14.31	35.03	3.74	2.15	pCi/g
AAB6175	-7.34	98.79	-24.86	40.76	4.68	2.15	pCi/g
AAB6176	7.34	98.79	-18.83	35.47	7.61	2.15	pCi/g
AAB6177	-7.34	98.79	-3.77	35.03	10.2	2.15	pCi/g
AAB6178	-7.34	98.79	6.78	35.03	11.16	2.15	pCi/g
AAB6179	-7.34	98.79	0.75	35.03	10.71	2.15	pCi/g
AAB6180	7.34	98.79	-9.79	35.03	11.34	2.15	pCi/g
AAB6181	0	98.79	-8.29	35.03	2.72	2.15	pCi/g
AAB6182	0	98.79	-5.27	35.03	-5.05	2.15	pCi/g
AAB6183	0	98.79	-8.29	35.03	-0.7	2.15	pCi/g
AAB6184	0	98.79	-5.27	35.03	-1.53	2.15	pCi/g
AAB6185	0	98.79	-6.78	35.03	-3.8	2.15	pCi/g
AAB6186	14.67	98.79	0.75	35.03	-6.96	2.15	pCi/g
AAB6187	0	98.79	-8.29	35.03	-2.88	2.15	pCi/g
AAB6188	0	98.79	-6.78	35.03	-1.78	2.15	pCi/g
AAB6189	0	2.02	-0.3	4.86	3.44	2.15	pCi/g
AAB6190	0	2.02	-0.3	4.86	0.1	0.55	pCi/ml
AAB6191	0	98.79	2.26	35.03	0.12	0.55	pCi/ml
AAB6192	0	98.79	5.27	35.03	6.4	2.15	pCi/g
AAB6193	14.67	98.79	5.27	35.03	3.4	2.15	pCi/g
AAB6194	0	98.79	-3.77	35.03	2.3	2.15	pCi/g
AAB6195	0	98.79	14.31	35.03	6.65	2.15	pCi/g
AAB6196	0	98.79	2.26	35.03	6.05	2.15	pCi/g
AAB6197	0	98.79	-8.29	35.03	3.43	2.15	pCi/g
AAB6198	0	98.79	8.29	35.03	-5.83	2.15	pCi/g
AAB6199	0	98.79	-0.75	35.03	-2.48	2.15	pCi/g
AAB6200	0	98.79	-2.26	35.03	-4.09	2.15	pCi/g
AAB6201	0	98.79	-2.26	35.03	-2.4	2.15	pCi/g
AAB6202	0	98.79	-5.27	35.03	-5.59	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6203	0	98.79	11.3	35.03	-5.25	2.15	pCi/g
AAB6204	0	98.79	-9.79	35.03	-2.34	2.15	pCi/g
AAB6205	0	2.02	-0.3	4.86	-6.32	2.15	pCi/g
AAB6206	0	2.02	-0.3	4.86	-0.07	0.55	pCi/ml
AAB6207	0	98.79	-5.27	35.03	-0.02	0.55	pCi/ml
AAB6209	0	98.79	2.26	35.03	-0.72	2.15	pCi/g
AAB6210	0	98.79	-2.26	35.03	5.11	2.15	pCi/g
AAB6211	0	98.79	29.38	44.31	2.42	2.15	pCi/g
AAB6212	0	98.79	0.75	35.03	3.81	2.15	pCi/g
AAB6213	0	98.79	-8.29	35.03	4.69	2.15	pCi/g
AAB6214	-7.34	98.79	2.26	35.03	2.59	2.15	pCi/g
AAB6215	-7.34	98.79	15.82	35.03	4.42	2.15	pCi/g
AAB6216	-7.34	98.79	3.77	35.03	3.7	2.15	pCi/g
AAB6217	-7.34	98.79	2.26	35.03	1.57	2.15	pCi/g
AAB6218	-7.34	98.79	2.26	35.03	0.83	2.15	pCi/g
AAB6219	22.01	119.68	6.78	35.03	1.18	2.15	pCi/g
AAB6220	-7.34	98.79	8.29	35.03	1.54	2.15	pCi/g
AAB6221	-7.34	98.79	2.26	35.03	4.3	2.15	pCi/g
AAB6222	-7.34	98.79	6.78	35.03	2.73	2.15	pCi/g
AAB6223	36.68	154.51	9.79	35.03	7.12	2.15	pCi/g
AAB6224	7.34	98.79	11.3	35.03	11.39	2.15	pCi/g
AAB6225	-7.34	98.79	9.79	35.03	11.04	2.15	pCi/g
AAB6226	7.34	98.79	12.81	35.03	11.21	2.15	pCi/g
AAB6227	22.01	119.68	5.27	35.03	10.63	2.15	pCi/g
AAB6228	0	98.79	-6.03	35.03	1	2.15	pCi/g
AAB6229	0	98.79	9.04	35.03	22.53	2.15	pCi/g
AAB6230	29.35	138.2	12.05	35.03	19.97	2.15	pCi/g
AAB6231	14.67	98.79	1.51	35.03	-3.54	2.15	pCi/g
AAB6232	0	98.79	6.03	35.03	-2.46	2.15	pCi/g
AAB6233	14.67	98.79	-1.51	35.03	16.94	2.15	pCi/g
AAB6234	0	98.79	-6.03	35.03	16.25	2.15	pCi/g
AAB6235	0	98.79	-4.52	35.03	12.6	2.15	pCi/g
AAB6236	0	98.79	-6.03	35.03	13.88	2.15	pCi/g
AAB6237	0	98.79	10.55	35.03	16.83	2.15	pCi/g
AAB6238	14.67	98.79	1.51	35.03	14.05	2.15	pCi/g
AAB6239	0.41	2.02	27.26	13.42	-0.15	0.55	pCi/ml
AAB6240	0	2.02	-0.3	4.86	-0.13	0.55	pCi/ml
AAB6241	0	98.79	6.03	35.03	5.33	2.15	pCi/g
AAB6242	14.67	98.79	0	35.03	12.79	2.15	pCi/g
AAB6243	0	98.79	4.52	35.03	5.34	2.15	pCi/g
AAB6244	0	98.79	-9.04	35.03	12.29	2.15	pCi/g
AAB6245	0	98.79	-6.03	35.03	2.64	2.15	pCi/g
AAB6246	0	98.79	0	35.03	4.25	2.15	pCi/g
AAB6247	0	98.79	-3.01	35.03	3.22	2.15	pCi/g
AAB6248	0	98.79	-18.08	35.03	4.48	2.15	pCi/g
AAB6249	0	98.79	-12.05	35.03	4.28	2.15	pCi/g
AAB6250	0	98.79	-10.55	35.03	7.61	2.15	pCi/g
AAB6251	0	98.79	-10.55	35.03	12.23	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6252	0	98.79	-7.53	35.03	9.86	2.15	pCi/g
AAB6253	0	98.79	-3.01	35.03	17.44	2.15	pCi/g
AAB6254	0	98.79	-10.55	35.03	20.47	2.15	pCi/g
AAB6255	0	98.79	-13.56	35.03	18.02	2.15	pCi/g
AAB6256	0	98.79	0	35.03	16.37	2.15	pCi/g
AAB6257	0	98.79	-15.07	35.03	19.8	2.15	pCi/g
AAB6258	-7.34	98.79	-3.77	35.03	-1.31	2.15	pCi/g
AAB6259	7.34	97.79	-8.29	35.03	-1.19	2.15	pCi/g
AAB6260	22.01	119.68	6.78	35.03	-0.49	2.15	pCi/g
AAB6261	7.34	98.79	-21.84	38.21	-0.27	2.15	pCi/g
AAB6262	-7.34	98.79	-17.33	35.03	1.17	2.15	pCi/g
AAB6263	-7.34	98.79	-8.29	35.03	1.11	2.15	pCi/g
AAB6264	36.68	154.51	23.35	39.5	15.07	2.15	pCi/g
AAB5265	-7.34	98.79	-2.26	35.03	1.74	2.15	pCi/g
AAB6266	22.01	119.68	-14.31	35.03	1.34	2.15	pCi/g
AAB6267	22.01	119.68	17.33	35.03	7.53	2.15	pCi/g
AAB6268	36.68	154.51	-6.78	35.03	30.91	2.15	pCi/g
AAB6269	66.03	207.3	11.3	35.03	8.01	2.15	pCi/g
AAB6270	-7.34	98.79	9.79	35.03	29.56	2.15	pCi/g
AAB6271	7.34	98.79	29.38	44.31	24.66	2.15	pCi/g
AAB6272	7.34	98.79	-4.52	35.03	27.02	2.15	pCi/g
AAB6273	7.34	97.79	-11.3	35.03	1.53	2.15	pCi/g
AAB6274	-7.34	98.79	5.27	35.03	-0.47	2.15	pCi/g
AAB6275	22.01	119.68	-8.29	35.03	-3.95	2.15	pCi/g
AAB6276	-22.01	119.68	-28.62	43.73	-1.68	2.15	pCi/g
AAB6277	7.34	98.79	-12.05	35.03	-0.47	2.15	pCi/g
AAB6278	-0.2	2.02	-0.45	4.86	0.03	0.55	pCi/ml
AAB6279	-0.61	2.35	0.74	4.86	0.37	0.55	pCi/ml
AAB6280	7.34	98.79	-18.08	35.03	-2.22	2.15	pCi/g
AAB6281	-7.34	98.79	-20.34	36.87	26.51	2.15	pCi/g
AAB6282	-0.41	2.02	0.15	4.86	0.52	0.55	pCi/ml
AAB6283	-0.81	2.71	0.15	4.86	0.42	0.55	pCi/ml
AAB6284	22.01	119.68	4.52	35.03	3.55	2.15	pCi/g
AAB6285	7.34	98.79	1.51	35.03	8.47	2.15	pCi/g
AAB6286	66.03	207.3	12.05	35.03	-6.74	2.15	pCi/g
AAB6287	7.34	98.79	-12.81	35.03	8.73	2.15	pCi/g
AAB6288	7.34	98.79	15.82	35.03	33.12	2.15	pCi/g
AAB6289	7.34	98.79	-15.82	35.03	37.68	2.15	pCi/g
AAB6291	-14.67	98.79	27.87	43.16	9.99	2.15	pCi/g
AAB6292	0	98.79	26.36	41.97	2.27	2.15	pCi/g
AAB6293	-14.67	98.79	-3.01	35.03	-19.25	3.28	pCi/g
AAB6294	-14.67	98.79	-15.07	35.03	-31.82	4.21	pCi/g
AAB6295	-14.67	98.79	-13.56	35.03	-36.41	5.68	pCi/g
AAB6296	-14.67	98.79	88.88	77.07	-39.42	6.71	pCi/g
AAB6297	44.02	169.26	6809.49	674.56	132.23	3.38	pCi/g
AAB6298	0	98.79	726.14	220.28	41.3	2.15	pCi/g
AAB6299	0	98.79	1520.08	318.71	49.05	2.15	pCi/g
AAB6300	0	98.79	-24.1	40.13	-0.13	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6301	0	98.79	9.04	35.03	2.9	2.15	pCi/g
AAB6302	-14.67	98.79	-12.05	35.03	3.86	2.15	pCi/g
AAB6303	0	98.79	1.51	35.03	9.84	2.15	pCi/g
AAB6304	14.67	98.79	16.57	35.03	11.04	2.15	pCi/g
AAB6305	0	98.79	3.01	35.03	9.06	2.15	pCi/g
AAB6306	29.35	138.2	27.12	42.57	10.47	2.15	pCi/g
AAB6307	44.02	169.26	3156.17	459.24	74.6	2.54	pCi/g
AAB6308	0	98.79	5.27	35.03	-0.32	2.15	pCi/g
AAB6309	-14.67	98.79	6.78	35.03	-0.57	2.15	pCi/g
AAB6310	-29.35	138.2	-11.3	35.03	0.85	2.15	pCi/g
AAB6311	-29.35	138.2	-39.92	51.65	0.43	2.15	pCi/g
AAB6312	7.34	98.79	-24.86	40.76	-0.83	2.15	pCi/g
AAB6313	-22.01	119.68	-42.94	53.56	1.63	2.15	pCi/g
AAB6314	-7.34	98.79	2.26	35.03	3.33	2.15	pCi/g
AAB6316	22.01	119.68	-3.77	35.03	8.5	2.15	pCi/g
AAB6317	-22.01	119.68	-8.29	35.03	6.32	2.15	pCi/g
AAB6318	-7.34	98.79	-8.29	35.03	8.2	2.15	pCi/g
AAB6319	7.34	98.79	6.78	35.03	10.09	2.15	pCi/g
AAB6320	-7.34	98.79	12.81	35.03	6.9	2.15	pCi/g
AAB6321	-58.69	195.44	-4.52	35.03	-0.74	2.15	pCi/g
AAB6322	-29.35	138.2	0	35.03	-1.51	2.15	pCi/g
AAB6323	-58.69	195.44	25.61	41.37	1.74	2.15	pCi/g
AAB6324	-44.02	169.26	15.07	35.03	1.43	2.15	pCi/g
AAB6325	-14.67	98.79	10.55	35.03	3.41	2.15	pCi/g
AAB6326	-29.35	138.2	12.05	35.03	3.39	2.15	pCi/g
AAB6327	-0.2	2.02	1.04	4.86	-0.92	0.55	pCi/ml
AAB6328	-0.2	2.02	0.45	4.86	-0.59	0.55	pCi/ml
AAB6329	0	98.79	21.09	37.54	4.56	2.15	pCi/g
AAB6330	-29.35	138.2	7.53	35.03	-1.12	2.15	pCi/g
AAB6331	-29.35	138.2	21.09	37.54	4.91	2.15	pCi/g
AAB6332	29.35	138.2	49.72	57.64	11.48	2.15	pCi/g
AAB6333	44.02	169.26	55.74	61.03	11.36	2.15	pCi/g
AAB6334	-29.35	138.2	39.17	51.16	11.69	2.15	pCi/g
AAB6335	14.67	98.79	55.74	61.03	6.02	2.15	pCi/g
AAB6336	-58.69	195.44	-7.53	35.03	-1.87	2.15	pCi/g
AAB6337	-14.67	98.79	116	88.04	6.44	2.15	pCi/g
AAB6338	-14.67	98.79	-1.51	35.03	0.71	2.15	pCi/g
AAB6339	0	98.79	185.3	111.28	9.88	2.15	pCi/g
AAB6340	14.67	98.79	69.3	68.05	3.29	2.15	pCi/g
AAB6341	-14.67	98.79	-18.08	35.03	3.13	2.15	pCi/g
AAB6342	0	98.79	0	35.03	5.04	2.15	pCi/g
AAB6343	-14.67	98.79	-27.12	42.57	3.89	2.15	pCi/g
AAB6344	-14.67	98.79	-21.09	37.54	11.11	2.15	pCi/g
AAB6345	-14.67	98.79	-24.1	40.13	12.38	2.15	pCi/g
AAB6346	14.67	98.79	7.53	35.03	11.31	2.15	pCi/g
AAB6347	14.67	98.79	9.04	35.03	12.36	2.15	pCi/g
AAB6348	29.35	138.2	-13.56	35.03	9.89	2.15	pCi/g
AAB6349	-14.67	98.79	673.42	212.13	16.03	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6350	44.02	169.26	9.04	35.03	1.61	2.15	pCi/g
AAB6351	14.67	96.79	24.1	40.13	-0.98	2.15	pCi/g
AAB6352	29.35	138.2	13.56	35.03	-0.95	2.15	pCi/g
AAB6353	0	98.79	24.1	40.13	1.41	2.15	pCi/g
AAB6354	0.2	2.02	-0.89	4.86	0.23	0.55	pCi/ml
AAB6355	0	2.02	-1.49	4.86	0.54	0.55	pCi/ml
AAB6356	14.67	98.79	-7.53	35.03	-0.4	2.15	pCi/g
AAB6357	29.35	138.2	18.08	35.03	0.92	2.15	pCi/g
AAB6358	29.35	138.2	13.56	35.03	0.81	2.15	pCi/g
AAB6359	117.38	276.39	43.69	54.03	5.64	2.15	pCi/g
AAB6360	58.69	195.44	49.72	57.64	8.61	2.15	pCi/g
AAB6361	44.02	169.26	72.31	69.51	8.5	2.15	pCi/g
AAB6362	44.02	169.26	64.78	65.79	7.16	2.15	pCi/g
AAB6363	36.68	154.51	18.08	35.03	3.84	2.15	pCi/g
AAB6364	22.01	119.68	25.61	41.37	4.36	2.15	pCi/g
AAB6365	22.01	119.68	36.16	49.15	4.34	2.15	pCi/g
AAB6366	51.35	182.82	0	35.03	2.29	2.15	pCi/g
AAB6367	-0.41	2.02	0.45	4.86	-0.27	0.55	pCi/ml
AAB6368	-0.41	2.02	-4.32	5.34	-0.3	0.55	pCi/ml
AAB6369	7.34	98.79	12.05	35.03	2.47	2.15	pCi/g
AAB6370	7.34	98.79	6.03	35.03	1.48	2.15	pCi/g
AAB6371	80.7	229.17	28.62	43.73	4.77	2.15	pCi/g
AAB6372	22.01	119.68	19.58	36.18	5.65	2.15	pCi/g
AAB6373	36.68	154.51	16.57	35.03	4.01	2.15	pCi/g
AAB6374	66.03	207.3	48.21	56.76	8.11	2.15	pCi/g
AAB6375	110.04	267.62	57.25	61.85	9.44	2.15	pCi/g
AAB6376	51.35	182.82	22.6	38.86	8.04	2.15	pCi/g
AAB6377	7.34	98.79	9.04	35.03	8.81	2.15	pCi/g
AAB6378	51.35	182.82	25.61	41.37	11.12	2.15	pCi/g
AAB6379	29.35	138.2	0.75	35.03	4.34	2.15	pCi/g
AAB6380	29.35	138.2	61.01	63.85	2.36	2.15	pCi/g
AAB6381	14.67	98.79	11.3	35.03	1.37	2.15	pCi/g
AAB6382	14.67	98.79	26.36	41.97	1.02	2.15	pCi/g
AAB6383	14.67	98.79	38.42	50.67	1.79	2.15	pCi/g
AAB6384	-29.35	138.2	32.39	46.52	4.35	2.15	pCi/g
AAB6385	29.35	138.2	11.3	35.03	2.6	2.15	pCi/g
AAB6386	14.67	98.79	24.86	40.76	4.12	2.15	pCi/g
AAB6387	-14.67	98.79	14.31	35.03	4.49	2.15	pCi/g
AAB6388	0	98.79	30.88	45.43	11.04	2.15	pCi/g
AAB6389	14.67	98.79	26.36	41.97	11.82	2.15	pCi/g
AAB6390	0	98.79	18.83	35.47	13.15	2.15	pCi/g
AAB6391	14.67	98.79	-5.27	35.03	2.07	2.15	pCi/g
AAB6392	14.67	98.79	3.77	35.03	3.63	2.15	pCi/g
AAB6393	0	98.79	-11.3	35.03	0.56	2.15	pCi/g
AAB6394	29.35	138.2	-23.35	39.5	-0.13	2.15	pCi/g
AAB6395	14.67	98.79	-9.79	35.03	2.94	2.15	pCi/g
AAB6396	14.67	98.79	14.31	35.03	2.59	2.15	pCi/g
AAB6397	29.35	138.2	113.74	87.18	4.26	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6398	29.35	138.2	9.79	35.03	2.87	2.15	pCi/g
AAB6399	58.69	195.44	18.83	35.47	4.61	2.15	pCi/g
AAB6400	0	98.79	-18.83	35.47	7.84	2.15	pCi/g
AAB6401	14.67	98.79	9.79	35.03	7.52	2.15	pCi/g
AAB6402	0	98.79	23.35	39.5	10.53	2.15	pCi/g
AAB6403	73.36	218.51	12.81	35.03	10.18	2.15	pCi/g
AAB6404	14.67	98.79	18.83	35.47	9.6	2.15	pCi/g
AAB6405	58.69	195.44	18.08	35.03	4.8	2.15	pCi/g
AAB6406	14.67	98.79	-3.01	35.03	0.31	2.15	pCi/g
AAB6407	-14.67	98.79	314.86	145.05	9.74	2.15	pCi/g
AAB6408	0	98.79	438.4	171.16	16.34	2.15	pCi/g
AAB6409	29.35	138.2	183.8	110.82	7.94	2.15	pCi/g
AAB6410	58.69	195.44	216.94	120.4	6.91	2.15	pCi/g
AAB6411	14.67	98.79	260.63	131.97	7.24	2.15	pCi/g
AAB6412	14.67	98.79	2056.4	370.69	32.6	2.15	pCi/g
AAB6413	0	2.02	0.15	4.86	0.02	0.55	pCi/ml
AAB6414	-22.01	119.68	-42.94	53.56	0.65	2.15	pCi/g
AAB6417	-22.01	119.68	-26.36	41.97	6.03	2.15	pCi/g
AAB6418	22.01	119.68	-0.75	35.03	10.01	2.15	pCi/g
AAB6419	-7.34	98.79	-14.31	35.03	7.36	2.15	pCi/g
AAB6420	-7.34	98.79	-15.82	35.03	5.23	2.15	pCi/g
AAB6421	7.34	98.79	-7.53	35.03	9.52	2.15	pCi/g
AAB6422	7.34	98.79	-19.58	36.18	9.7	2.15	pCi/g
AAB6423	-7.34	98.79	-24.1	40.13	2.24	2.15	pCi/g
AAB6424	-7.34	98.79	-37.66	50.17	0.29	2.15	pCi/g
AAB6425	51.35	182.82	3.01	35.03	0.39	2.15	pCi/g
AAB6426	7.34	98.79	-3.01	35.03	3.24	2.15	pCi/g
AAB6427	7.34	98.79	-15.07	35.03	1.97	2.15	pCi/g
AAB6428	7.34	98.79	-21.09	37.54	2.64	2.15	pCi/g
AAB6429	7.34	98.79	-19.58	36.18	10.91	2.15	pCi/g
AAB6430	51.35	182.82	13.56	35.03	10.3	2.15	pCi/g
AAB6431	22.01	119.68	-3.01	35.03	10.94	2.15	pCi/g
AAB6432	22.01	119.68	24.1	40.13	6.3	2.15	pCi/g
AAB6433	66.03	207.3	1.51	35.03	8.61	2.15	pCi/g
AAB6434	22.01	119.68	48.21	56.76	1.94	2.15	pCi/g
AAB6435	-14.67	98.79	12.05	35.03	3.12	2.15	pCi/g
AAB6436	-58.69	195.44	7.53	35.03	2.45	2.15	pCi/g
AAB6437	-58.69	195.44	15.07	35.03	2.18	2.15	pCi/g
AAB6438	-14.67	98.79	-9.04	35.03	1.42	2.15	pCi/g
AAB6439	22.01	119.68	-15.07	35.03	5.13	2.15	pCi/g
AAB6440	0	98.79	42.18	53.09	7.55	2.15	pCi/g
AAB6441	0	98.79	24.1	40.13	6.99	2.15	pCi/g
AAB6442	14.67	98.79	22.6	38.86	6.26	2.15	pCi/g
AAB6443	29.35	138.2	75.33	70.95	5.34	2.15	pCi/g
AAB6444	-7.34	98.79	18.08	35.03	8.15	2.15	pCi/g
AAB6445	51.35	182.82	25.61	41.37	7.21	2.15	pCi/g
AAB6446	51.35	182.82	30.13	44.87	9.34	2.15	pCi/g
AAB6447	-7.34	98.79	-19.58	36.18	-1.4	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6448	-22.01	119.68	10.55	35.03	-1.63	2.15	pCi/g
AAB6449	-7.34	98.79	-4.52	35.03	-0.75	2.15	pCi/g
AAB6450	36.68	154.51	-9.04	35.03	-3.52	2.15	pCi/g
AAB6451	0	98.79	21.84	38.21	1.86	2.15	pCi/g
AAB6452	-0.61	2.35	-0.74	4.86	-0.43	0.55	pCi/ml
AAB6453	-0.41	2.02	0	4.86	-0.2	0.55	pCi/ml
AAB6454	102.71	258.54	11.3	35.03	6.88	2.15	pCi/g
AAB6455	73.36	218.51	29.38	44.31	8.1	2.15	pCi/g
AAB6456	29.35	138.2	27.87	43.16	11.6	2.15	pCi/g
AAB6457	58.69	195.44	30.88	45.43	10.72	2.15	pCi/g
AAB6458	73.36	218.51	12.81	35.03	9.89	2.15	pCi/g
AAB6458D	14.67	98.79	27.87	43.16	6.99	2.15	pCi/g
AAB6459	14.67	98.79	27.87	43.16	9.04	2.15	pCi/g
AAB6460	88.04	239.36	41.43	52.62	9.21	2.15	pCi/g
AAB6461	-14.67	98.79	-9.04	35.03	0.96	2.15	pCi/g
AAB6462	0	98.79	-27.12	42.57	2.15	2.15	pCi/g
AAB6463	29.35	138.2	-18.08	35.03	0.01	2.15	pCi/g
AAB6464	0	98.79	-28.62	43.73	2.85	2.15	pCi/g
AAB6465	14.67	98.79	0	35.03	-1.8	2.15	pCi/g
AAB6466	0	98.79	-4.52	35.03	4.04	2.15	pCi/g
AAB6467	0	98.79	-30.13	44.87	1.97	2.15	pCi/g
AAB6468	0	98.79	-45.2	54.96	5.33	2.15	pCi/g
AAB6469	14.67	98.79	-12.05	35.03	9.94	2.15	pCi/g
AAB6470	-14.67	98.79	-1.51	35.03	9.34	2.15	pCi/g
AAB6471	0	98.79	-25.61	41.37	7.81	2.15	pCi/g
AAB6472	14.67	98.79	-19.58	36.18	-0.04	2.15	pCi/g
AAB6473	-7.34	98.79	-14.31	35.03	2.28	2.15	pCi/g
AAB6474	36.68	154.51	6.78	35.03	3.02	2.15	pCi/g
AAB6475	7.34	98.79	-14.31	35.03	1.09	2.15	pCi/g
AAB6476	36.68	154.51	6.78	35.03	4.68	2.15	pCi/g
AAB6477	66.03	207.3	18.83	35.47	2.38	2.15	pCi/g
AAB6478	22.01	119.68	8.29	35.03	4.98	2.15	pCi/g
AAB6479	36.68	154.51	15.82	35.03	8.66	2.15	pCi/g
AAB6480	36.68	154.51	18.83	35.47	12.6	2.15	pCi/g
AAB6481	80.7	229.17	86.63	76.08	10.22	2.15	pCi/g
AAB6482	51.35	182.82	77.59	72	8.15	2.15	pCi/g
AAB6483	36.68	154.51	14.31	35.03	7.28	2.15	pCi/g
AAB6484	7.3	98.79	59.51	63.06	3.86	2.15	pCi/g
AAB6485	29.35	138.2	8.29	35.03	-0.79	2.15	pCi/g
AAB6486	-14.67	98.79	14.31	35.03	-0.27	2.15	pCi/g
AAB6487	-14.67	98.79	17.33	35.03	-2.33	2.15	pCi/g
AAB6488	14.67	98.79	6.78	35.03	0.55	2.15	pCi/g
AAB6489	-14.67	98.79	14.31	35.03	1.94	2.15	pCi/g
AAB6490	44.02	169.26	23.35	39.5	1.04	2.15	pCi/g
AAB6491	-29.35	138.2	-32.39	46.52	0.43	2.15	pCi/g
AAB6492	73.36	218.51	17.33	35.03	6.96	2.15	pCi/g
AAB6493	0	2.02	-1.49	4.86	-0.29	0.55	pCi/ml
AAB6494	0.2	2.02	0.6	4.86	-0.74	0.55	pCi/ml

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6495	44.02	169.26	47.46	56.31	7.41	2.15	pCi/g
AAB6496	44.02	169.26	71.56	69.15	9.13	2.15	pCi/g
AAB6497	14.67	98.79	62.52	64.64	9.37	2.15	pCi/g
AAB6498	0	98.79	41.43	52.62	5.02	2.15	pCi/g
AAB6499	14.67	98.79	59.51	63.06	6.17	2.15	pCi/g
AAB6500	29.35	138.2	36.91	49.66	6.23	2.15	pCi/g
AAB6501	-14.67	98.79	11.3	35.03	1.65	2.15	pCi/g
AAB6502	29.35	138.2	17.33	35.03	2.29	2.15	pCi/g
AAB6503	73.36	218.51	3.77	35.03	2.31	2.15	pCi/g
AAB6504	-29.35	138.2	-14.31	35.03	3.02	2.15	pCi/g
AAB6505	0	98.79	-9.79	35.03	1.69	2.15	pCi/g
AAB6506	29.35	138.2	8.29	35.03	4.5	2.15	pCi/g
AAB6507	29.35	138.2	-12.81	35.03	1.36	2.15	pCi/g
AAB6508	-14.67	98.79	20.34	36.87	3.78	2.15	pCi/g
AAB6509	-29.35	138.2	30.88	45.43	1.97	2.15	pCi/g
AAB6510	-29.35	138.2	51.98	58.93	5.25	2.15	pCi/g
AAB6511	-14.67	98.79	23.35	39.5	3.29	2.15	pCi/g
AAB6512	0	98.79	15.82	35.03	-2	2.15	pCi/g
AAB6513	-29.35	138.2	3.77	35.03	0.81	2.15	pCi/g
AAB6516	-29.35	138.2	-5.27	35.03	0.18	2.15	pCi/g
AAB6517	14.67	98.79	21.84	38.21	2.24	2.15	pCi/g
AAB6518	-14.67	98.79	20.34	36.87	-0.03	2.15	pCi/g
AAB6519	14.67	98.79	36.91	49.66	0.41	2.15	pCi/g
AAB6520	0	98.79	-8.29	35.03	1.33	2.15	pCi/g
AAB6521	-14.67	98.79	11.3	35.03	1.93	2.15	pCi/g
AAB6522	0	98.79	12.81	35.03	3.06	2.15	pCi/g
AAB6523	0	98.79	9.79	35.03	2.55	2.15	pCi/g
AAB6524	0	98.79	-0.75	35.03	3.93	2.15	pCi/g
AAB6525	-14.67	98.79	12.81	35.03	0.38	2.15	pCi/g
AAB6526	14.67	98.79	-4.52	35.03	4.12	2.15	pCi/g
AAB6527	29.35	138.2	-22.6	38.86	3.36	2.15	pCi/g
AAB6528	0	98.79	15.07	35.03	4.6	2.15	pCi/g
AAB6529	14.67	98.79	4.52	35.03	4.46	2.15	pCi/g
AAB6530	14.67	98.79	7.53	35.03	4.85	2.15	pCi/g
AAB6531	-14.67	98.79	-21.09	37.54	3.62	2.15	pCi/g
AAB6532	-14.67	98.79	-10.55	35.03	2.25	2.15	pCi/g
AAB6533	29.35	138.2	12.05	35.03	4.3	2.15	pCi/g
AAB6534	0	98.79	9.04	35.03	4.19	2.15	pCi/g
AAB6535	29.35	138.2	9.04	35.03	2.81	2.15	pCi/g
AAB6536	44.02	169.26	28.62	43.73	1.51	2.15	pCi/g
AAB6537	22.01	119.68	-6.78	35.03	3.43	2.15	pCi/g
AAB6538	-0.41	2.02	-2.23	4.86	-0.64	0.55	pCi/ml
AAB6539	0.2	2.02	-1.79	4.86	-0.62	0.55	pCi/ml
AAB6540	22.01	119.68	24.86	40.76	8.52	2.15	pCi/g
AAB6541	7.34	98.79	26.36	41.97	7.63	2.15	pCi/g
AAB6542	-0.41	2.02	-2.38	4.86	-0.72	0.55	pCi/ml
AAB6543	0.2	2.02	0.74	4.86	-0.9	0.55	pCi/ml
AAB6544	66.03	207.3	9.79	35.03	8.07	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6545	7.34	98.79	9.79	35.03	8.81	2.15	pCi/g
AAB6546	36.68	154.51	21.84	38.21	8.14	2.15	pCi/g
AAB6547	51.35	182.82	36.91	49.66	7.91	2.15	pCi/g
AAB6548	7.34	98.79	24.86	40.76	8.63	2.15	pCi/g
AAB6549	51.35	182.82	11.3	35.03	6.13	2.15	pCi/g
AAB6550	22.01	119.68	45.95	55.41	10.19	2.15	pCi/g
AAB6551	22.01	119.68	29.38	44.31	5.24	2.15	pCi/g
AAB6552	-66.03	207.3	6.03	35.03	1.5	2.15	pCi/g
AAB6553	-36.68	154.51	-22.6	38.86	3.23	2.15	pCi/g
AAB6554	-7.34	98.79	-31.64	45.98	3.33	2.15	pCi/g
AAB6555	-66.03	207.3	-45.2	54.96	5.08	2.15	pCi/g
AAB6556	-66.03	207.3	-30.13	44.87	7.88	2.15	pCi/g
AAB6557	-36.68	154.51	-1.51	35.03	7.81	2.15	pCi/g
AAB6558	-66.03	207.3	-13.56	35.03	7.16	2.15	pCi/g
AAB6559	7.34	98.79	-1.51	35.03	6.67	2.15	pCi/g
AAB6560	-7.34	98.79	-7.53	35.03	7.15	2.15	pCi/g
AAB6561	-66.03	207.3	-21.09	37.54	6.97	2.15	pCi/g
AAB6562	-36.68	154.51	18.08	35.03	8.9	2.15	pCi/g
AAB6563	-22.01	119.68	-12.05	35.03	4.23	2.15	pCi/g
AAB6565	-80.7	229.17	-51.22	58.5	-0.46	2.15	pCi/g
AAB6566	-22.01	119.68	-37.66	50.17	3.16	2.15	pCi/g
AAB6567	-80.7	229.17	-40.68	52.14	5.53	2.15	pCi/g
AAB6568	-66.03	207.3	-28.62	43.73	6.22	2.15	pCi/g
AAB6569	14.67	98.79	1764.14	343.34	53.45	2.4	pCi/g
AAB6570	73.36	218.51	2121.18	376.49	67.96	0.55	pCi/ml
AAB6571	-0.2	2.02	-0.74	4.86	-0.29	0.55	pCi/ml
AAB6572	0	2.02	0.45	4.86	-0.57	3.54	pCi/g
AAB6573	14.67	98.79	2041.34	369.33	148.45	2.21	pCi/g
AAB6574	44.02	169.26	1752.09	342.17	57.89	2.15	pCi/g
AAB6575	44.02	169.26	305.82	142.95	11.71	2.15	pCi/g
AAB6576	29.35	138.2	43.69	54.03	9.16	2.15	pCi/g
AAB6577	88.04	239.36	13.56	35.03	9.88	2.15	pCi/g
AAB6578	44.02	169.26	13.56	35.03	9.4	2.15	pCi/g
AAB6579	132.05	293.16	61.77	64.25	9.17	2.77	pCi/g
AAB6580	29.35	138.2	4188.13	529.02	90.98	2.15	pCi/g
AAB6582	51.35	182.82	11.3	35.03	2.22	11.41	pCi/g
AAB6583	7.34	98.79	109.22	85.43	1478.07	8.51	pCi/g
AAB6584	22.01	119.68	27996.47	1367.77	822.52	2.15	pCi/g
AAB6586	44.02	169.26	95.66	79.95	1.51	2.15	pCi/g
AAB6587	29.35	138.2	41.43	52.62	6.87	0.55	pCi/ml
AAB6588	6.31	7.55	9.53	7.94	-0.03	0.55	pCi/ml
AAB6589	-0.2	2.02	-1.34	4.86	-0.73	2.15	pCi/g
AAB6590	44.02	169.26	48.96	57.2	11.96	2.15	pCi/g
AAB6591	-14.67	98.79	54.99	60.62	11.34	2.15	pCi/g
AAB6592	14.67	98.79	24.86	40.76	17.32	2.15	pCi/g
AAB6593	29.35	138.2	38.42	50.67	16.42	2.15	pCi/g
AAB6594	0	98.79	51.98	58.93	27.39	2.15	pCi/g
AAB6595	212.75	372.11	34466.99	1517.62	4.32	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB6596	36.68	154.51	67.04	66.93	5.14	2.15	pCi/g
AAB6597	7.34	98.79	-11.3	35.03	4.57	2.15	pCi/g
AAB6598	7.34	98.79	29.38	44.31	3.21	2.15	pCi/g
AAB6599	22.01	119.68	-8.29	35.03	5.13	2.15	pCi/g
AAB6600	36.68	154.51	18.83	35.47	2.81	2.15	pCi/g
AAB6601	36.68	154.51	12.81	35.03	4.95	2.15	pCi/g
AAB6602	22.01	119.68	3.77	35.03	4.2	2.15	pCi/g
AAB6603	110.04	267.62	62.52	64.64	4.34	2.15	pCi/g
AAB6603D	7.34	98.79	59.51	63.06	N/A		pCi/g
AAB6604	22.01	119.68	689.99	214.73	15.23	2.15	pCi/g
AAB6605	22.01	119.68	49.72	57.64	1.82	2.15	pCi/g
AAB6606	7.34	98.79	37.66	50.17	0.93	2.15	pCi/g
AAB6607	51.35	182.82	1003.34	258.93	22.41	2.15	pCi/g
AAB6608	7.34	98.79	82.86	74.41	4.43	2.15	pCi/g
AAB6609	22.01	119.68	30.13	44.87	-0.4	2.15	pCi/g
AAB6610	-7.34	98.79	12.05	35.03	2.26	2.15	pCi/g
AAB6611	22.01	119.68	13.56	35.03	3.04	2.15	pCi/g
AAB6612	36.67	207.3	24.1	40.13	7.14	2.15	pCi/g
AAB6613	51.35	182.82	-1.51	35.03	5.38	2.15	pCi/g
AAB6614	44.02	267.62	49.72	57.64	7.83	2.15	pCi/g
AAB6615	-22.01	119.68	-16.57	35.03	1.3	2.15	pCi/g
AAB6616	-7.34	98.79	43.69	54.03	13.71	2.15	pCi/g
AAB6617	-22.01	119.68	1.51	35.03	8.73	2.15	pCi/g
AAB6618	-7.34	98.79	12.05	35.03	19.36	2.15	pCi/g
AAB6619	-7.34	98.79	31.64	45.98	10.75	2.15	pCi/g
AAB6620	-0.61	2.35	-2.53	4.86	-0.58	0.55	pCi/ml
AAB6621	-0.61	2.35	0	4.86	-0.5	0.55	pCi/ml
AAB6622	-22.01	119.68	-27.12	42.57	1.86	2.15	pCi/g
AAB6623	7.34	98.79	27.12	42.57	9.74	2.15	pCi/g
AAB6624	-7.34	98.79	37.66	50.17	9.86	2.15	pCi/g
AAB8641	36.68	154.51	39.17	51.16	10.16	2.15	pCi/g
AAB8642	7.34	98.79	3.01	35.03	1.03	2.15	pCi/g
AAB8643	7.34	98.79	66.29	66.55	0.6	2.15	pCi/g
AAB8644	-7.34	98.79	3.01	35.03	1.55	2.15	pCi/g
AAB8645	-80.7	229.17	-33.14	47.06	6.47	2.15	pCi/g
AAB8646	-51.35	182.82	-13.56	35.03	6.84	2.15	pCi/g
AAB8647	-51.35	182.82	-28.62	43.73	5.05	2.15	pCi/g
AAB8648	-66.03	207.3	-21.09	37.54	5.49	2.15	pCi/g
AAB8649	-80.7	229.17	-40.68	52.14	5.55	2.15	pCi/g
AAB8650	-51.35	182.82	-7.53	35.03	5.73	2.15	pCi/g
AAB8651	7.34	98.79	18.08	35.03	6.44	2.15	pCi/g
AAB8652	-66.03	207.3	-7.53	35.03	4.44	2.15	pCi/g
AAB8653	14.67	98.79	20.34	36.87	22.1	2.15	pCi/g
AAB8654	0	98.79	32.39	46.52	12.9	2.15	pCi/g
AAB8655	-0.2	2.02	-3.43	4.86	-0.79	0.55	pCi/ml
AAB8656	-0.2	2.02	-3.43	4.86	-0.51	0.55	pCi/ml
AAB8657	-14.67	98.79	-3.77	35.03	15.39	2.15	pCi/g
AAB8658	-14.67	98.79	20.34	36.87	10.3	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB8659	-14.67	98.79	26.36	41.97	9.63	2.15	pCi/g
AAB8660	-14.67	98.79	42.94	53.56	7.99	2.15	pCi/g
AAB8661	0	98.79	56.49	61.44	5.13	2.15	pCi/g
AAB8662	0	98.79	20.34	36.87	4.79	2.15	pCi/g
AAB8663	-29.35	138.2	24.86	40.76	4.59	2.15	pCi/g
AAB8664	-14.67	98.79	27.87	43.16	9.1	2.15	pCi/g
AAB8665	14.67	98.79	33.9	47.59	6.6	2.15	pCi/g
AAB8666	14.67	98.79	18.83	35.47	1.61	2.15	pCi/g
AAB8668	-7.34	98.79	-19.58	36.18	5.09	2.15	pCi/g
AAB8669	7.34	98.79	4.52	35.03	5.35	2.15	pCi/g
AAB8671	-7.34	98.79	9.04	35.03	5.23	2.15	pCi/g
AAB8672	-7.34	98.79	-30.13	44.87	4.38	2.15	pCi/g
AAB8673	66.03	207.3	21.09	37.54	5.06	2.15	pCi/g
AAB8674	51.35	182.82	16.57	35.03	4.32	2.15	pCi/g
AAB8675	22.01	119.68	22.6	38.86	5.56	2.15	pCi/g
AAB8676	36.68	154.51	33.14	47.06	3.61	2.15	pCi/g
AAB8677	7.34	98.79	-1.51	35.03	4.2	2.15	pCi/g
AAB8678	36.68	154.51	69.3	68.05	4.53	2.15	pCi/g
AAB8679	7.34	98.79	22.6	38.86	1.69	2.15	pCi/g
AAB8680	29.35	138.2	5.27	35.03	2.65	2.15	pCi/g
AAB8681	29.35	138.2	20.34	36.87	5.52	2.15	pCi/g
AAB8682	29.35	138.2	24.86	40.76	7.38	2.15	pCi/g
AAB8683	0	98.79	-30.88	45.43	5.79	2.15	pCi/g
AAB8684	14.67	98.79	-20.34	36.87	5.95	2.15	pCi/g
AAB8685	14.67	98.79	-0.75	35.03	5.65	2.15	pCi/g
AAB8686	14.67	98.79	-3.77	35.03	4.99	2.15	pCi/ml
AAB8687	0	2.02	-3.58	4.86	0.42	0.55	pCi/ml
AAB8688	0	2.02	-3.87	5.06	-0.11	0.55	pCi/g
AAB8689	44.02	169.26	12.81	35.03	6.21	2.15	pCi/g
AAB8690	44.02	169.26	21.84	38.21	2.85	2.15	pCi/g
AAB8691	0	98.79	9.79	35.03	1.14	2.15	pCi/g
AAB8692	0	98.79	29.38	44.31	2.22	2.15	pCi/g
AAB8693	14.67	98.79	6.78	35.03	2.64	2.15	pCi/g
AAB8694	0	98.79	30.88	45.43	-1.57	2.15	pCi/g
AAB8695	14.67	98.79	5.27	35.03	-0.14	2.15	pCi/g
AAB8696	-14.67	98.79	15.82	35.03	-1.9	2.15	pCi/g
AAB8697	-14.67	98.79	20.34	36.87	-1.79	2.15	pCi/g
AAB8698	29.35	138.2	35.4	48.64	-1.17	2.15	pCi/g
AAB8699	73.36	218.51	23.35	39.5	-1.05	2.15	pCi/g
AAB8700	22.01	119.68	-32.39	46.52	-0.54	2.15	pCi/g
AAB8701	7.34	98.79	-20.34	36.87	-0.53	2.15	pCi/g
AAB8702	-7.34	98.79	-15.82	35.03	2.46	2.15	pCi/g
AAB8703	22.01	119.68	12.81	35.03	1.11	2.15	pCi/g
AAB8704	7.34	98.79	-14.31	35.03	1.11	2.15	pCi/g
AAB8705	7.34	98.79	-12.81	35.03	1.95	2.15	pCi/g
AAB8706	36.68	154.51	2.26	35.03	2.39	2.15	pCi/g
AAB8707	7.34	98.79	-9.79	35.03	2.64	2.15	pCi/g
AAB8708	58.69	195.44	18.08	35.03	1.05	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB8709	7.34	98.79	12.81	35.03	1.19	2.15	pCi/g
AAB8710	-29.35	138.2	9.04	35.03	4.31	2.15	pCi/g
AAB8711	0	98.79	13.56	35.03	3.62	2.15	pCi/g
AAB8712	0	98.79	10.55	35.03	7.19	2.15	pCi/g
AAB8713	-14.67	98.79	-10.55	35.03	8.52	2.15	pCi/g
AAB8714	-14.67	98.79	-4.52	35.03	1.73	2.15	pCi/g
AAB8715	-14.67	98.79	-10.55	35.03	2.45	2.15	pCi/g
AAB8716	14.67	98.79	-4.52	35.03	3.49	2.15	pCi/g
AAB8717	14.67	98.79	20.34	36.87	2	2.15	pCi/g
AAB8718	0	98.79	9.79	35.03	4.13	2.15	pCi/g
AAB8719	-14.67	98.79	27.87	43.16	4.82	2.15	pCi/g
AAB8720	14.67	98.79	-15.82	35.03	4.65	2.15	pCi/g
AAB8721	0	98.79	20.34	36.87	7.66	2.15	pCi/g
AAB8722	14.67	98.79	-11.3	35.03	2.21	2.15	pCi/g
AAB8723	14.67	98.79	20.34	36.87	-0.41	2.15	pCi/g
AAB8724	0	2.02	-2.98	4.86	-0.29	0.55	pCi/ml
AAB8725	1.42	3.59	5.81	6.2	-0.21	0.55	pCi/ml
AAB8726	58.69	195.44	51.98	58.93	2.01	2.15	pCi/g
AAB8727	29.35	138.2	41.43	52.62	0.97	2.15	pCi/g
AAB8728	0	98.79	11.3	35.03	-2.49	2.15	pCi/g
AAB9201	14.67	98.79	10.55	35.03	4.07	2.15	pCi/g
AAB9202	-14.67	98.79	-4.52	35.03	4.58	2.15	pCi/g
AAB9203	-14.67	98.79	-4.52	35.03	5.04	2.15	pCi/g
AAB9204	14.67	98.79	33.14	47.06	5.4	2.15	pCi/g
AAB9205	-14.67	98.79	10.55	35.03	5.53	2.15	pCi/g
AAB9206	-29.35	138.2	27.12	42.57	8.83	2.15	pCi/g
AAB9207	-29.35	138.2	18.08	35.03	9.15	2.15	pCi/g
AAB9208	-29.35	138.2	22.6	38.86	9.53	2.15	pCi/g
AAB9209	14.67	98.79	42.18	53.09	8.77	2.15	pCi/g
AAB9210	14.67	98.79	22.6	38.86	6.49	2.15	pCi/g
AAB9211	7.34	98.79	18.83	35.47	0.38	2.15	pCi/g
AAB9212	-22.01	119.68	0.75	35.03	3.12	2.15	pCi/g
AAB9213	7.34	98.79	14.31	35.03	3.78	2.15	pCi/g
AAB9214	22.01	119.68	0.75	35.03	3.58	2.15	pCi/g
AAB9215	36.68	154.51	29.38	44.31	4.49	2.15	pCi/g
AAB9216	-22.01	119.68	21.84	38.21	3.73	2.15	pCi/g
AAB9217	22.01	119.68	33.9	47.59	5.57	2.15	pCi/g
AAB9218	0	2.02	-0.74	4.86	-0.31	0.55	pCi/ml
AAB9219	0	2.02	-2.23	4.86	-0.25	0.55	pCi/ml
AAB9220	22.01	119.68	12.81	35.03	5.27	2.15	pCi/g
AAB9221	7.34	98.79	58	62.26	6.32	2.15	pCi/g
AAB9222	7.34	98.79	44.44	54.5	6.73	2.15	pCi/g
AAB9223	58.69	207.3	38.42	50.67	3.31	2.15	pCi/g
AAB9224	-22.01	119.68	30.88	45.43	3.67	2.15	pCi/g
AAB9225	7.34	98.79	20.34	36.87	3.98	2.15	pCi/g
AAB9226	-22.01	119.68	291.51	139.57	12.47	2.15	pCi/g
AAB9227	22.01	119.68	586.79	198.02	15.49	2.15	pCi/g
AAB9228	-22.01	119.68	14.31	35.03	5.79	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB9229	7.34	98.79	30.88	45.43	5.47	2.15	pCi/g
AAB9230	22.01	119.68	33.9	47.59	6.64	2.15	pCi/g
AAB9231	22.01	119.68	15.82	35.03	4.15	2.15	pCi/g
AAB9232	-7.34	98.79	36.91	49.66	5.26	2.15	pCi/g
AAB9233	22.01	119.68	30.88	45.43	5.75	2.15	pCi/g
AAB9234	7.34	98.79	58	62.26	6.18	2.15	pCi/g
AAB9235	0	98.79	13.56	35.03	4.29	2.15	pCi/g
AAB9236	44.02	169.26	-3.01	35.03	5.74	2.15	pCi/g
AAB9237	0	98.79	-19.58	36.18	7.38	2.15	pCi/g
AAB9238	14.67	98.79	19.58	36.18	5.61	2.15	pCi/g
AAB9239	0	98.79	64.78	65.79	8.56	2.15	pCi/g
AAB9240	14.67	98.79	19.58	36.18	6.08	2.15	pCi/g
AAB9241	14.67	98.79	36.16	49.15	4.79	2.15	pCi/g
AAB9242	14.67	98.79	28.62	43.73	4.27	2.15	pCi/g
AAB9243	14.67	98.79	16.57	35.03	6.38	2.15	pCi/g
AAB9244	14.67	98.79	60.26	63.46	7.99	2.15	pCi/g
AAB9245	0	98.79	18.08	35.03	7.72	2.15	pCi/g
AAB9246	58.69	195.44	138.6	96.24	8.27	2.15	pCi/g
AAB9247	14.67	98.79	-9.04	35.03	1.04	2.15	pCi/g
AAB9248	14.67	98.79	33.14	47.06	1.41	2.15	pCi/g
AAB9249	0	98.79	40.68	52.14	3.27	2.15	pCi/g
AAB9250	0	98.79	4.52	35.03	7.53	2.15	pCi/g
AAB9251	14.67	98.79	18.08	35.03	3.26	2.15	pCi/g
AAB9252	-14.67	98.79	-1.51	35.03	6.37	2.15	pCi/g
AAB9253	58.69	195.44	97.92	80.89	8.59	2.15	pCi/g
AAB9254	-0.41	2.02	-2.83	4.86	-0.37	0.55	pCi/ml
AAB9255	-0.41	2.02	-2.23	4.86	-0.01	0.55	pCi/ml
AAB9256	29.35	138.2	58.75	62.66	6.97	2.15	pCi/g
AAB9257	-44.02	169.26	2.26	35.03	3.09	2.15	pCi/g
AAB9258	0	98.79	-32.39	46.52	0.79	2.15	pCi/g
AAB9259	0	98.79	-3.77	35.03	1.13	2.15	pCi/g
AAB9260	0	98.79	9.79	35.03	4.46	2.15	pCi/g
AAB9261	-44.02	169.26	-50.47	58.07	7.28	2.15	pCi/g
AAB9262	0	2.02	0.15	4.86	-0.16	0.55	pCi/ml
AAB9263	0.61	2.35	0.45	4.86	-0.24	0.55	pCi/ml
AAB9264	-44.02	169.26	-47.46	56.31	6.22	2.15	pCi/g
AAB9265	-14.67	98.79	-9.79	35.03	12.87	2.15	pCi/g
AAB9266	-44.02	169.26	3.77	35.03	13.28	2.15	pCi/g
AAB9267	-44.02	169.26	-14.31	35.03	13.46	2.15	pCi/g
AAB9269	0	98.79	-18.83	35.47	3.71	2.15	pCi/g
AAB9270	0	98.79	-6.78	35.03	0.87	2.15	pCi/g
AAB9271	14.67	98.79	9.79	35.03	5.17	2.15	pCi/g
AAB9272	44.02	169.26	45.95	55.41	11.17	2.15	pCi/g
AAB9273	0	98.79	8.29	35.03	-0.01	2.15	pCi/g
AAB9274	0	98.79	-12.81	35.03	3.48	2.15	pCi/g
AAB9275	29.35	138.2	35.4	48.64	10.84	2.15	pCi/g
AAB9276	29.35	138.2	17.33	35.03	12	2.15	pCi/g
AAB9277	0	98.79	5.27	35.03	10.3	2.15	pCi/g

Table 7-3
TA-10
MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB9278	-3.69	83.28	26.69	90.73	2.5	2.15	pCi/g
AAB9279	-3.69	83.28	116.37	104.98	1.26	2.15	pCi/g
AAB9280	3.69	83.28	60.85	90.73	-0.32	2.15	pCi/g
AAB9281	-3.69	83.28	-11.74	90.73	0.7	2.15	pCi/g
AAB9282	-3.69	83.28	41.64	90.73	0.64	2.15	pCi/g
AAB9283	11.07	83.28	43.77	90.73	6.09	2.15	pCi/g
AAB9284	18.45	83.28	30.96	90.73	4.92	2.15	pCi/g
AAB9285	-3.69	83.28	28.83	90.73	5.23	2.15	pCi/g
AAB9286	3.69	83.28	13.88	90.73	4.02	2.15	pCi/g
AAB9287	-3.69	83.28	-9.61	90.73	0.65	2.15	pCi/g
AAB9288	3.69	83.28	39.5	90.73	-3.06	2.15	pCi/g
AAB9289	3.69	83.28	28.83	90.73	1.47	2.15	pCi/g
AAB9290	11.07	83.28	86.48	90.73	2.26	2.15	pCi/g
AAB9291	0.41	2.02	-0.15	4.86	-0.1	0.55	pCi/ml
AAB9292	0	2.02	0.15	4.86	0.1	0.55	pCi/ml
AAB9293	3.69	83.28	50.18	90.73	8.45	2.15	pCi/g
AAB9294	40.59	115.27	575.44	233.45	6.33	2.15	pCi/g
AAB9295	-3.69	83.28	124.91	108.77	5.6	2.15	pCi/g
AAB9296	18.45	83.28	131.32	111.52	7.07	2.15	pCi/g
AAB9297	-22.01	119.68	-9.04	35.03	2.14	2.15	pCi/g
AAB9298	7.34	98.79	-4.52	35.03	-0.67	2.15	pCi/g
AAB9299	36.68	154.51	3.01	35.03	0.99	2.15	pCi/g
AAB9300	-7.34	98.79	49.72	57.64	5.9	2.15	pCi/g
AAB9301	7.34	98.79	21.09	37.54	2.58	2.15	pCi/g
AAB9302	7.34	98.79	4.52	35.03	6.58	2.15	pCi/g
AAB9303	0.2	2.02	-0.74	4.86	0.22	0.55	pCi/ml
AAB9304	0.2	2.02	1.19	4.86	0.35	0.55	pCi/ml
AAB9305	-22.01	119.68	25.61	41.37	2.33	2.15	pCi/g
AAB9306	22.01	119.68	27.12	42.57	8.2	2.15	pCi/g
AAB9307	22.01	119.68	30.13	44.87	5.69	2.15	pCi/g
AAB9308	36.68	154.51	39.17	51.16	8.28	2.15	pCi/g
AAB9309	22.01	119.68	4914.28	573.05	136.29	3.26	pCi/g
AAB9310	95.37	249.14	55.74	61.03	5.82	2.15	pCi/g
AAB9311	7.34	98.79	1012.38	260.1	33.86	2.15	pCi/g
AAB9312	7.34	98.79	842.15	237.22	26.53	2.15	pCi/g
AAB9313	-7.34	98.79	-6.03	35.03	-2.21	2.15	pCi/g
AAB9314	7.34	98.79	15.07	35.03	-2.27	2.15	pCi/g
AAB9315	7.34	98.79	7.53	35.03	-2.86	2.15	pCi/g
AAB9316	-7.34	98.79	27.12	42.57	4.43	2.15	pCi/g
AAB9317	29.35	138.2	36.16	49.15	4.45	2.15	pCi/g
AAB9318	-14.67	98.79	21.09	37.54	2.14	2.15	pCi/g
AAB9319	-0.81	2.71	-3.87	5.06	0.01	0.55	pCi/ml
AAB9320	-0.81	2.71	-3.72	4.96	-0.06	0.55	pCi/ml
AAB9321	14.67	98.79	31.64	45.98	5.91	2.15	pCi/g
AAB9322	29.35	138.2	24.1	40.13	4.44	2.15	pCi/g
AAB9323	0	98.79	34.65	48.12	4.79	2.15	pCi/g
AAB9324	0	98.79	16.57	35.03	4.42	2.15	pCi/g
AAB9325	29.35	138.2	49.72	57.64	8.7	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB9326	44.02	169.26	30.13	44.87	8.45	2.15	pCi/g
AAB9327	22.01	119.68	36.16	49.15	1.97	2.15	pCi/g
AAB9328	51.35	182.82	30.13	44.87	3.07	2.15	pCi/g
AAB9329	-7.34	98.79	6.03	35.03	2.5	2.15	pCi/g
AAB9330	-7.34	98.79	75.33	70.95	1.15	2.15	pCi/g
AAB9331	22.01	119.66	32.39	46.52	2.28	2.15	pCi/g
AAB9332	51.35	182.82	29.38	44.31	0.69	2.15	pCi/g
AAB9333	-7.34	98.79	24.86	40.76	7.75	2.15	pCi/g
AAB9334	66.03	207.3	32.39	46.52	9.95	2.15	pCi/g
AAB9335	-22.01	119.68	59.51	63.06	9.42	2.15	pCi/g
AAB9336	7.34	98.79	23.35	39.5	8.99	2.15	pCi/g
AAB9337	-7.34	98.79	622.19	203.9	12.34	2.15	pCi/g
AAB9338	0	2.02	-0.82	4.86	0.52	0.55	pCi/ml
AAB9339	0.41	2.02	8.42	7.46	0.83	0.55	pCi/ml
AAB9340	36.68	154.51	100.94	82.13	11.81	2.15	pCi/g
AAB9341	51.35	182.82	9668.87	803.8	251.7	5.64	pCi/g
AAB9342	22.01	119.66	30758.69	1433.66	893.01	10.62	pCi/g
AAB9343	29.35	138.2	90562.39	2460.01	764	8.53	pCi/g
AAB9344	14.67	98.79	1831.18	349.81	72.72	2.63	pCi/g
AAB9345	0	98.79	133.33	94.39	0.51	2.15	pCi/g
AAB9346	-14.67	98.79	-8.29	35.03	-0.43	2.15	pCi/g
AAB9347	14.67	98.79	42.94	53.56	0.19	2.15	pCi/g
AAB9348	44.02	169.26	33.9	47.59	10.69	2.15	pCi/g
AAB9349	58.69	195.44	77.59	72	18.86	2.15	pCi/g
AAB9350	73.36	218.51	29.38	44.31	18.01	2.15	pCi/g
AAB9351	-7.34	98.79	-31.64	45.98	2.12	2.15	pCi/g
AAB9352	36.68	154.51	4.52	35.03	5.37	2.15	pCi/g
AAB9353	7.34	98.79	-13.56	35.03	4.37	2.15	pCi/g
AAB9354	-7.34	98.79	-21.09	37.54	4.26	2.15	pCi/g
AAB9355	7.34	98.79	-4.52	35.03	2.82	2.15	pCi/g
AAB9356	7.34	98.79	6.03	35.03	4.04	2.15	pCi/g
AAB9357	22.01	119.68	10.55	35.03	2.23	2.15	pCi/g
AAB9358	7.34	98.79	0	35.03	10.42	2.15	pCi/g
AAB9359	22.01	119.68	-3.01	35.03	12.73	2.15	pCi/g
AAB9360	6.89	101.39	51	67.93	3.46	2.15	pCi/g
AAB9361	20.66	112.36	6801.64	784.52	329.48	5.54	pCi/g
AAB9362	-6.89	101.39	12544.47	1065.43	237.06	4.7	pCi/g
AAB9363	-6.89	101.39	79.56	84.85	491.36	6.76	pCi/g
AAB9364	-6.89	101.39	3400.82	554.74	417.84	6.23	pCi/g
AAB9365	20.66	112.36	128.53	107.84	21.04	2.15	pCi/g
AAB9366	-6.89	101.39	-2.04	58.69	19.74	2.15	pCi/g
AAB9367	-6.89	101.39	8.16	58.69	6.47	2.15	pCi/g
AAB9368	20.66	112.36	-6.12	58.69	19.21	2.15	pCi/g
AAB9369	0	98.79	27.87	43.16	6.66	2.15	pCi/g
AAB9370	14.67	98.79	53.48	59.78	4.43	2.15	pCi/g
AAB9371	73.36	218.51	41.43	52.62	4.28	2.15	pCi/g
AAB9372	14.67	98.79	23.35	39.5	4.08	2.15	pCi/g
AAB9373	-0.2	2.02	-1.04	4.86	-0.04	0.55	pCi/ml

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB9374	0.2	2.02	8.49	7.49	-0.42	0.55	pCi/ml
AAB9375	22.01	119.68	-16.57	35.03	1.58	2.15	pCi/g
AAB9376	7.34	98.79	-6.03	35.03	2.98	2.15	pCi/g
AAB9377	7.34	98.79	-28.62	43.73	4.72	2.15	pCi/g
AAB9378	13.78	101.39	25.5	58.69	3.61	2.15	pCi/g
AAB9379	0	101.39	-5.1	58.69	7.74	2.15	pCi/g
AAB9380	13.78	101.39	11.22	58.69	9.45	2.15	pCi/g
AAB9381	-13.78	101.39	-7.14	58.69	6.27	2.15	pCi/g
AAB9382	22.01	119.68	33.14	47.06	4.73	2.15	pCi/g
AAB9383	-7.34	98.79	4.52	35.03	4.06	2.15	pCi/g
AAB9384	7.34	98.79	16.57	35.03	3.16	2.15	pCi/g
AAB9385	0	101.39	19.38	58.69	4.77	2.15	pCi/g
AAB9386	41.33	158.9	13.26	58.69	5.23	2.15	pCi/g
AAB9387	-13.78	101.39	-21.42	58.69	4.26	2.15	pCi/g
AAB9388	-13.78	101.39	-7.14	58.69	4.49	2.15	pCi/g
AAB9389	0	101.39	9.18	58.69	6.3	2.15	pCi/g
AAB9390	55.1	183.49	37.74	58.69	11.22	2.15	pCi/g
AAB9391	13.78	101.39	-11.22	58.69	4.01	2.15	pCi/g
AAB9392	55.1	183.49	27.54	58.69	10.24	2.15	pCi/g
AAB9393	27.55	129.74	25.5	58.69	9.39	2.15	pCi/g
AAB9394	0	101.39	-17.34	58.69	10.63	2.15	pCi/g
AAB9397	-6.89	101.39	-14.28	58.69	15.32	2.15	pCi/g
AAB9398	20.66	112.36	16.32	58.69	15.78	2.15	pCi/g
AAB9399	20.66	112.36	-8.15	58.69	11.14	2.15	pCi/g
AAB9421	-7.34	98.79	-27.12	42.57	0.01	2.15	pCi/g
AAB9422	14.67	98.79	33.14	47.06	2.82	2.15	pCi/g
AAB9423	44.02	169.26	198.86	115.28	0.57	2.15	pCi/g
AAB9424	44.02	169.26	64.78	65.79	8.18	2.15	pCi/g
AAB9425	58.69	195.44	75.33	70.95	8.75	2.15	pCi/g
AAB9426	58.69	195.44	76.83	71.65	9.32	2.15	pCi/g
AAB9427	14.67	98.79	9.04	35.03	7.53	2.15	pCi/g
AAB9428	29.35	138.2	40421.53	1643.5	791.83	8.46	pCi/g
AAB9429	-7.34	98.79	14.31	35.03	3.51	2.15	pCi/g
AAB9430	7.34	98.79	11.3	35.03	2.1	2.15	pCi/g
AAB9431	-7.34	98.79	5.27	35.03	1.26	2.15	pCi/g
AAB9432	7.34	98.79	14.31	35.03	3.66	2.15	pCi/g
AAB9433	7.34	98.79	20.34	36.87	3.74	2.15	pCi/g
AAB9434	22.01	119.68	47.46	56.31	2.14	2.15	pCi/g
AAB9435	14.67	98.79	49.72	57.64	1.93	2.15	pCi/g
AAB9436	14.67	98.79	24.1	40.13	1.71	2.15	pCi/g
AAB9437	0	98.79	18.08	35.03	0.4	2.15	pCi/g
AAB9438	29.35	138.2	25.61	41.37	-0.01	2.15	pCi/g
AAB9439	88.04	239.36	61.77	64.25	3.85	2.15	pCi/g
AAB9440	-0.41	2.02	-2.83	4.86	-0.1	0.55	pCi/ml
AAB9441	-0.2	2.02	-2.23	4.86	0.26	0.55	pCi/ml
AAB9442	-29.35	138.2	2.26	35.03	3.6	2.15	pCi/g
AAB9443	0	98.79	9.79	35.03	3.95	2.15	pCi/g
AAB9444	-14.67	98.79	-2.26	35.03	-0.48	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB9445	-14.67	98.79	-11.3	35.03	-0.84	2.15	pCi/g
AAB9446	-44.02	169.26	-33.9	47.59	-0.15	2.15	pCi/g
AAB9447	58.69	195.44	32.39	46.52	-0.47	2.15	pCi/g
AAB9448	-44.02	169.26	-53.48	59.78	1.78	2.15	pCi/g
AAB9449	-44.02	169.26	-29.38	44.31	-0.34	2.15	pCi/g
AAB9450	44.02	169.26	15.82	35.03	1.96	2.15	pCi/g
AAB9451	14.67	98.79	-8.29	35.03	5.39	2.15	pCi/g
AAB9452	-14.67	98.79	-38.42	50.67	6.18	2.15	pCi/g
AAB9453	0	101.39	-6.12	58.69	2.37	2.15	pCi/g
AAB9454	-14.67	98.79	21.84	38.21	5.43	2.15	pCi/g
AAB9455	0	101.39	28.56	58.69	2.77	2.15	pCi/g
AAB9456	0	101.39	8.16	58.69	3.09	2.15	pCi/g
AAB9457	0	101.39	-10.2	58.69	3	2.15	pCi/g
AAB9458	0.2	2.02	-0.89	4.86	-0.18	0.55	pCi/ml
AAB9459	0.41	2.02	1.79	4.86	-0.59	0.55	pCi/ml
AAB9460	27.55	129.74	28.56	58.69	3.38	2.15	pCi/g
AAB9461	0	101.39	24.48	58.69	5.96	2.15	pCi/g
AAB9462	27.55	129.74	36.72	58.69	5.15	2.15	pCi/g
AAB9463	13.78	101.39	-6.12	58.69	8.86	2.15	pCi/g
AAB9464	0	101.39	-12.24	58.69	6.07	2.15	pCi/g
AAB9465	27.55	129.74	-12.24	58.69	10.32	2.15	pCi/g
AAB9466	-3.69	83.28	56.58	90.73	-3.41	2.15	pCi/g
AAB9467	3.69	83.28	75.8	90.73	-2.95	2.15	pCi/g
AAB9468	-3.69	83.28	84.34	90.73	-4.41	2.15	pCi/g
AAB9469	-3.69	83.28	50.18	90.73	-4.26	2.15	pCi/g
AAB9470	-3.69	83.23	39.5	90.73	-2.79	2.15	pCi/g
AAB9471	33.21	83.28	67.26	90.73	-5.08	2.15	pCi/g
AAB9472	11.07	83.28	37.37	90.73	-1.23	2.15	pCi/g
AAB9473	-3.69	83.28	45.91	90.73	5.82	2.15	pCi/g
AAB9474	3.69	83.28	52.31	90.73	-1.45	2.15	pCi/g
AAB9475	-3.69	83.28	67.26	90.73	5.41	2.15	pCi/g
AAB9476	-3.69	83.28	67.26	90.73	3.76	2.15	pCi/g
AAB9477	3.69	83.28	71.53	90.73	-4.52	2.15	pCi/g
AAB9478	3.69	83.28	54.45	90.73	-4.22	2.15	pCi/g
AAB9479	-3.69	83.28	-5.34	90.73	-4.09	2.15	pCi/g
AAB9480	-3.69	83.28	67.26	90.73	-0.62	2.15	pCi/g
AAB9481	-3.69	83.28	62.99	90.73	5.59	2.15	pCi/g
AAB9482	3.69	83.28	11.74	90.73	-1.88	2.15	pCi/g
AAB9483	3.69	83.28	52.31	90.73	-3.31	2.15	pCi/g
AAB9484	3.69	83.28	71.53	90.73	0.21	2.15	pCi/g
AAB9485	11.07	83.28	73.66	90.73	5.01	2.15	pCi/g
AAB9486	-3.69	83.28	3.2	90.73	2.67	2.15	pCi/g
AAB9487	-3.69	83.28	37.37	90.73	11.46	2.15	pCi/g
AAB9488	3.69	83.28	28.83	90.73	2.76	2.15	pCi/g
AAB9489	-3.69	83.28	48.04	90.73	2.69	2.15	pCi/g
AAB9490	3.69	83.28	24.55	90.73	6.31	2.15	pCi/g
AAB9491	-3.69	83.28	-5.34	90.73	5.17	2.15	pCi/g
AAB9492	-3.69	83.28	11.74	90.73	1.34	2.15	pCi/g

Table 7-3
TA-10
MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB9493	3.69	83.28	11.74	90.73	4.31	2.15	pCi/g
AAB9494	36.68	154.51	10.55	35.03	2.73	2.15	pCi/g
AAB9495	7.34	98.79	-10.55	35.03	6.62	2.15	pCi/g
AAB9496	-7.34	98.79	10.55	35.03	8.47	2.15	pCi/g
AAB9497	-7.34	98.79	22.6	38.86	8.34	2.15	pCi/g
AAB9498	14.67	98.79	3.77	35.03	1.49	2.15	pCi/g
AAB9501	44.02	169.26	18.83	35.47	1.52	2.15	pCi/g
AAB9502	14.67	98.79	-15.82	35.03	0.45	2.15	pCi/g
AAB9503	0	2.02	0.89	4.86	0.22	0.55	pCi/ml
AAB9504	0.41	2.02	0.45	4.86	0.07	0.55	pCi/ml
AAB9505	0	98.79	-29.38	44.31	2.96	2.15	pCi/g
AAB9506	14.67	98.79	-2.26	35.03	2.66	2.15	pCi/g
AAB9507	0	98.79	-20.34	36.87	4.93	2.15	pCi/g
AAB9508	0	98.79	8.29	35.03	7.25	2.15	pCi/g
AAB9509	14.67	98.79	11.3	35.03	7.97	2.15	pCi/g
AAB9510	73.36	218.51	35.4	48.64	9.72	2.15	pCi/g
AAB9511	58.69	195.44	24.86	40.76	4.72	2.15	pCi/g
AAB9512	51.35	182.82	6.03	35.03	-1.6	2.15	pCi/g
AAB9513	-0.41	2.02	-1.42	4.86	0.4	0.55	pCi/ml
AAB9514	-0.61	2.35	-1.42	4.86	-2.33	0.55	pCi/ml
AAB9515	22.01	119.68	18.08	35.03	-1.95	2.15	pCi/g
AAB9516	22.01	119.68	7.53	35.03	-5.46	2.15	pCi/g
AAB9517	-7.34	98.79	13.56	35.03	-1.17	2.15	pCi/g
AAB9518	22.01	119.68	12.05	35.03	0.23	2.15	pCi/g
AAB9519	-7.34	98.79	4.52	35.03	2.73	2.15	pCi/g
AAB9520	36.68	154.51	12.05	35.03	3.37	2.15	pCi/g
AAB9521	36.68	154.51	0	35.03	1.98	2.15	pCi/g
AAB9522	36.68	154.51	43.69	54.03	5.56	2.15	pCi/g
AAB9523	7.34	98.79	12.05	35.03	5.66	2.15	pCi/g
AAB9524	66.03	207.3	35.4	48.64	0.49	2.15	pCi/g
AAB9525	-7.34	98.79	29.38	44.31	0.85	2.15	pCi/g
AAB9526	-22.01	119.68	-9.79	35.03	0.21	2.15	pCi/g
AAB9527	22.01	119.68	29.38	44.31	-1.84	2.15	pCi/g
AAB9528	-22.01	119.68	36.91	49.66	-1.36	2.15	pCi/g
AAB9529	-7.34	98.79	17.33	35.03	-0.52	2.15	pCi/g
AAB9530	-7.34	98.79	32.39	46.52	1.13	2.15	pCi/g
AAB9531	7.34	98.79	9.79	35.03	0.24	2.15	pCi/g
AAB9532	-7.34	98.79	33.9	47.59	-1.53	2.15	pCi/g
AAB9533	22.01	119.68	38.42	50.67	1.82	2.15	pCi/g
AAB9534	-7.34	98.79	50.47	58.07	4.95	2.15	pCi/g
AAB9535	-22.01	119.68	27.87	43.16	5.99	2.15	pCi/g
AAB9537	7.34	98.79	13.56	35.03	3.14	2.15	pCi/g
AAB9538	22.01	119.68	12.05	35.03	4.7	2.15	pCi/g
AAB9539	-7.34	98.79	16.57	35.03	2.8	2.15	pCi/g
AAB9540	-14.67	98.79	-27.12	42.57	1.49	2.15	pCi/g
AAB9541	0	98.79	30.13	44.87	2.45	2.15	pCi/g
AAB9542	29.35	138.2	51.22	58.5	2.03	2.15	pCi/g
AAB9543	0	98.79	10.55	35.03	3.73	2.15	pCi/g

Table 7-3
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MRAL Screening Results

Sample ID	Gross Alpha	Uncertainty (+/-)	Gross Beta	Uncertainty (+/-)	Gross Gamma	Uncertainty (+/-)	Units
AAB9544	-44.02	169.26	-0.75	35.03	8.12	2.15	pCi/g
AAB9545	-14.67	98.79	6.78	35.03	-0.21	2.15	pCi/g
AAB9546	-44.02	169.26	-8.29	35.03	-3.99	2.15	pCi/g
AAB9547	0	98.79	2.26	35.03	-3.59	2.15	pCi/g
AAB9548	-44.02	169.26	6.78	35.03	-3.66	2.15	pCi/g
AAB9549	-44.02	169.26	-11.3	35.03	-4.36	2.15	pCi/g
AAB9550	-14.67	98.79	12.81	35.03	-4.86	2.15	pCi/g
AAB9551	44.02	169.26	45.95	55.41	-4.64	2.15	pCi/g
AAB9552	-14.67	98.79	3.77	35.03	-5.61	2.15	pCi/g
AAB9553	-29.35	138.2	29.38	44.31	-4.1	2.15	pCi/g
AAB9554	-14.67	98.79	-9.79	35.03	-4.32	2.15	pCi/g
AAB9555	29.35	138.2	3.77	35.03	-4.24	2.15	pCi/g
AAB9556	51.35	182.82	10.55	35.03	1.31	2.15	pCi/g
AAB9557	36.68	154.51	-19.58	36.18	2.07	2.15	pCi/g
AAB9558	-7.34	98.79	0	35.03	4.38	2.15	pCi/g
AAB9559	36.68	154.51	18.08	35.03	3.16	2.15	pCi/g
AAB9560	6.89	101.39	10.2	58.69	2.98	2.15	pCi/g
AAB9561	1.93	6.43	-13.12	22.56	-0.17	0.49	pCi/ml
AAB9562	0	2.73	-5.25	14.3	0.63	0.49	pCi/ml
AAB9563	-6.89	101.39	-12.24	58.69	4.62	2.15	pCi/g
AAB9564	-6.89	101.39	-16.32	58.69	3.89	2.15	pCi/g
AAB9565	6.89	101.39	22.44	58.69	4.46	2.15	pCi/g
AAB9566	6.89	101.39	-2.04	58.69	3.97	2.15	pCi/g
AAB9567	-6.89	101.39	-24.48	58.69	2.26	2.15	pCi/g
AAB9568	-6.89	101.39	4.08	58.69	1.7	2.15	pCi/g
AAB9569	34.44	145.06	4.08	58.69	1.57	2.15	pCi/g
AAB9570	6.89	101.39	-4.08	58.69	2.86	2.15	pCi/g
AAB9571	20.66	112.36	-24.48	58.69	3.71	2.15	pCi/g
AAB9572	-0.97	4.55	-9.62	19.32	0.12	0.49	pCi/ml
AAB9573	-0.97	4.55	11.37	21	0.17	0.49	pCi/ml
AAB9574	-6.89	101.39	0	58.69	3.92	2.15	pCi/g
AAB9575	-6.89	101.39	-4.08	58.69	2.88	2.15	pCi/g
AAB9576	6.89	101.39	-10.2	58.69	4.48	2.15	pCi/g
AAB9577	-6.89	101.39	0	58.69	5.67	2.15	pCi/g
AAB9578	6.89	101.39	4.08	58.69	6.49	2.15	pCi/g
AAB9579	20.66	112.36	-4.08	58.69	4.12	2.15	pCi/g
AAB9580	20.66	112.36	12.24	58.69	5.05	2.15	pCi/g
AAB9581	-3.69	83.28	40.57	90.73	1.79	2.16	pCi/g
AAB9582	-3.69	83.28	27.76	90.73	-0.73	2.16	pCi/g
AAB9583	3.69	83.28	61.92	90.73	1.41	2.16	pCi/g
AAB9584	3.69	83.28	74.73	90.73	2.38	2.16	pCi/g
AAB9585	-3.69	83.28	87.54	91.06	2.9	2.16	pCi/g
AAB9586	-3.69	83.28	87.54	91.06	1.72	2.16	pCi/g
AAB9587	-11.07	83.28	29.89	90.73	-4.5	2.16	pCi/g
AAB9588	-3.69	83.28	87.54	91.06	3.62	2.16	pCi/g
AAB9589	3.69	83.28	81.14	90.73	1.76	2.16	pCi/g
AAB9590	25.83	91.95	98.22	96.45	7.03	2.16	pCi/g

Table 7-4
TA-10
Boreholes with Elevated Radioactivity

Borehole ID	Sample ID	MRAL Screening Result (pCi/g)	MRAL Screening Uncertainty (+/- pCi/g)
10-1200	AAB 9279	116.37 β	104.98 β
10-1201	AAB 9337	622.19 β	203.9 β
	AAB 9340	100.94 β	82.13 β
	AAB 9341	9668.87 β 251.7 γ	803.8 β 5.64 γ
	AAB 9342	30758.69 β 893.01 γ	1433.66 β 10.62 γ
	AAB 9343	90562.39 β 764 γ	2460.01 β 8.53 γ
	AAB 9344	1831.18 β 72.72 γ	349.81 β 2.63 γ
	AAB 9345	133.33 β	94.39 β
	AAB 9349	77.59 β	72.00 β
10-1202	AAB 9294	575.44 β	233.45 β
	AAB 9295	124.91 β	108.77 β
	AAB 9296	131.32 β	111.52 β
10-1204	AAB 9309	4914.28 β 136.29 γ	573.05 β 3.26 γ
	AAB 9311	1012.38 β 33.86 γ	260.10 β 2.15 γ
	AAB 9312	842.15 β 26.53 γ	237.22 β 2.15 γ
10-1205	AAB 9361	6801.64 β 329.48 γ	764.52 β 5.54 γ
	AAB 9362	12544.47 β 237.06 γ	1065.43 β 4.7 γ
	AAB 9363	79.56 β 491.36 γ	84.85 β 6.76 γ
	AAB 9364	3400.82 β 417.84 γ	554.74 β 6.23 γ
	AAB 9365	128.53 β	107.84 β
10-2210	AAB 6297	6809.49 β 132.23 γ	674.56 β 3.38 γ
	AAB 6298	726.14 β	220.28 β
	AAB 6299	1520.08 β 49.05 γ	318.71 β 2.15 γ
	AAB 6307	3156.17 β 74.60 γ	459.24 β 2.54 γ
10-2211	AAB 6337	116.00 β	88.04 β
	AAB 6339	185.30 β	111.28 β
	AAB 6340	69.30 β	86.05 β
	AAB 6349	673.42 β	212.13 β
10-1213	AAB 6397	113.74 β	87.18 β
10-1215	AAB 6407	314.86 β	145.05 β
	AAB 6408	438.40 β	171.16 β
	AAB 6409	183.80 β	110.82 β
	AAB 6410	216.94 β	120.40 β

TABLE 7-4 (continued)

Borehole ID	Sample ID	MRAL Screening Result (pCi/g)	MRAL Screening Uncertainty (+/- pCi/g)
	AAB 6411	260.63 β	131.97 β
	AAB 6412	2056.40 β 32.6 γ	370.69 β 2.15 γ
	AAB 6569	1764.14 β 53.45 γ	343.34 β 2.15 γ
	AAB 6570	2121.18 β 67.96 γ	376.49 β 2.40 γ
	AAB 6573	2041.34 β 148.45 γ	369.33 β 3.54 γ
	AAB 6574	1752.09 β 57.89 γ	342.17 β 2.21 γ
	AAB 6575	305.82 β	142.95 β
	AAB 6580	4188.13 β 90.98 γ	529.02 β 90.98 γ
10-2219	AAB 6586	95.66 β	79.95 β
10-2220	AAB 6583	109.22 β 1478.07 γ	85.43 β 11.41 γ
	AAB 6584	27996.47 β 822.52 γ	1367.77 β 8.51 γ
	AAB 6595	34466.99 β	1517.62 β
	AAB 9428	40421.53 β 791.83 γ	1643.50 β 8.46 γ
10-2221	AAB 9423	198.86 β	115.28 β
10-1222F	AAB 9253	97.92 β	80.89 β
10-1223	AAB 6604	689.99 β	214.73 β
	AAB 6607	1003.34 β	258.93 β
	AAB 6608	82.86 β	74.41 β
10-1289	AAB 9226	291.51 β	139.57 β
	AAB 9227	586.79 β	198.02 β
10-1293	AAB 9246	138.60 β	96.24 β

Attachment D-4

Memo from D. Meyer to C. Blackwell, Dated August 19, 1963

[redacted] 8 [redacted]

Dean D. Meyer, Group Leader, H-1 Aug. 19, 1963

Charles D. Blackwell and Frank Sabich, General Monitoring Section, H-1

REMOVAL OF ALL STRUCTURES IN BAYO CANYON

H-1

GMX-5 Reports 1963

In early March, 1963, a decision was made to end the operations of Group GMX-5 in Bayo Canyon (TA-10) and to effect the removal of all structures within the site. A limited amount of work would still be done by GMX-5, however, their operations would cease by June 30, 1963. These operations were to be confined to a small area of the site and it was determined that preliminary plans for removal of some of the areas could precede before the end of this period. Several meetings were held with all groups concerned with the removal of these structures early in the planning period. These groups included H-DO, H-1, H-3, H-5, H-6, ENG-DO, ENG-3, ENG-4, GMX-DO, GMX-5, and SP-2 of LASL, AEC Fire Department, and Zia Company.

After lengthy discussions with all groups concerned with the removal of the Bayo Canyon structures, it was decided to remove the contents of structure TA-10-48 as the initial step because of the nature of the structure, its contents and its location. The method of removal was decided upon and work began on March 25, 1963. The personnel involved were supplied with surgeon caps, coveralls, cloth booties, leather palm gloves, and respirators. The type of respirator used was a full face unit of three separate makes, depending upon respirator fit and personal preference. The respirators were fitted to the individuals on the job by Group H-5 and were tested for fit routinely during the operation by both Groups H-1 and H-5. Each individual was issued a film badge to record any radiation to which they were exposed during the cleanup operation.

Structure TA-10-48 was a pit located south of TA-10-1. The pit was divided into two sections, each 5' x 5' x 10' deep and were lined with boards and had a board covering. These pits had been used for the disposal of such contaminated items as gloves, bottles, cans, lab equipment used in chemistry, etc. These items had been contaminated to a high degree with $Ba^{140}La^{140}$ and the impurities associated with such sources, chiefly Sr^{90}. This pit had not been used for the disposal of such contaminated items for a period of greater than ten years and considerable decay had taken place

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before this removal began. This area had been fenced off with a wood fence but the fence had decayed and was falling down in some places. It had also been posted with radiation and contaminated warning signs. A few items had been added to the pit from other decontamination processes by GMX-5 personnel, however, the contamination levels on this waste material were of a low level and the radioactive contaminants had a very short half-life. We had anticipated having an airborne problem with radioactive materials if the debris being removed was in a dry condition and we were prepared to use a light spray of water during removal to control the dust. However, the area remained quite damp and such spraying was not required. Air samples were taken using a Hi-Vol sampler pulling 40 cfm of air through HV-70 filter paper. Readings from this operation would be a guide for what we expected would be encountered in the remaining pits within the area. The samples were counted for gross beta-gamma and the average count was 33 d/m-M^3 with a high reading of 43 d/m-M^3.

The removal of the material from the pits was effected through the use of a front end loader and placing the material in dump trucks. The truck beds were covered after loading with tarps securily fastened in place to prevent scattering in transit to the contaminated burial pits at Area "G". After the trucks had been dumped, the beds were made free of loose material by the use of brooms by personnel wearing full protective clothing, including a full face respirator. Later, all the material removed from Bayo Canyon to the dump was covered with a protective layer of dirt as in normal burial operations. Before operations began in TA-10-48, the highest reading at the surface was 1.0 mrad/hr as indicated by a G-M survey meter, Model E-112-B held at ground level with the shield open. At a depth of three feet, the reading had risen to 4 mrad/hr. On the second day of operations, the pit had been enlarged to 30' in length and to a depth of 16'. The reading in the bottom of the pit was 20 mrad/hr at a distance of 6" from the bottom of the excavated area. At a depth of 20', the reading had dropped to 16 mrad/hr in contact with the surface of the soil at the pit bottom. Personnel entering the pit picked up a maximum of 0.2 mrad/hr on their cloth booties. At a depth of approximately 26', the radiation level had dropped to 1.5 mrad/hr in the bottom of the hole in contact with the dirt. Core samples were taken by Group H-6 for radiometric analysis. One sample taken at a depth of one foot below floor level indicated 600 d/m/dry gram of soil. All other samples taken down to a depth of four feet below pit floor level indicated activity ranging from 0 - 40 d/m of Sr^{90}/dry gram. Gross alpha measurements of samples gave results approaching natural background. This pit was later filled with uncontaminated dirt from other areas within the canyon.

The next step was to start excavation on TA-10-44. This was also a burial pit, however, the surface of the pit was composed of uncontaminated sand and this was moved to an adjacent area to be used as refill. The surface reading above this pit was not above the natural background. Numerous items were found in the pit, however, the maximum reading found was 3.0 mrad/hr. The pit was used for the burial of gloves, rags, acid bottles, etc. Another problem arose in working this area because of the loose material. The sides of the pit kept caving in and covering the pit with clean sand. A bulldozer was used to push this sand north of the pit to be used as refill also.

The cleanup of the canyon was not on a strict time table but it was felt that the job should be completed as soon as possible. Five dump trucks were used to haul the dirt and debris to the contaminated dump at Area "G". In order to keep the trucks busy, it was decided to start hauling from the Tank Farm before Pit 44 was finished. The Tank Farm consisted of the following structure numbers: 38, 39, 41, 42, 43, and 50. After the trucks had been loaded and were on the way to the dump, the loader operator moved the uncontaminated sand from the edges and sides of Pit No. 44 until more contaminated soil and debris could be moved from the pit. In moving the clean sand, each loader of material had to be dumped slowly and checked thoroughly for the presence of gloves and rags that had been placed in the pit edges. This pit was finally dug to a depth of 15 feet and a reading of 1.5 mrad/hr remained in the bottom at ground level. Group H-6 could not take samples from the bottom of this pit in the conventional sampling manner because of the loose quartz sand. Instead, samples were taken from a hole made by a spade in the pit floor at depths down to 2.5 feet below the main excavation. Results from these samples gave various readings with a maximum of 4500 d/m Sr^{90}/dry gram. Because the sand would allow the radioactive material to percolate through the sand to some unknown depth and be captured in the clay layer, it was decided to refill this pit with clean material and level the area.

As the work progressed, it became apparent that five large pine trees would have to be removed from the center of the Tank Farm area. The ground reading around these trees varied from 1.0 mrad/hr to 6.0 mrad/hr. These trees were cut down with a chain saw and the stumps removed with a bulldozer. The trees were removed from this area to the south side of the road. Samples were taken from one of the trees and delivered to Group H-7 for analysis. The readings on the sample tree was 1.5 mrad/hr at the base and increased to about 4 mrad/hr near the top of the tree. (For a more complete set of data on these samples, information may be obtained from Group H-7.)

The work on the west end of the Tank Farm uncovered a clay pipe line which read 18.0 mrad/hr. Also in this same general area, a two inch diameter steel pipe was found which read 35.0 mrad/hr on the outside. These items were located between Pits 42 and 43. At this time, the crafts were ordered to remove the trucks and front end loader to another job for a period of two weeks. These pieces of equipment were washed by the Decontamination Crew and released.

The bulldozer was used to explore the rest of the Tank Farm. The area around Pits 44 and 43 were skimmed and another pit measuring twelve inches in diameter was found approximately two feet south of Pit 42. This new pit read 10.0 mrad/hr. A two foot square pit was located about 40 feet north of Pit 41. An unknown pit reading 20 mrad/hr at a distance of one foot was found approximately 6 feet south of Pit 50.

After the two week delay, the trucks and front end loader were returned to Bayo and the excavation of Pit 43 began. At a depth of 6 feet a reading of 1.5 mrad/hr was taken. Since the sand was so loose, the rubber tired front end loader had difficulty in moving out of a deep pit. A front end loader on tracks would be more versatile, however, none were available. The bulldozer was used to cut into the pits to ease the grade for the front end loader. As the excavated area became larger, it was difficult to determine the spots of contamination from the seat of the bulldozer and front end loader. Eighteen stakes were made and painted red to mark the area for the equipment operators. As each pass was made and soil removed, the pits were monitored to determine radiation levels.

At a depth of ten feet it was discovered that Pits 41, 42, and 43 had a common drain filled with clay drain pipe. The maximum reading in this area was 20.0 mrad/hr. Also found in this area was a stainless steel pipe 3/4 inches in diameter. Running along with this pipe was a ground wire. The function of these two items was not determined, however, they ran north from Pit 50 for about 125 feet. This pipe and wire did not appear to be contaminated on the outside but were taken to the contaminated dump as the pipe ended in a leach field in the creek bed. A reading in the gravel bed was 0.2 mrad/hr but some wood in this area gave a reading of 1.5 mrad/hr. The gravel bed was four feet square and five feet deep.

It was decided to core drill in the Tank Farm area to determine contamination levels. The surface level at this time was 6.0 mrad/hr, at eighteen inches the reading was 1.0 mrad/hr, at thirty inches (in clay) the reading was 11.0 mrad/hr, and at sixty inches the reading was 9.0 mrad/hr.

At this time it was believed advisable to approach the area from the east end. Pits 38 and 39 were removed and these gave a reading of 5.0 mrad/hr or less. In removing dirt between Pit 39 and Pit 50, lead sheets 5/8" thick and measuring 2' x 3' were uncovered. This was thought to be another burial dump because of the presence of this material, however, with the removal of more dirt, stainless steel pipe was located leading to three stainless steel acid tanks. The tanks were located about 60 feet northeast of Pit 50. The tanks read 0.2 mrad/hr but dripping from the lines read 2.0 mrad/hr. The tanks were only partially filled with liquid and were removed without spillage to the contaminated dump. Acid Pits 50 and 51 were removed along with all connecting lines. These pits gave a reading of 5.0 mrad/hr. Pit 38 which was the septic tank for TA-10-1 was removed to the dump also, even though no radioactive contamination could be detected in this vicinity.

Building TA-10-2 was a small shed used to contain a large source shield. All the shielding material was contaminated inside to a level of several mrad/hr (exact count could not be made because of small cavity) and was placed in the dump. It was decided to burn all buildings that would burn but to burn only a few buildings at one time. Lack of communications between various groups resulted in Building 18 and 21 being burned without our knowledge as this took place at night. However, we feel no real harm was done as these buildings were practically free of radioactivity. The monitoring results of these buildings had indicated radiation levels less than 0.1 mrad/hr.

The asphalt firing pads had a reading of 0.5 mrad/hr on the surface. This surface was removed to the dump also and in the process, readings up to 1.0 mrad/hr were detected. The area around Structures 2, 22, 23, 24, 25, 8, 14, and 13 was skimmed with the bulldozer and the material removed to the dump. Dirt was removed from around Buildings 8, 13, and 14. This was used to fill some of the pits that had been cleared

(44 and 48). The operation moved to the west firing pad for asphalt removal and the levels were the same as on the previous firing pad.

Building 13 was a concrete bunker and had to be drilled and blasted before removal. This concrete was used to fill in part of the Tank Farm as the concrete was not contaminated. Buildings 2, 8, and 14 were burned and the ashes from these, in addition to Buildings 18 and 21, were hauled to the dump. The cable channels from Building 15 to the firing units were made of copper and were found to be free of contamination so these were sent to salvage. Bunker 15 was of concrete construction and had to be drilled and blasted for removal. This debris was free of radioactivity and was used to fill the pits in the Tank Farm. Pit 40 was a septic tank for Building 21 and was removed to the dump. The area in the vicinity of the firing pads was dug out to where the radiation level was only background on the portable survey instruments (H-112-B).

During the period of time when pit evacuation was being done, it was decided to begin operations on canyon cleanup of all debris from explosions carried out in the canyon. Since 1944, Group GMX-5 had set off 254 explosions in the RaLa implosion experiments. Each shot added additional debris to the landscape in the form of bits of wire, metal, and wood. These were radioactive but had decayed during the years so that pieces of debris monitored individually showed no activity. However, when gathered into a large pile, readings as high as 1.0 mrad/hr could be detected. Arrangements were made to secure the services of 25 Indians from the Zia and Jemez Pueblos to search the entire area in a 2500 foot radius of the firing site and pick up everything not native to the area. The Indians were briefed by various groups including H-3 and H-1 and during this search were accompanied by a member of H-1, by a member of H-3 and a representative of the AEC Project Support Branch. The material was placed in burlap bags and stacked in convenient pick up locations. The cleanup required about ten days and resulted in 90 truck loads of material. During this period, eleven pieces of uranium with a total weight of 33 pounds were found. (For a more complete report on the cleanup by the Indian crew, see the report by Clarence Courtright of H-3.)

After the west end of the canyon had been cleared of radioactive material, work continued on the Tank Farm. Another leach bed was located under Pit 43. The reading at six feet was 12.0 mrad/hr and at fifteen feet, the reading was 3.0 mrad/hr. After excavating a pit approximately 20 feet deep and still finding sand and a reading of approximately 1.5 mrad/hr, the Tank Farm was used to bury concrete from the bunkers that were uncontaminated. The remaining uncontaminated concrete was hauled to the base of the city dump.

The x-unit pits were loaded on a low-boy for removal to the dump. During this loading process, the boom for the large crane collapsed at a ninety degree angle. The area was clear of personnel and no one was injured.

Structure 31 was a cell of concrete used in RaLa experiments and was too heavy to remove intact. It was blasted and the rubble taken to the dump. The dirt was removed from Buildings 10, 11, 12, and 34 and they were burned. These buildings had only an insignificant amount of contamination.

The west end of Building 1 was removed and placed in the open area west of the building for burning. Air samples were taken on all burnings except Buildings 18 and 21. The highest reading recorded on air samples during burning was 8.6 $d/m\text{-}M^3$ with the desirable maximum limit not to exceed 580 $d/m\text{-}M^3$. The concrete in the west end of Building 1 had a maximum reading of 18.0 mrad/hr. After this concrete was removed, the rest of the building was burned. The remaining wall was torn down and as it was uncontaminated, it was buried in Bayo canyon.

The area west of Structures 24 and 25 had been used to wash sources over a period of years. The surface did not show any contamination; however, the area measuring 8 feet wide, 80 feet long, and 4 feet deep was cleared and checked with no contamination found. Any remaining ashes from burning operations were hauled to the contaminated dump. The area around Building 1 was thoroughly excavated to be certain no hidden pipes remained. The fences around the canyon and all signs were removed. The only structure still remaining in the canyon was Building 20 which was later relocated near Building SM-65 in TA-3. Urine samples for gross beta were analyzed on all personnel working in Bayo during the cleanup and no significant count was found. Only one injury was recorded. Antonio Roybal, Z-1418, a Zia laborer cut his right index finger on the tail gate of a truck. The wound was monitored and no detectable activity could be found. Mr. Roybal was sent to the hospital emergency room where two stitches were required to close the wound.

After the canyon cleanup had been completed, a committee appointed by the LASL Director's Office toured the area and in a meeting held to discuss the cleanup results, declared the area to be free of significant radioactive contamination and did not constitute in any way a health hazard from radioactive materials and could be returned to the AEC for future assignment.

original signed by
Charles D. Blackwell

Charles D. Blackwell

original signed by
Frank Babich

Frank Babich

CDB:FB/es

cc: File

Attachment D-5

Radiological Addendum to the
RFI Report for TA-10 Subsurface PRSs

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Los Alamos National Laboratory
UNIVERSITY OF CALIFORNIA

Environmental Restoration
Environmental Restoration Project
MS M992
Los Alamos, New Mexico 87545
505-667-0808/FAX 505-665-4747

Date: June 3, 1996
Refer to: EM/ER:96-326

Mr. Ted Taylor
Los Alamos Area Office
US Department of Energy, MS A316
Los Alamos, NM 87544

SUBJECT: SUBMITTAL OF THE RADIOLOGICAL ADDENDUM TO THE RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION (RFI) REPORT FOR POTENTIAL RELEASE SITES (PRSs) IN TECHNICAL AREA (TA) 10

Dear Ted:

Enclosed is a copy of the Los Alamos National Laboratory's Radiological Addendum to the RFI Report concerning PRSs 10-002(a,b), 10-003(a-o), 10-004(a,b), 10-005, and 10-007 for TA-10. The addendum documents the sampling results for radiological consitutents at these PRSs.

Please ask your office to contact Garry Allen at (505) 667-6080 or Bonnie Koch at (505) 665-7202, if you have any questions.

Sincerely,

GRAllen

for Jorg Jansen
Program Manager

Received by ER-RPF
JUN 12 1996

JJ/bp

Enclosure: Radiological Addendum Report concerning PRSs 10-002(a,b), 10-003(a-o), 10-004(a,b), 10-005, and 10-007

Cy (w/ enc.):
G. Allen, CST-18, MS E525
B. Koch, LAAO, MS A316
RPF, MS M707

Cy (w/o enc.):
T. Glatzmaier, DDEES/ER, MS M992
J. Harry, EES-5, MS M992
D. McInroy, EM/ER, MS M992
L. Soholt, EM/ER, MS M992
J. Vozella, LAAO, MS A316
EM/ER File, MS M992

Radiological Addendum to the RFI Report for Potential Release Sites

10-002(a,b)
10-003(a-o)
10-004(a,b)
10-005
10-007

TA-10 Subsurface

Field Unit 1

Environmental Restoration Project

June 1996

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-96-1748

EXECUTIVE SUMMARY

This Radiological Addendum to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report for Potential Release Sites (PRSs) in Technical Area (TA) 10 describes the results for radionuclide analyses conducted for the TA-10 Subsurface Aggregate at Los Alamos National Laboratory (LANL). Although radiological constituents are not regulated under RCRA, the investigation of the TA-10 Subsurface Aggregate included both hazardous (as defined by RCRA) and radiological constituents. The results for hazardous RCRA constituents were included in the RFI Report for the TA-10 Subsurface Aggregate. Included in this addendum are the screening assessments and radiological dose assessments based on the radionuclide results from samples collected during the Phase I investigation of PRSs 10-002(a,b), 10-003(a-o), 10-004(a,b), 10-005, and 10-007.

TA-10, also referred to as Bayo Site, was used from 1943 to 1961 as a firing site to conduct experiments using high explosives in conjunction with nuclear weapons research. The site consisted of firing pads, control buildings, battery buildings, a radiochemistry laboratory, subsurface disposal systems, and other associated structures. Decontamination and decommissioning of the site, including both firing pads and the radiochemistry laboratory, was completed in 1963. TA-10 was released to Los Alamos County in 1967. Bayo Canyon is currently open to the public for recreational use.

The specific area under investigation for this addendum is the Subsurface Aggregate, which includes all areas at TA-10 where subsurface contamination is a concern. The Subsurface Aggregate is located near the former radiochemistry laboratory and includes PRSs 10-002(a,b), 10-003(a-o), 10-004(a,b), 10-005, and 10-007. Radionuclides were associated with former Laboratory processes at TA-10 and previous investigations have shown radionuclides to be present. Total uranium, isotopic uranium, and strontium-90 were included as chemicals of potential concern (COPCs) for the TA-10 Subsurface Aggregate.

The primary objective of the TA-10 Subsurface Aggregate Phase I investigation was to characterize the nature, concentrations, and lateral and vertical extent of potential subsurface contamination related to historical activities at the site. The investigation was conducted from May to November 1994 and included geodetic surveys, radiological surveys, geophysical surveys, borehole drilling, and subsurface sampling.

The screening assessments presented in Section 5.0 of this addendum consider the Subsurface Aggregate as six investigation areas. These areas are consistent with those presented in the RFI Report.

- PRS 10-002(a) consists of a former solid waste disposal pit (TA-10-44) for the former radiochemistry laboratory (TA-10-1).
- PRS 10-002(b) consists of another former solid waste disposal pit (TA-10-48) for the former radiochemistry laboratory (TA-10-1).
- The Central Area consists of the former radiochemistry laboratory liquid waste disposal complex [PRSs 10-003(a-o)] as well as the building debris landfill (PRS 10-007) created during the 1963 decontamination and decommissioning of this area.
- PRS 10-004(a) consists of a former sanitary septic tank and overflow pit (TA-10-40) that served the personnel building (TA-10-21).
- PRS 10-004(b) consists of a former sanitary septic tank (TA-10-38) that served the former radiochemistry laboratory (TA-10-1).
- PRS 10-005 consists of a former open surface disposal pit used to contain shot debris swept from TA-10 firing sites and adjacent areas.

In the RFI report, which addressed only hazardous RCRA constituents, all of these investigation areas were recommended for removal from LANL's RCRA operating permit because no hazardous RCRA constituents were retained as COPCs as a result of the risk screening process. In this addendum, which addresses radiological constituents, four of the six investigation areas [PRSs 10-002(a), 10-004(a), 10-004(b), and 10-005] require no further action because no radionuclides are retained as COPCs as a result of the risk screening process. In the remaining two areas, the Central Area [PRSs 10-003(a-o) and 10-007] and PRS 10-002(b), radionuclides were retained as COPCs as a result of the screening assessments, and risk assessments were conducted.

The results for the current recreational scenarios for PRSs 10-002(b) and the Central Area indicate that current use of these areas for hiking is not associated with an unacceptable health risk level. The results for the residential use scenarios for these areas indicate unacceptable risk levels, due primarily to ingestion of garden produce. If Bayo Canyon is developed for residential or agricultural purposes, remedial action may be warranted. The results of the site-wide future recreational scenario indicate that unacceptable risk levels may occur, primarily from ingestion of edible plants. An interim action will be conducted to remove the chamisa bushes containing elevated levels of strontium-90 from this area. In addition, the potential for future surface contamination from plant uptake will be evaluated and, if necessary, remedial alternatives will be considered.

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1.0 INTRODUCTION

This Radiological Addendum to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report for Potential Release Sites (PRSs) in Technical Area (TA) 10 describes the results for radionuclide analyses conducted for the TA-10 Subsurface Aggregate at Los Alamos National Laboratory (LANL). Although radiological constituents are not regulated under RCRA, the investigation of the TA-10 Subsurface Aggregate included both hazardous (as defined by RCRA) and radiological constituents. The results for hazardous RCRA constituents were included in the *RFI Report for the TA-10 Subsurface Aggregate* (LANL 1996, 06-0131). Included in this addendum are the screening assessments and radiological dose assessments based on the radionuclide results from samples collected during the Phase I investigation of PRSs 10-002(a,b), 10-003(a-o), 10-004(a,b), 10-005, and 10-007.

1.1 General Site History

TA-10, also referred to as Bayo Site, was used from 1943 to 1961 as a firing site to conduct experiments using high explosives in conjunction with nuclear weapons research. The site consisted of firing pads, control buildings, battery buildings, a radiochemistry laboratory, subsurface disposal systems, and other associated structures. Decontamination and decommissioning of the site, including both firing pads and the radiochemistry laboratory, was completed in 1963 (LANL 1992, 0783). TA-10 was released to Los Alamos County in 1967. Bayo Canyon is currently open to the public for recreational use.

The specific area under investigation for this report is the Subsurface Aggregate, which includes all areas at TA-10 where subsurface contamination is a concern. The Subsurface Aggregate is mostly located near the radiochemistry laboratory and includes PRSs 10-002(a,b), 10-003(a-o), 10-004(a,b), 10-005, and 10-007.

The screening assessments presented in Section 5.0 of this addendum consider the Subsurface Aggregate as six distinct investigation areas (Fig. 1.1-1). These areas are consistent with those presented in the RFI Report (LANL 1996, 06-0131).

- PRS 10-002(a) consists of a former solid waste disposal pit (TA-10-44) for the former radiochemistry laboratory (TA-10-1).

- PRS 10-002(b) consists of another former solid waste disposal pit (TA-10-48) for the former radiochemistry laboratory (TA-10-1).

- The Central Area consists of the former radiochemistry laboratory liquid waste disposal complex [PRSs 10-003(a-o)] as well as the building debris landfill (PRS 10-007) created during the 1963 decontamination and decommissioning of this area.
- PRS 10-004(a) consists of a former sanitary septic tank and overflow pit (TA-10-40) that served the personnel building (TA-10-21).
- PRS 10-004(b) consists of a former sanitary septic tank (TA-10-38) that served the former radiochemistry laboratory (TA-10-1).
- PRS 10-005 consists of a former open surface disposal pit used to contain shot debris swept from TA-10 firing sites and adjacent areas.

Radionuclides were associated with former Laboratory processes at TA-10 and previous investigations have shown radionuclides to be present. Total uranium, isotopic uranium, and strontium-90 were included as chemicals of potential concern (COPCs) in the Phase I RFI of the TA-10 Subsurface Aggregate.

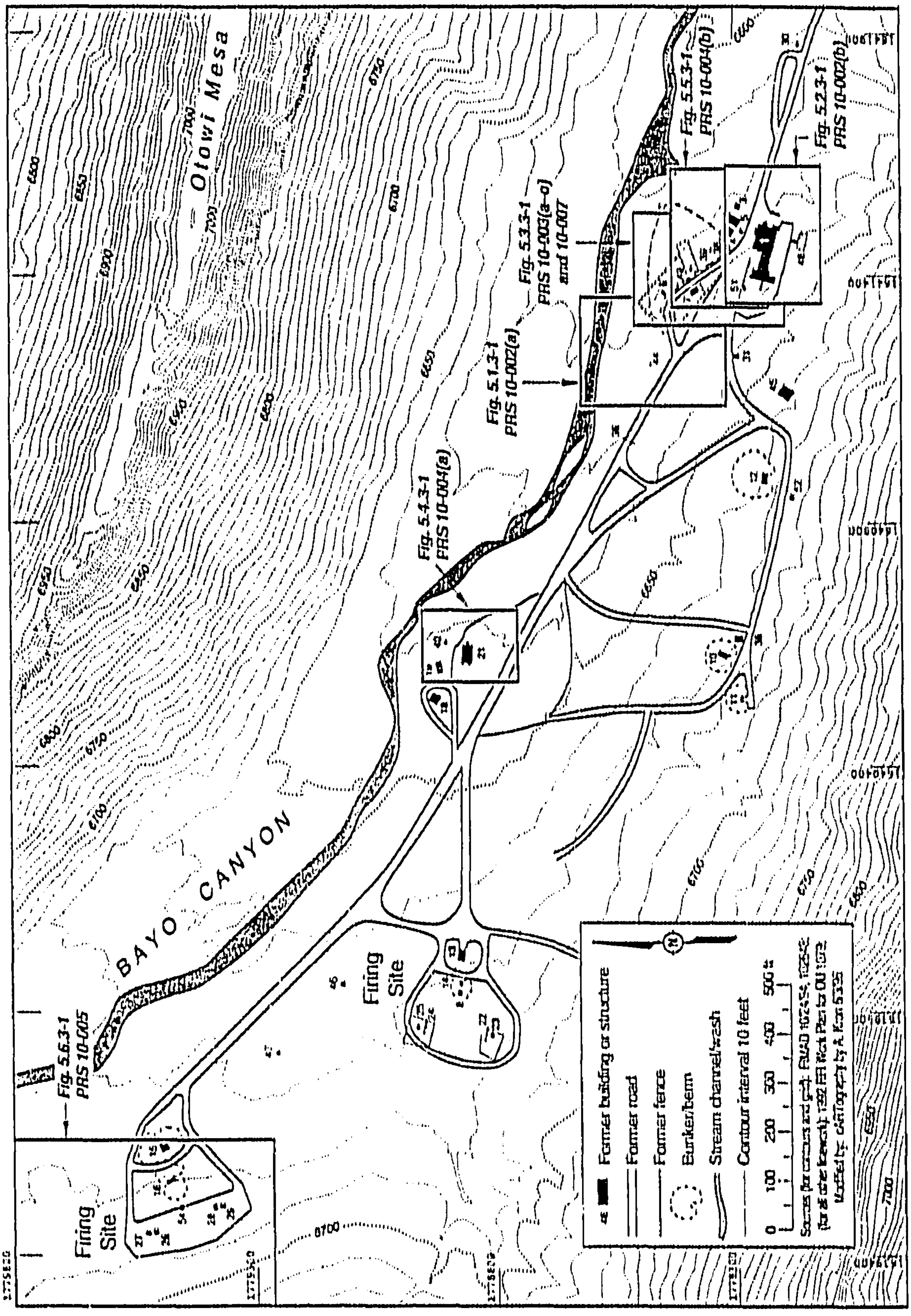

Fig. 1.1-1. Index map of investigation areas within the TA-10 Subsurface Aggregate.

1.2 RFI Overview

The primary objective of the TA-10 Subsurface Aggregate Phase I Investigation was to characterize the nature, concentrations, and lateral and vertical extent of potential subsurface contamination related to historical activities at the site.

1.3 Field Activities

The Phase I Investigation of the TA-10 Subsurface Disposal Aggregate was conducted from May to November 1994. The investigation included geodetic surveys, radiological surveys, geophysical surveys, drilling, and subsurface sampling. Details of these field activities are discussed in Section 1.3 of the RFI report (LANL 1996, 06-0131).

In summary, geodetic and geophysical surveys were conducted to identify the locations of former buildings and structures associated with former TA-10 operations. A radiological survey was also conducted for health and safety purposes before drilling activities began. The ground surface and vegetation in the areas in and around the drilling arrays and support areas were surveyed with an Eberline™ ESP-1/HP-260 for the presence of beta and gamma radiation. Elevated radioactivity was detected in the surface soils and chamisa plants near drilling arrays 1 and 2 in the western portion of the Central Area. This area of elevated readings is cordoned off with temporary fencing, and appropriate control signs are posted. An additional radiological survey was conducted after drilling activities were complete, and the results of this survey indicated that no radiological contamination was introduced to the surface during drilling activities.

Sampling activities during the TA-10 Subsurface Aggregate Investigation included borehole drilling and subsurface sampling, as discussed in Section 1.3.4 of the RFI report (LANL 1996, 06-0131). A total of 93 boreholes were drilled and sampled. Boreholes were organized into 12 four-armed drilling arrays, each consisting of between 5 and 10 boreholes. The arrays were generally centered on former structure locations or areas known or suspected to be contaminated based on the results of previous investigations. Some of the drilling arrays were oriented according to the expected distribution of subsurface contaminants and others were oriented in the four cardinal directions. Borehole spacing within each array ranged from 5 to 15 ft. Sampling arrays are shown on Figs. 5.1.3-1, 5.2.3-1, 5.3.3-1, 5.4.3-1, 5.5.3-1, and 5.6.3-1 in Section 5.0 of this addendum.

Boreholes were advanced to a minimum depth of 50 ft below ground surface (bgs). A minimum of four soil samples were collected from each borehole for laboratory analysis of selected radiological and nonradiological constituents. Based on field screening and mobile laboratory analytical data, drilling arrays were advanced vertically and laterally to adequately bound the zones of contamination.

Recovered core was field-screened for gross beta and gamma radiation using an Eberline™ ESP-1 with an HP 260 probe or a Ludlum Model 12™ with a 44-40 shielded probe, and for volatile organic compounds (VOCs) using a Thermo Environmental™ Model 580B photoionization detector (PID). Core barrels and borehole cuttings were initially screened for gross beta/gamma radioactivity as they were retrieved from the borehole. Each borehole was screened for VOCs and combustible gases. Gross beta/gamma and VOC screening were performed immediately after the core barrel was opened and prior to core logging and sampling. Samples were collected at 5-ft intervals for gross radioactivity screening at the mobile radiological analytical laboratory (MRAL) and screening of selected nonradiological constituents at the mobile chemistry analytical laboratory (MCAL). Samples were collected from that portion of the core showing the highest radioactivity based on field screening or, if there was no reading greater than background, from an interval selected at random. MRAL analysis suites included moisture and gross alpha, beta, and gamma radiation. MCAL analyses included analyses of semivolatile organic compounds (SVOCs) and x-ray fluorescence (XRF) metals.

At least four samples were collected from each borehole for a full suite of fixed laboratory analyses. These four samples were collected from 1) the midpoint of the first 10-ft interval, 2) the bottom of the borehole, 3) the interval exhibiting the highest field screening levels for radionuclides and VOCs, and 4) a random core interval retrieved from below 10 ft bgs and selected to target locations immediately underlying previously existing structures, exhibiting a change in color or obvious staining of the core, showing significant changes in lithology, and/or contacting the fill/tuff interface.

2.0 ENVIRONMENTAL SETTING

Information about the climate, geology, and hydrology of the TA-10 Subsurface Aggregate area, as well as biological and cultural surveys conducted at the site, can be found in Section 2.0 of the RFI report (LANL 1996, 06-0131).

3.0 APPROACH TO DATA ASSESSMENT AND ANALYSIS

The general approach used for data analysis in this addendum is summarized in Section 3.0 of the RFI report. This section summarizes only those aspects of data analysis that differ from the approach discussed in the RFI report.

3.1 Human Health Screening Assessment Approach for Radionuclides

Radionuclide analyses conducted by gamma spectroscopy often yield results for radionuclides that are not appropriate to evaluate as potential site contaminants. These include short-lived activation/fission products, naturally occurring background radionuclides, and daughter radionuclides of naturally occurring radionuclides. These three classes of radionuclides are not considered site contaminants for the following reasons.

Short-lived activation/fission products that are commonly reported in gamma spectroscopy analyses (e.g., barium-140, cerium-144, cesium-134, cobalt-57, europium-152, manganese-54, ruthenium-106, and sodium-22) have half-lives ranging from a few days to 2.6 years. They are routinely reported because they are used as internal standards to measure such things as equipment performance and laboratory background or contamination. However, these activation/fission products are not related to the RFI and are not expected to occur normally at TA-10 sites. Therefore, short-lived activation/fission products are not evaluated as COPCs.

The only naturally occurring radionuclide reported in the gamma spectroscopy analyses for this site was potassium-40. Potassium-40 is routinely reported because it is used as an internal standard. There is no process knowledge of the use of potassium-40 at TA-10, and reported concentrations are generally within known background ranges (Longmire et al. 1995,1266). Therefore, potassium-40 will not be evaluated as a COPC.

The daughters of uranium and thorium, which are naturally occurring radionuclides, are also reported by gamma-spectroscopy analyses. These daughters (e.g., isotopes of actinium, bismuth, lead, protactinium, radium, radon, thallium, and thorium) are present in secular equilibrium concentrations and are not directly evaluated as potential radionuclide contaminants. Quality assurance/quality control (QA/QC) activities review daughter radionuclides for anomalies, and any daughter radionuclides that can not be attributed to the parent at background concentrations are retained as COPCs.

Primary radionuclides that were analyzed for this site include americium-241, cesium-137, cobalt-60, neptunium-237, radium-226 and -228, strontium-90, and isotopic uranium.

Detection limits for radionuclides are not available. A value of 3 sigma (three times the measurement uncertainty or one standard deviation) is used to calculate a sample-specific minimum detectable activity, which is then employed in the same manner as a detection limit. This methodology is similar to Currie's method of determining the maximum detectable activity of radionuclides (Currie 1968, 0792). This 3 sigma screening value takes into account variability due to counting statistics, but does not account for spectral peak identification problems. Thus, this 3 sigma screening is conservative, and may include radionuclides whose presence is spuriously reported due to spectral interferences or misidentifications. Any radionuclides below the minimum detectable activity are eliminated as COPCs.

3.2 Human Health Risk Assessment Approach

Human health risks are calculated in this report using the RESRAD code, a program developed by the Department of Energy (DOE) to estimate dose from direct and indirect soil exposure pathways (Yu et al. 1993, 1177). RESRAD also incorporates the Environmental Protection Agency (EPA) cancer risk slope factors so that lifetime excess cancer risks can be calculated in addition to annual doses (mrem/yr). LANL has developed site-specific input parameters for the RESRAD code to reflect the local meteorology, hydrogeology, and topography. LANL has also developed default exposure assumptions for different land uses, including residential, industrial, construction, and recreational (trail user and camper) scenarios. These parameters are available in the Derivation and Use of Radionuclide Soil Cleanup Guidelines document (Perona 1996, 1326).

Although RESRAD and the guidelines document have default values for most input assumptions, PRS-specific assumptions are also needed to reflect the conditions and potential exposure routes for each PRS. The TA-10 subsurface input assumptions that differ from the default values are shown in Appendix C.

4.0 RESULTS OF QUALITY ASSURANCE/QUALITY CONTROL ACTIVITIES

This section describes the results of QA/QC activities for radionuclide analyses of samples collected from the TA-10 Subsurface Aggregate. The discussion is organized according to the suite of analyses performed and the request numbers under which samples were analyzed for each suite. In Appendix B of this addendum, the QA/QC issues that arose during analysis are summarized according to the request number and associated samples.

Samples were analyzed for radionuclides under many different request numbers. The specific radionuclide analyses included strontium-90, gamma spectroscopy, isotopic uranium, and total uranium. The specific analytes associated with each request are presented in Appendix B of this addendum.

For requests 18323, 18782, 18742, 18900, 18990, 18994, 19014, 19706, 19760, 19763, 19764, 19770, 19771, 19773, 19794, 19811, 19964, 20068, 20070, 20073, 20077, 20080, 20083, 20084, 20086, 20316, 20343, 20370, and 20438, all data are valid and usable without qualification.

For requests 18709, 18710, and 18932, all uranium data are qualified J, estimated detected quantities, for a low recovery in the QC sample (34 to 35%). All other data are valid and usable without qualification.

For requests 18713, 18716, 18725, 18727, 18731, and 18741, all uranium data are qualified J for low recoveries in the QC sample (32 to 65%). Detected values of strontium-90 are also qualified J for high recoveries in the QC sample (122 to 154%).

For request 18729, uranium data are qualified R, rejected, for a recovery of less than 1% in the QC sample. Detected values of strontium-90 are qualified J for a high recovery in the QC sample (122%).

For request 18743, uranium data are qualified J for a low recovery in the QC sample (26%). All other data are valid and usable without qualification.

For request 18898, uranium and strontium-90 data are qualified J for low recoveries in the QC and matrix spike samples, respectively.

For requests 19101 and 19102, there were several QC problems. In all samples except AAB6460, which was included in another batch, uranium data are qualified J for low recoveries in the QC sample (66 to 78%). In all samples except AAB6454 and AAB6455, which were included in another batch, strontium-90 data are qualified R for a recovery in the QC sample of less than 10% (approximately 6%). For samples AAB6454 and AAB6455, strontium-90 data are qualified J for low recovery in the QC sample (69%). All other data are valid and usable without qualification.

For request 19104, strontium-90 data are qualified J for a low recovery in the QC sample (22%). All other data are valid and usable without qualification.

For request 19106, uranium data are qualified J for low recoveries in the QC sample (59%). Strontium-90 data are qualified J for low recoveries in the QC sample (22 to 29%).

For request 19574, the lab used a sample amount that was too small for proper quantitation for gamma spectroscopy and total uranium. Therefore, data for gamma spectroscopy and total uranium are qualified J.

For request 19604, strontium-90 data are qualified J for low recoveries in the QC sample and laboratory control sample (LCS) (52% and 64%). All other data are valid and usable without qualification.

For request 19695, strontium-90 data are qualified J for a low recovery in the QC sample (44%). Uranium data for samples AAB6379 and AAB6501 are qualified J for having internal standards outside control limits (lifetime decay values below allowable limits). All other data are valid and usable without qualification.

For request 19789, uranium data are qualified J for low recovery in the QC sample (76%). All other data are valid and usable without qualification.

For requests 19804 and 19805, uranium and strontium-90 data are qualified J for low matrix spike recoveries (75% and 21%, respectively).

For request 19807, strontium-90 data are qualified J for a high recovery in the LCS sample (121%). Uranium data are qualified J for having internal standards outside control limits (lifetime decay values below allowable limits).

For request 19808, strontium-90 data are qualified J for low recoveries in the matrix spike sample (36 to 76%). Uranium data are qualified J for a high recovery in the LCS sample (122%).

For request 19809, strontium-90 data are qualified J for a low recovery in the QC sample (42%). Uranium data are qualified J for a high recovery in the LCS sample (121%) and a low recovery in the QC sample (79%).

For requests 19812 and 19814, strontium-90 data are qualified J for a low recovery in the LCS sample (70%). For samples AAB8686 and AAB8687, uranium data are qualified J for having internal standards outside control limits (lifetime decay values below allowable limits). All other data are valid and usable without qualification.

For request 19815, strontium-90 and uranium data are qualified J for low recoveries in the QC sample (40 and 51%, respectively).

For requests 19878 and 19880, the samples were split into several batches. For samples AAB9257, AAB9448, AAB9451, AAB9454, AAB9248, and AAB9253, the strontium-90 data are qualified J for a low recovery in the QC sample (70%). For sample AAB9440, the uranium data are qualified J for a low matrix spike recovery. All other data are valid and usable without qualification.

For request 19884, all uranium data are qualified J for low recoveries in the QC sample (45 to 73%). For samples AAB8701 and AAB8709, strontium-90 data are qualified J for a low recovery in the matrix spike sample (42%). All other data are valid and usable without qualification.

For request 19886, strontium-90 data are qualified J for a low recovery in the matrix spike sample (77%) and uranium data are qualified J for a high recovery in the matrix spike sample (156%).

For request 19887, strontium-90 data are qualified J for a low recovery in the matrix spike sample (60%) and uranium data are qualified J for a low recovery in the matrix spike sample (76%).

For request 19888, strontium-90 data are qualified J for a low recovery in the matrix spike sample (77%) and the QC sample (46%). All other data are valid and usable without qualification.

For request 19890, strontium-90 data are qualified J for a low recovery in the matrix spike sample (63%) and the QC sample (38%). All other data are valid and usable without qualification.

For request 19892, uranium and strontium-90 data are qualified J for low matrix spike recoveries (78 and 77%, respectively).

For request 19898, uranium data are qualified J for low recoveries in the QC sample (78%), and strontium-90 data are qualified J for low matrix spike recoveries (77%).

For request 20012, strontium-90 results are qualified J for heterogeneity shown in duplicate analyses. The duplicates varied by more than 20% for values greatly exceeding the screening action level (SAL). All other data are valid and usable without qualification.

For request 20082, uranium data are qualified J for having internal standards outside control limits (lifetime decay values below allowable limits). All other data are valid and usable without qualification.

For request 20087, uranium data are qualified J for a low recovery in the QC sample (75%). All other data are valid and usable without qualification.

For request 20109, strontium-90 data are qualified J for a low recovery in the QC sample (70%). All other data are valid and usable without qualification.

For request 20111, uranium and strontium-90 data are qualified J for low recoveries in the QC sample (78 and 27%, respectively).

For request 20113, strontium-90 data are qualified J for a low recovery in the QC sample (58%), and uranium data are qualified J for a low recovery in the LCS (43%).

For request 20232, uranium data are qualified J for a high recovery in the LCS (127%). All other data are valid and usable without qualification.

For request 20325, strontium-90 data are qualified J for a low recovery in the matrix spike sample (46%), and uranium data are qualified J for a low recovery in the LCS (76%).

For request 20328, strontium-90 data are qualified J for a low recovery in the QC sample (63%). All other data are valid and usable without qualification.

For request 20332, uranium and strontium-90 data are qualified J for low recoveries in the QC sample (63 and 71%, respectively).

For request 2010, two samples were analyzed for gamma spectroscopy and isotopic plutonium. All QC parameters were within allowed limits, therefore all data are valid without qualification.

5.0 SITE-SPECIFIC RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 PRS 10-002(a)

PRS 10-002(a) consists of a former solid waste disposal pit (TA-10-44) for the former radiochemistry laboratory. No radiological constituents are retained as COPCs in the human health screening assessment for PRS 10-002(a), and no further action (NFA) is recommended for this PRS.

5.1.1 History of PRS 10-002(a)

PRS 10-002(a) is discussed in Subsection 3.1.4 of the RFI Work Plan for Operable Unit (OU) 1079 (LANL 1992, 0783).

PRS 10-002(a) was a waste disposal pit measuring 8 ft long x 5 ft wide x 12 ft deep that was used to dispose of spent chemicals, laboratory equipment, and trash such as gloves, rags, and acid bottles. The exact dates of use for this pit are not known, but are thought to have been between 1945 and 1950. It is also not known whether this pit was covered during or after the period of active use, but it is thought that after it was no longer in use in the early 1950s, it was covered with soil until cleanup activities began in 1963. The quantities of contaminants buried in the pit are also unknown. Specific contaminants listed as potentially present in the pit include strontium-90, uranium, barium, cadmium, platinum, benzene, carbon tetrachloride, unspecified acids (probably nitric, hydrochloric, hydrofluoric, and sulfuric acids), and unspecified organics and inorganics. Other radionuclides may have been in the waste, but were not documented. PRS 10-002(a) was decontaminated and decommissioned in 1963. All waste items were removed and the pit was excavated to a depth of 15 ft. The pit was then backfilled with clean soil.

The COPCs for PRS 10-002(a) include strontium-90, total uranium, barium, cadmium, target analyte list (TAL) metals, VOCs, and SVOCs. Only the radionuclides are discussed in this addendum.

5.1.2 Previous Investigations of PRS 10-002(a)

PRS 10-002(a) was investigated previous to the RFI. These previous investigations are described in Subsection 3.1.4.2.2 of the RFI Work Plan for OU 1079 and summarized below (LANL 1992, 0783).

During the 1963 decontamination and decommissioning, readings at the bottom of the pit after excavation indicated 1.5 mR/hr of beta/gamma radioactivity. In addition, five holes were drilled in or near PRS 10-002(a) during the 1977 Former Utilized Sites Remedial Action Program (FUSRAP) survey. These holes indicated no gross beta radioactivity above background, but did indicate above background gross alpha radioactivity.

5.1.3 Field Investigation of PRS 10-002(a)

The objective of the Phase I RFI at PRS 10-002(a) was to characterize the nature, concentration, and lateral and vertical extent of potential subsurface contamination related to historical activities at the site. The RFI was conducted in July 1994. The area of PRS 10-002(a) was characterized using one four-armed sampling array (Fig. 5.1.3-1). This array was centered on structure TA-10-44, and was oriented in the four cardinal directions. The array consisted of 5 boreholes augered to 50 ft bgs. Boreholes were spaced 10 ft apart along the arms of the array.

Samples collected from each borehole were submitted for analysis for SVOCs, TAL metals, gamma spectroscopy, total uranium, and strontium-90. All appropriate QC samples, including duplicates, field blanks, and rinsate blanks, were collected during subsurface soil sampling activities. Sampling information is summarized in Table 5.1.4-1 of the RFI report. Radioactive field screening data indicated that no radioactivity was detected above instrument background levels in this drilling array. Boreholes were backfilled with drill cuttings and completed with a 2-ft thick concrete cap.

For more information about the RFI field activities at PRS 10-002(a), refer to Section 5.1.4 of the RFI report.

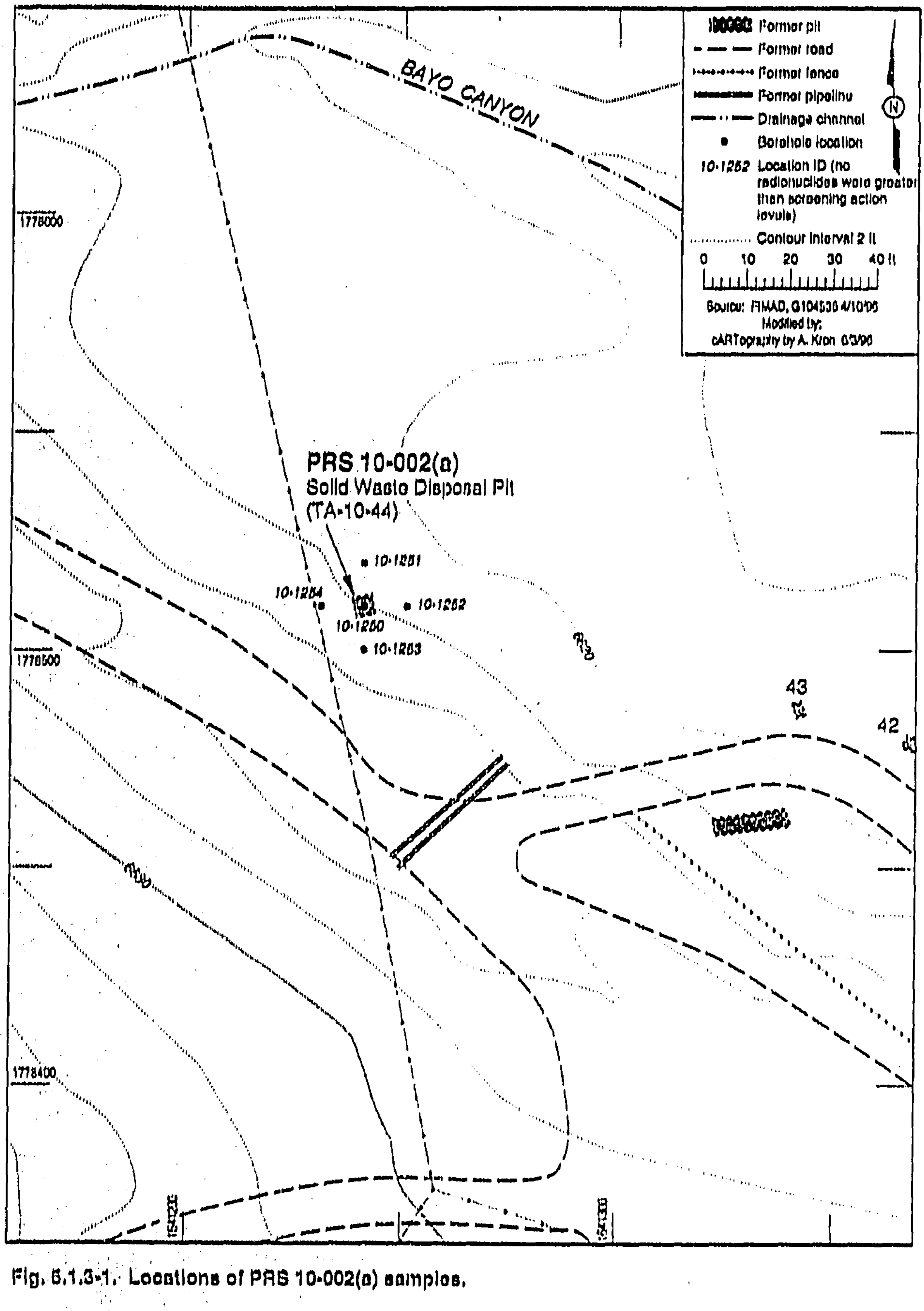

Fig. 5.1.3-1. Locations of PRS 10-002(a) samples.

5.1.4 Background Comparison for Radiological Constituents at PRS 10-002(a)

Radionuclides detected in the PRS 10-002(a) area were compared to the minimum detectable activity as described in Section 3.1 of this addendum. The results from PRS 10-002(a) samples with activities exceeding the minimum detectable activity are presented in Table 5.1.4-1. Strontium-90 was the only radionuclide detected at levels greater than the minimum detectable activity, and it will be carried forward in the screening assessment to the SALs comparison.

TABLE 5.1.4-1

PRS 10-002(a) SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	STRONTIUM-90 (pCi/g)
			SAL[a]	5.9
AAB6215	10-1250	Alluvium	3.3–3.9	0.77
AAB6228D[b]	10-1252	Alluvium	3.4–4	0.73
AAB6228	10-1252	Alluvium	3.4–4	0.81
AAB6231	10-1252	Alluvium	15.4–16.6	0.72
AAB6232	10-1252	Alluvium	15.4–16.6	0.55
AAB6241	10-1252	Pumice	40.9–41.5	1.62
AAB6251	10-1253	Transitional	26.5–27.1	0.13J[c]
AAB6256	10-1253	Pumice	49.4–50	0.48J

[a] SAL = Screening action level.
[b] D = Duplicate sample.
[c] J = Value is an estimated detected quantity (see Section 4.0).

5.1.5 Human Health Assessment for Radiological Constituents at PRS 10-002(a)

This section presents the human health assessment for radiological data collected from the PRS 10-002(a) area.

5.1.5.1 Screening Assessment for Radiological Constituents at PRS 10-002(a)

This section discusses the SALs comparison for PRS 10-002(a) radionuclides detected at levels greater than minimum detectable activity.

Greater Than or Equal to SAL. No radionuclide was detected at levels greater than or equal to the SAL.

No SAL. All radionuclides had SALs for comparison.

Less than SAL. Strontium-90 was detected at levels less than the SAL (see Table 5.1.4-1).

Because strontium-90 was the only radionuclide detected at levels below SAL, no multiple chemical evaluation is conducted. At the conclusion of this screening assessment, no radionuclides are retained as COPCs.

5.1.5.2 Extent of Contamination for Radiological Constituents at PRS 10-002(a)

No radionuclides were retained as COPCs in the screening assessment for PRS 10-002 (a).

5.1.5.3 Risk Assessment for Radiological Constituents at PRS 10-002(a)

No dose assessment was conducted for PRS 10-002(a) because no radionuclides were retained as COPCs in the screening assessment.

5.1.6 Ecological Assessment for Radiological Constituents at PRS 10-002(a)

The preliminary ecological screening assessment indicates that this site is located in a floodplain and is potentially within the foraging range of the spotted bat and peregrine falcon. These factors must be taken into consideration should any remedial action be undertaken at this site.

According to guidance from the International Atomic Energy Agency, human health assessment results for radionuclides are assumed to be protective of most animal populations (International Atomic Energy Agency 1992, 0983). As a result, the human health assessment results adequately represent the ecological concerns for this site.

5.1.7 Conclusions and Recommendations for PRS 10-002(a)

Based on the results from the Phase I RFI, no radionuclides are present at levels exceeding SALs at PRS 10-002(a). In addition, no RCRA constituents were detected above SALs (see Section 5.1.7 of the RFI report). Therefore, PRS 10-002(a) is recommended for NFA.

5.2 PRS 10-002(b)

PRS 10-002(b) consists of a former solid waste disposal pit (TA-10-48) for the former radiochemistry laboratory. Strontium-90 was retained as a COPC in the human health screening assessment for PRS 10-002(b). A radiological dose assessment performed on the PRS 10-002(b) data indicates that risk levels are acceptable in the current recreational land-use scenario, but are unacceptable in the future residential land-use scenario. If the site is developed for residential or agricultural use, remedial action may be warranted.

5.2.1 History of PRS 10-002(b)

PRS 10-002(b) is discussed in Subsection 3.1.4 of the RFI Work Plan for OU 1079 (LANL 1992, 0783).

PRS 10-002(b) was a waste disposal pit used to dispose of spent chemicals, laboratory equipment, and trash such as gloves, rags, and acid bottles. In addition, this pit was used to dispose of residues from the lanthanum-140 extraction process performed in the radiochemistry laboratory. PRS 10-002(b) was divided into two sections, each measuring 5 ft x 5 ft x 10 ft. The pit sections were lined with boards and had wood covers. The quantities of contaminants buried in the pit are unknown. Specific contaminants listed as potentially present in the pit include strontium-90, uranium, barium, cadmium, platinum, benzene, carbon tetrachloride, unspecified acids (probably nitric, hydrochloric, hydrofluoric, and sulfuric acids), and unspecified organics and inorganics. No other radionuclideswere documented in the waste.

The exact dates of use for this pit are not known, but are thought to have been between 1945 and 1950. After it was no longer in use in the early 1950s, the pit was covered with soil until it was decontaminated and decommissioned in 1963. All solid waste was then removed and the pit was excavated to a depth of 26 ft. The pit was then backfilled with clean fill.

The COPCs for PRS 10-002(b) include strontium-90, total uranium, barium, cadmium, TAL metals, VOCs, and SVOCs. Only the radionuclides are discussed in this addendum.

5.2.2 Previous Investigations of PRS 10-002(b)

PRS 10-002(b) was investigated previous to the RFI. These previous investigations are described in Subsection 3.1.4.3.2 of the RFI Work Plan for OU 1079 and summarized below (LANL 1992, 0783).

During the 1963 decontamination and decommissioning, it was determined that slight strontium contamination remained in the bottom of the pit. However, because gross beta radioactivity was approaching background, the pit was backfilled with clean fill.

Several test holes were drilled at or near PRS 10-002(b) in 1973 and 1974. Test hole Mq, drilled in 1973 to a depth of approximately 38 ft, was a few meters north of the PRS. Plutonium and strontium-90 analyses indicated only background activity, indicating no subsurface migration had occurred from the pit. A test hole drilled in the pit in 1974 to a depth of approximately 11 ft contained only background gross alpha and beta radioactivity.

During the 1977 FUSRAP survey, five holes were augered in or near PRS 10-002(b). Contrary to the results from the 1973 and 1974 test holes, the FUSRAP boreholes indicated gross beta activity up to 291 pCi/g with the highest concentrations occurring in borehole 48bb at depths of 15 to 20 ft.

5.2.3 Field Investigation of PRS 10-002(b)

The objective of the RFI at PRS 10-002(b) was to characterize the nature, concentration, and lateral and vertical extent of potential subsurface contamination related to historical activities at the site. The RFI was conducted in July 1994. The area of PRS 10-002(b) was characterized using two four-armed sampling arrays (Fig. 5.2.3-1). The first of these arrays consisted of eight boreholes and was drilled according to the survey coordinates of the array, which were thought to be centered on structure TA-10-48. However, it was later determined that this original array was too far west of the location of the former waste pit and the beta contamination detected during previous investigations. It was determined that the center of the array should have been 50 ft east of the original surveyed location, and a second sampling array consisting of eight boreholes was drilled at that location. Both arrays were oriented in the four cardinal directions. All boreholes were drilled to approximately 50 ft bgs. Boreholes were spaced 5 ft apart along the arms of the original array and 10 ft apart along the arms of the second array.

Samples collected from these boreholes were submitted for analysis for SVOCs, TAL metals, gamma spectroscopy, total uranium, and strontium-90. If field screening revealed elevated gross radioactivity, the laboratory analysis request also included isotopic uranium and gamma spectroscopy. Fifty percent of the total number of samples sent to the fixed laboratory for analysis were also analyzed for high explosives. All appropriate QC samples, including duplicates, field blanks, and rinsate blanks, were collected during subsurface soil sampling activities. Sampling information is summarized in Table 5.2.4-1 of the RFI report. Radioactive field screening with hand-held instruments indicated elevated radioactivity was present only in borehole 10-1289 from 10 ft to 14 ft bgs. All boreholes were backfilled with drill cuttings and completed with a 2-ft thick concrete cap except borehole 10-1289. Because MRAL analytical results indicated the presence of elevated beta radioactivity in samples collected from this borehole, it was backfilled with a cement/bentonite slurry.

For more information on the RFI field activities at PRS 10-002(b), refer to Section 5.2.4 of the RFI report.

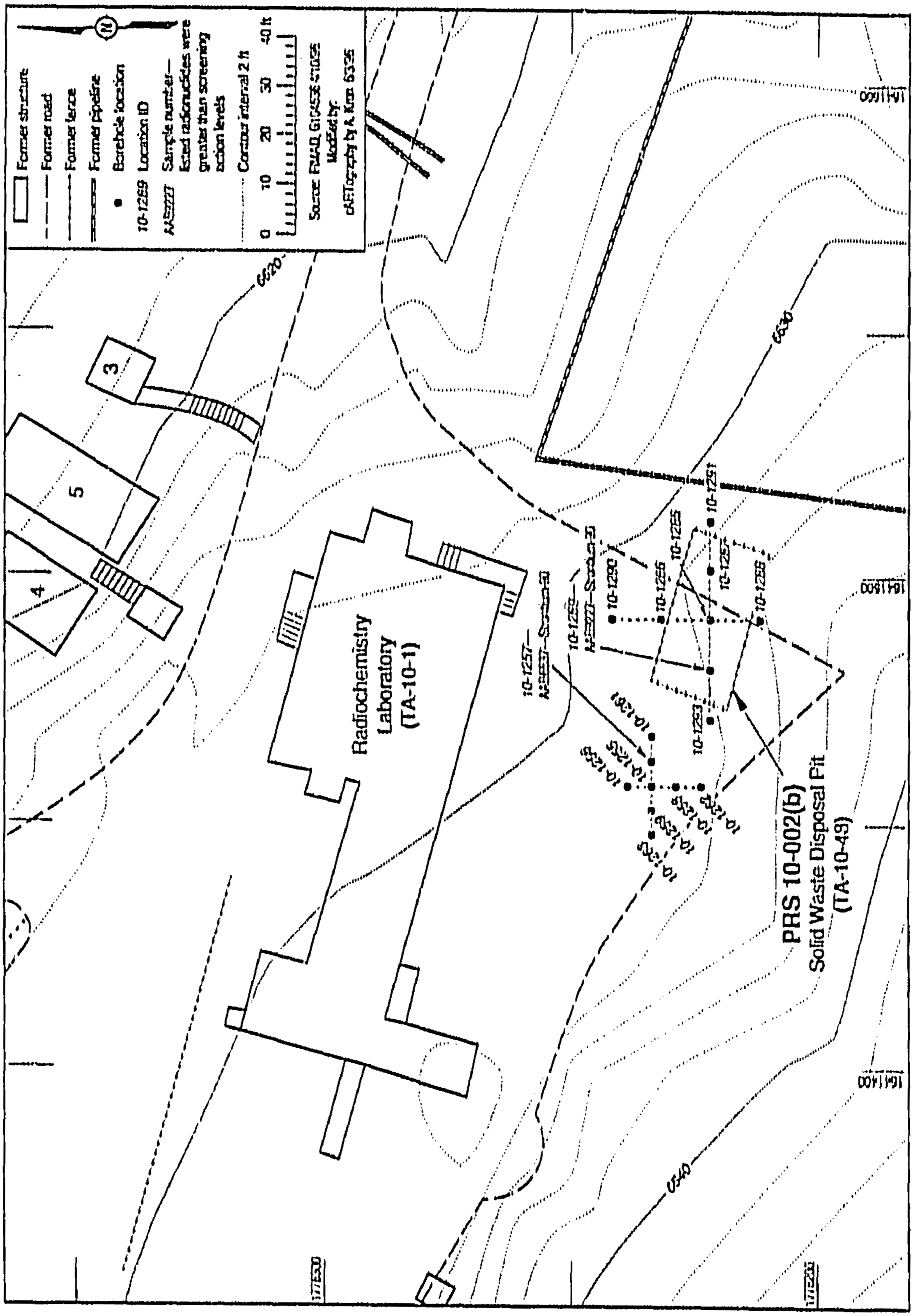

Fig. 5.2.3-1. Locations of PRS 10-002(b) samples and radionuclides detected at levels greater than the minimum detectable activity.

5.2.4 Background Comparison for Radiological Constituents at PRS 10-002(b)

Radionuclides detected in the PRS 10-002(b) area were compared to the minimum detectable activity as described in Section 3.1 of this addendum. The results from PRS 10-002(b) samples with activities exceeding the minimum detectable activity are presented in Table 5.2.4-1. Strontium-90 was the only radionuclide detected at levels greater than the minimum detectable activity, and it will be carried forward in the screening assessment to the SALs comparison.

TABLE 5.2.4-1

PRS 10-002(b) SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	STRONTIUM-90 (pCi/g)
			SAL[a]	5.9
AAB6537	10-1257	Alluvium	3.6–4.2	340.02J[b]
AAB6552	10-1261	Alluvium	2.8–3.8	1.8J
AAB8674	10-1262	Transitional	29.5–29.8	0.52J
AAB8678	10-1262	Pumice	47.3–48.3	0.65J
AAB8691	10-1286	Alluvium	4.2–4.6	0.51J
AAB8701	10-1290	Alluvium	4.1–4.5	0.698J
AAB9205	10-1287	Qbo[c]	29.1–30	1.97J
AAB9211	10-1291	Alluvium	2.8–3.7	1.17J
AAB9433	10-1288	Alluvium	22.5–23.5	1.08J
AAB9227	10-1289	Alluvium	11.4–12.1	150J
AAB9234	10-1289	Pumice	48.5–49.4	0.691J
AAB9246	10-1293	Pumice	48.6–49.6	2.98J
AAB9247	10-1293	Alluvium	10–10.8	3.59J

[a] SAL = Screening action level.
[b] J = Value is an estimated detected quantity (see Section 4.0).
[c] Qbo = The Otowi Member of the Bandelier Tuff.

5.2.5 Human Health Assessment for Radiological Constituents at PRS 10-002(b)

This section presents the human health assessment for radiological data collected from the PRS 10-002(b) area.

5.2.5.1 Screening Assessment for Radiological Constituents at PRS 10-002(b)

This section discusses the SALs comparison for PRS 10-002(b) radionuclides detected at levels greater than the minimum detectable activity.

Greater Than or Equal to SAL. Strontium-90 was detected at levels greater than its SAL (see Table 5.2.4-1 and Fig. 5.2.3-1).

No SAL. All radionuclides had SALs for comparison.

Less than SAL. No radionuclide was detected at levels less than the SAL.

Because no radionuclides were detected at levels below SAL, no multiple chemical evaluation is conducted. At the conclusion of this screening assessment, strontium-90 is retained as a COPC.

5.2.5.2 Extent of Contamination for Radiological Constituents at PRS 10-002(b)

Boreholes 10-1257 and 10-1289 are the only locations at PRS 10-002(b) where strontium-90 concentrations exceeded the SAL. As shown in Fig. 5.2.3-1, these boreholes are bounded laterally by neighboring boreholes with strontium-90 concentrations below the SAL. In addition, the elevated values of strontium-90 are limited to one depth at each location and are bounded by lower strontium-90 concentrations in samples collected at lower depths. Additional discussion of the vertical and lateral extent of contamination, as well as a comparison of the RFI data and FUSRAP data, is presented in Section 5.7.1 of this addendum.

5.2.5.3 Risk Assessment for Radiological Constituents at PRS 10-002(b)

This section discusses the dose assessment for PRS 10-002(b). The dose assessment consists of identification of radionuclides of potential concern, exposure assessment, and development of dose contributions.

5.2.5.3.1 Identification of Radionuclides of Potential Concern

The results of the screening assessment for PRS 10-002(b) show that strontium-90 is retained as a radionuclide of potential concern.

5.2.5.3.2 Exposure and Dose Assessment for PRS 10-002(b)

An exposure and dose assessment of the elevated strontium-90 at PRS 10-002(b) was conducted to determine if the remaining strontium-90 poses a current or potential future health risk. Two scenarios were evaluated for their exposure potential:

- Current recreational use of the area, and
- Future residential use of the area.

Both scenarios were evaluated using the DOE RESRAD program and the LANL-specific default exposure and site parameters specified in Derivation and Use of Radionuclide Soil Cleanup Guidelines (Yu et al. 1993, 1177; Perona 1996, 1326). All dose evaluations include the evaluation of strontium-90 and its decay product yttrium-90. Because strontium-90 and yttrium-90 have relatively short half-lives (approximately 29 years and 64 hours, respectively), all doses estimated for these radionuclides are highest in the present and decrease over time.

Current Recreational Use

The current recreational use scenario is based on the assumption that someone hiking through the area may be exposed to COPCs through inhalation of resuspended dust and incidental ingestion of soil. The highest level of near-surface contamination at PRS 10-002(b) is 340 pCi/g of strontium-90, which was detected at a depth of 3.6 to 4.2 ft in borehole 10-1257. The current recreational use scenario assumes that this level of contamination (340 pCi/g of strontium-90) was located continuously from the surface down to 4 ft bgs over an area of approximately 30 m^2 (which is the approximate size of the area between borehole 10-1257 and the next uncontaminated borehole). These assumptions regarding the source term are expected to overestimate the potential dose in order to compensate for uncertainties in the database. In actuality, the isolated reading of 340 pCi/g for strontium-90 appears to be associated with a piece of shrapnel because further screening of this boring indicated no elevated activities at any other location.

The results of the dose assessment for the current recreational scenario indicate that a dose of 0.5 mrem/yr would be received under the exposure assumptions described above. Because the exposure assumptions are expected to overestimate dose and the estimated dose is well below the EPA guideline of 15 mrem/yr, current recreational use of this area does not pose a significant risk to human health. For details of the RESRAD calculations for this scenario, refer to Appendix C, section C-1.

Future Residential Use

The residential use scenario is based on the assumption that a house is built in the most highly contaminated area. The residential use scenario assumes that the contaminated area excavated for the home is 25 ft x 50 ft, which is the approximate size of the area containing all of the boreholes associated with PRS 10-002(b). The scenario also assumes that the average strontium-90 activity in the 25 ft x 50 ft area is 37.1 pCi/g. This value is the actual average strontium-90 activity for the volume of soil contained in the 25 ft x 50 ft area to a depth of 20 ft, which includes the maximum strontium-90 value of 470.9 pCi/g[1] in FUSRAP borehole

48bb. These assumptions regarding the source term are expected to overestimate the potential dose in order to compensate for uncertainties in the database.

The exposure pathways for the residential use scenario include the following:

- Inhalation of resuspended dust,
- Ingestion of produce from a home garden,
- Ingestion of home-grown meat,
- Ingestion of home-grown milk, and
- Incidental soil ingestion.

Based on the groundwater model used in RESRAD, strontium-90 would not reach the water table prior to its decay. Therefore, pathways associated with groundwater do not contribute to the exposure potential.

The results of the dose assessment for the future residential scenario indicate that an estimated dose of 17 mrem/yr would be received under the exposure assumptions described above. Of this dose, 16 mrem/yr is received from ingestion of homegrown produce, 0.4 mrem/yr is received from meat ingestion, 0.1 mrem/yr is received from milk ingestion, 0.03 mrem/yr is received from incidental soil ingestion, and 0.01 mrem/yr is received from inhalation of resuspended dust. A total dose of 16 mrem/yr would be equivalent to a lifetime excess cancer risk of 1 in 10 000 over a thirty-year exposure period. Due to the conservative nature of the input parameters, this risk level may be significantly overestimated. However, these results indicate that future residential use of this area may pose a significant risk to human health. If this area is developed for future residential use, remedial action may be warranted. For details of the RESRAD calculations for this scenario, refer to Appendix C, section C-2.

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[1] Because the FUSRAP investigation focused on laboratory analysis of gross beta counts, there are limited analytical data available from that investigation for strontium-90. As a result, a statistical model was developed to estimate strontium-90 activity for a particular location based on gross beta counts measured at that location. This statistical model is presented in Fig. 5.7.1-6 of this addendum. The value of 470.9 pCi/g is an interpolated value derived from this model.

5.2.6 Ecological Assessment for Radiological Constituents at PRS 10-002(b)

The preliminary ecological screening assessment indicates that this site is located in a floodplain and is potentially within the foraging range of the spotted bat and peregrine falcon. These factors must be taken into consideration should any remedial action be undertaken at this site.

According to guidance from the International Atomic Energy Agency, human health assessment results for radionuclides are assumed to be protective of most animal populations (International Atomic Energy Agency 1992, 1993). As a result, the human health assessment results adequately represent the ecological concerns for this site.

5.2.7 Conclusions and Recommendations for PRS 10-002(b)

Several areas of elevated strontium-90 concentrations were detected in PRS 10-002(b). Borehole 10-1267 had one elevated level of 340 pCi/g in the first sampling interval of (3.6 to 4.2 ft), but no elevated levels were found upon further screening of adjacent intervals. Borehole 10-1269 had one elevated level of 150 pCi/g at a depth of 11 ft. FUSRAP borehole 48bb had two elevated levels of 68 pCi/g at 12 ft and 471 pCi/g at 17 ft.

In the current recreational scenario, only near-surface contamination was considered, and the value of 340 pCi/g was conservatively assumed to be located continuously from the surface down to 4 ft bgs over an area of approximately 30 m^2. A dose of 0.5 mrem/yr would be received under the current recreational scenario, which is well below the EPA guideline of 15 mrem/yr. Therefore, current recreational use of this area does not pose a significant risk to human health.

In the future residential scenario, all of the elevated levels were averaged with other detected strontium-90 activities across a residential exposure unit. A dose of 17 mrem/yr would be received under the future residential scenario, primarily due to ingestion of garden produce. This equates to a lifetime excess cancer risk of 1 in 10 000. Comparison of these risk estimates to the EPA recommended dose limit of 15 mrem/yr and the National Contingency Plan lifetime excess cancer limit range of 1 in 10 000 to 1 in 10 000 000 indicates a marginal risk potential from residential use of this area. If the area is developed for residential or agricultural purposes, remedial action may be warranted.

PRS 10-002(b) was also included in a site-wide risk evaluation, which is presented in Section 5.7.2 of this addendum.

5.3 Central Area, PRSs 10-003(a-o) and 10-007

The Central Area includes the former radiochemistry laboratory liquid waste disposal complex [PRSs 10-003(a-o)] as well as the building debris landfill (PRS 10-007) created during the 1963 decontamination and decommissioning of TA-10. Strontium-90 was retained as a COPC in the human health screening assessment for PRSs 10-003(a-o) and 10-007. A radiological dose assessment performed on the data for these PRSs indicates that risk levels are acceptable in the current recreational land-use scenario, but are unacceptable in the future residential land-use scenario. If the site is developed for residential or agricultural purposes, remedial action may be warranted.

5.3.1 History of PRSs 10-003(a-o) and 10-007

The PRSs of the TA-10 Subsurface Aggregate Central Area [PRSs 10-003(a-o) and 10-007] are discussed in Subsection 3.1.4 of the RFI Work Plan for OU 1079 (LANL 1992, 0783).

PRSs 10-003(a-o) were part of a liquid waste disposal complex that served the former radiochemistry laboratory, TA-10-1. The radiochemistry laboratory was used to separate, precipitate, and encapsulate lanthanum-140 into sources. The liquid disposal complex consisted of liquid disposal pits, industrial waste manholes and septic tanks, industrial waste lines, and a leach field that received the liquid radioactive and chemical wastes generated by radiochemistry laboratory operations.

The entire liquid waste disposal complex [PRSs 10-003(a-o)] was excavated to a depth of approximately 18.6 ft during the 1963 decontamination and decommissioning of TA-10. The excavation was then backfilled with soil from other parts of Bayo Canyon as well as building debris from the TA-10 decontamination and decommissioning. The landfill (PRS 10-007) was sited within the excavation created by the removal of the liquid waste disposal complex near the intermittent stream at TA-10. Items in the landfill include concrete from the two former firing site detonation control buildings (TA-10-13 and TA-10-15), as well as soil from the vicinity of the former inspection building (TA-10-8), one of the former battery buildings (TA-10-14), and former building TA-10-13 (LANL 1992, 0783).

The COPCs in the Central Area include strontium-90, total uranium, barium, cadmium, lead, beryllium, TAL metals, VOCs, and SVOCs. Only the radionuclides are discussed in this addendum.

5.3.2 Previous Investigations of PRSs 10-003(a-o) and 10-007

PRSs 10-003(a-o) were investigated previous to the RFI. These previous investigations are described in Subsection 3.1.4.1.2 of the RFI Work Plan for OU 1079 and summarized below (LANL 1992, 0783).

During the 1963 decontamination and decommissioning activities, radiation levels in the Central Area excavation area ranged up to 35 mR/hr. It was recognized at the time of decommissioning that potentially radioactive materials may have remained in the canyon. Periodic surveys were therefore conducted from 1966 to 1976.

In 1973, a test hole was drilled to a depth of 18.9 ft in the vicinity of PRS 10-003(g), a former industrial waste manhole. The drill encountered blocks of concrete from the building debris left in the excavation during decommissioning, and sample analyses indicated surface and subsurface strontium-90 contamination. Five additional test holes were drilled in 1974. Samples from these holes had gross beta activity at levels above background.

Extensive sampling was also performed at the former radiochemistry laboratory (TA-10-1) and the entire liquid waste disposal complex [PRS 10-003(a-o)] through trenching and drilling during the 1977 FUSRAP survey. The FUSRAP results indicated that subsurface contamination was mostly low level and was within 31 ft of the radiochemistry laboratory and the liquid waste disposal complex. The highest levels were found near PRS 10-003(b), a former liquid waste disposal pit.

No investigations specific to PRS 10-007 occurred previous to the RFI discussed in this report.

5.3.3 Field Investigation of PRSs 10-003(a-o) and 10-007

The objective of the RFI at PRSs 10-003(a-o) and 10-007 was to characterize the nature, concentration, and lateral and vertical extent of potential subsurface contamination related to historical activities at the site. The RFI was conducted from June through November 1994. The TA-10 Central Area was characterized using seven four-armed sampling arrays (Fig. 5.3.3-1). These arrays were generally centered on or near former waste pits, drain lines, manholes, septic tanks, or known areas of subsurface beta contamination as determined from previous studies. The arrays consisted of 5, 9, or 10 boreholes with depths of 50 ft bgs. The arms of some arrays were oriented along former drain lines, trenches, surface depressions, or the long axis of suspected areas of contamination. The arms of other arrays were oriented in the four cardinal directions. Boreholes were spaced 5 to 15 ft apart along the arms of each array.

Samples collected from these boreholes were submitted for analysis for SVOCs, TAL metals, gamma spectroscopy, total uranium, and strontium-90. If field screening revealed elevated gross radioactivity, the laboratory analysis request also included isotopic uranium and gamma spectroscopy. Fifty percent of the total number of samples sent to the fixed laboratory for analysis were also analyzed for high explosives. All appropriate QC samples, including duplicates, field blanks, and rinsate blanks, were collected during subsurface soil sampling activities. Sampling information is summarized in Table 5.3.4-1 of the RFI report. Radioactivity field screening data indicated no radioactivity above background levels in drilling arrays 4, 5, 6, and 7. However, field screening and MRAL results did indicate the presence of radioactivity above background levels in boreholes in arrays 1, 2, and 3. These results are summarized in Table 5.3.4-2 of the RFI report. Within the TA-10 Central Area, 14 boreholes were backfilled with the cement/bentonite slurry because of elevated radioactivity detected by hand-held screening instruments and/or MRAL results, and 38 boreholes were backfilled with drill cuttings and completed with the concrete cap.

In addition to the seven drilling arrays, borehole 10-1205 was added south of the former radiochemistry laboratory (structure TA-10-1) during the course of the field program when three radiochemists formerly employed at the radiochemistry laboratory identified an area suspected to be the location of an undocumented laboratory waste pit. The borehole was drilled to assess the presence of subsurface radioactivity. Samples collected were submitted to the MRAL for analysis, and no radioactivity was detected above background levels.

For more information about the RFI field activities for PRSs 10-003(a-o) and 10-007, refer to Section 5.3.4 of the RFI report

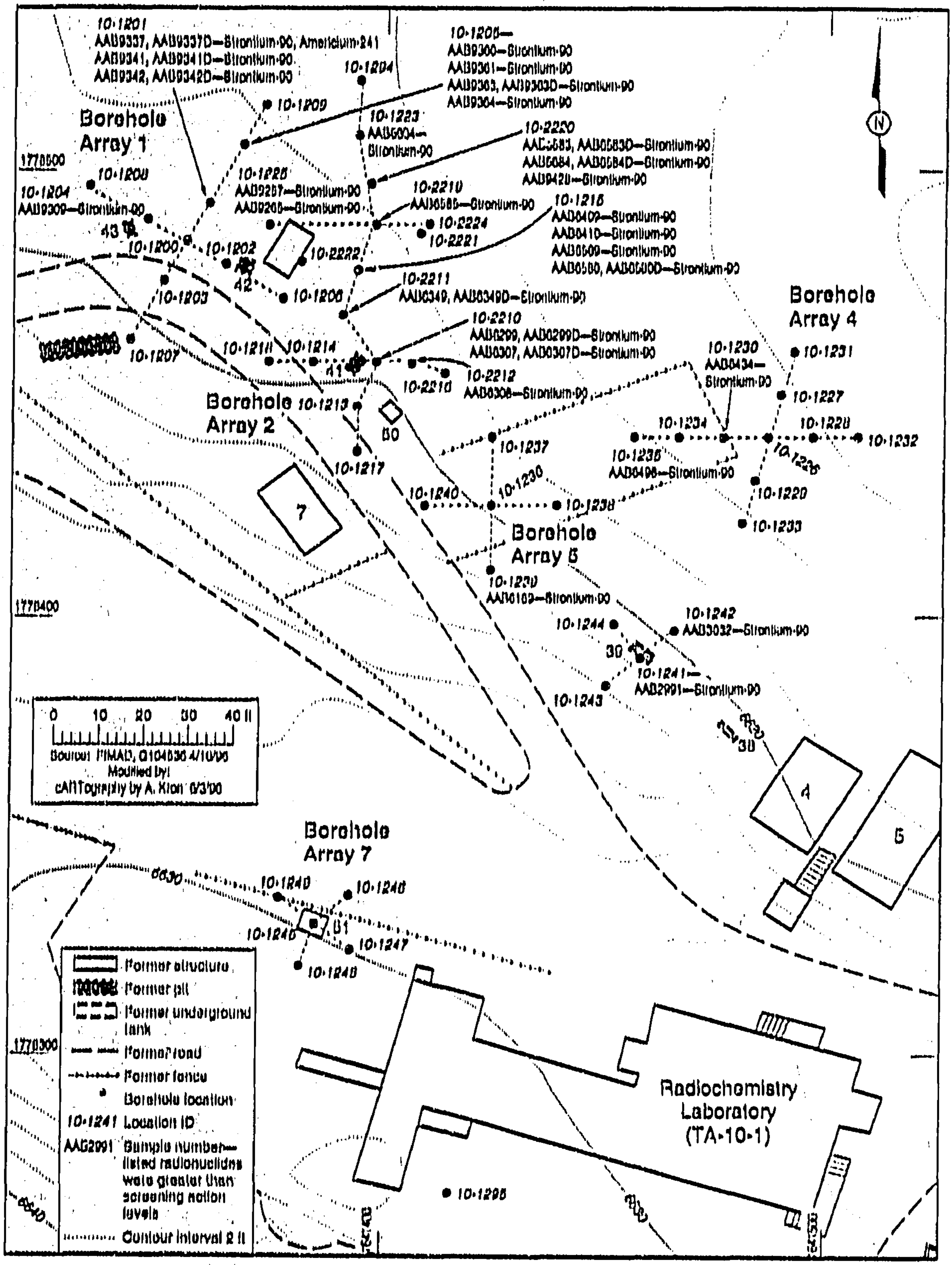


Fig. 5.3.3-1 Locations of samples collected at PRSs 10-003(a-o) and 10-007 and radionuclides detected at levels greater than the minimum detectable activity.

5.3.4 Background Comparison for Radiological Constituents at PRSs 10-003(a-o) and 10-007

Radionuclides detected in the area of PRSs 10-003(a-o) and 10-007 were compared to the minimum detectable activity as described in Section 3.1 of this addendum. The results from samples with activities exceeding the minimum detectable activity are presented in Table 5.3.4-1. Americium-241, cesium-137, and strontium-90 were detected at levels greater than the minimum detectable activity, and they are carried forward in the screening assessment to the SALs comparison.

TABLE 5.3.4-1

PRSs 10-003(a-o) and 10-007 SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	AMERICIUM-241 (pCi/g)	CESIUM-137 (pCi/g)	STRONTIUM-90 (pCi/g)
			SAL[a]	22	5.1	5.9
AAB2845	10-1249	Alluvium	0.9–1.5	–[b]	–	1.75
AAB2861	10-1247	Alluvium	0.8–1.4	–	–	3.26
AAB2991	10-1241	Alluvium	3.5–4	–	–	9.44
AAB3001	10-1241	Pumice	49.1–49.6	–	–	0.74
AAB3001D[c]	10-1241	Pumice	49.1–49.6	–	–	0.75
AAB3002	10-1241	Alluvium	22–22.3	–	–	0.8
AAB3003	10-1241	Transitional	33.9–34.3	–	–	0.84
AAB3004D	10-1244	Alluvium	4.3–4.9	–	–	0.86
AAB3018	10-1244	Alluvium	12.5–13.1	–	–	0.28J[d]
AAB3019D	10-1242	Alluvium	4.1–4.7	–	–	3.91
AAB3019	10-1242	Alluvium	4.1–4.7	–	–	4.19J
AAB3032	10-1242	Alluvium	6.2–6.8	–	–	26.22J
AAB3057	10-1226	Transitional	32.5–33	–	–	2.3R[e]
AAB3059	10-1226	Pumice	43.9–44.3	–	–	0.7R
AAB3062	10-1228	Alluvium	3.5–4.2	–	–	5.21J
AAB3069	10-1228	Transitional	32.1–32.5	–	–	1.06J
AAB3072	10-1228	Pumice	49–49.8	–	–	0.52J
AAB3073	10-1228	Alluvium	21.4–21.8	–	–	0.35
AAB3073D	10-1228	Alluvium	21.4–21.8	–	–	0.59
AAB6126	10-1236	Fill	2.8–3.4	–	–	0.84
AAB6129	10-1248	Alluvium	3.4–4.05	–	–	1.27
AAB6152	10-1236	Transitional	30–31.2	–	–	0.33
AAB6157D	10-1237	Alluvium	2.5–3.1	–	–	0.70
AAB6157	10-1237	Alluvium	2.5–3.1	–	–	0.96

TABLE 5.3.4-1 (CONTINUED)

PRSs 10-003(a-o) and 10-007 SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	AMERICIUM-241 (pCi/g)	CESIUM-137 (pCi/g)	STRONTIUM-90 (pCi/g)
			SAL[a]	22	5.1	5.9
AAB6169	10-1239	Alluvium	2.5–3.1	–	–	7.97
AAB6182	10-1240	Alluvium	3.1–3.7	–	–	0.9J
AAB6186	10-1240	Alluvium	19–19.6	–	–	0.7J
AAB6193	10-1240	Pumice	36.6–37.6	–	–	0.4J
AAB6194	10-1240	Pumice	36.6–37.6	–	–	0.7J
AAB6197	10-1240	Pumice	49.4–50	–	–	3.1J
AAB6198	10-1238	Alluvium	4.4–5	–	–	0.8J
AAB6205	10-1238	Alluvium	23.1–23.7	–	–	1.6J
AAB6211	10-1238	Pumice	38.8–39.4	–	–	0.9J
AAB6211D	10-1238	Pumice	38.8–39.4	–	–	1.1J
AAB6214	10-1238	Pumice	49.4–50	–	–	0.9
AAB6292	10-1210	Alluvium	6–6.6	–	–	0.83R
AAB6299	10-2210	Alluvium	18–18.6	–	–	1 378
AAB6299D	10-2210	Alluvium	18–18.6	–	–	1 399
AAB6306	10-2210	Pumice	49–49.8	–	–	0.66J
AAB6307D	10-2210	Alluvium	11.9–12.5	–	–	2 748.9
AAB6307	10-2210	Alluvium	11.9–12.5	–	–	2 906.2
AAB6308	10-1212	Fill	3.6–4.2	–	–	6.14J
AAB6321	10-2216	Alluvium	7.5–8.5	–	–	1.82J
AAB6322	10-2216	Alluvium	7.5–8.5	–	–	2.56J
AAB6330	10-2216	Alluvium	27.5–28	–	–	0.61J
AAB6338	10-2211	Alluvium	13.8–14.3	–	–	3.3
AAB6343	10-2211	Alluvium	31.4–31.9	–	–	0.64
AAB6348	10-2211	Pumice	49.5–50	–	–	0.86
AAB6349	10-2211	Alluvium	16.3–16.8	–	–	255.05
AAB6349D	10-2211	Alluvium	16.3–16.8	–	–	265.76
AAB6371	10-1214	Alluvium	25.9–26.4	–	–	0.48J
AAB6376	10-1214	Transitional	36.6–37.1	–	–	0.53J
AAB6404	10-1213	Pumice	39.2–39.7	–	–	0.51J
AAB6409	10-1215	Alluvium	15–15.9	–	–	11.76J
AAB6410	10-1215	Alluvium	15–15.9	–	–	21.72J
AAB6421	10-1229	Qbo[f]	35–35.8	–	–	0.45J
AAB6423	10-1227	Alluvium	3.1–3.7	–	–	5.54J

TABLE 5.3.4-1 (CONTINUED)

PRSs 10-003(a-o) and 10-007 SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	AMERICIUM-241 (pCi/g)	CESIUM-137 (pCi/g)	STRONTIUM-90 (pCi/g)
			SAL[a]	22	5.1	5.9
AAB6432	10-1227	Qbo	49.1–49.8	–	–	0.42J
AAB6433	10-1227	Qbo	44.5–45	–	–	0.76J
AAB6434	10-1230	Alluvium	4–4.5	–	–	7.42
AAB6445	10-1230	Qbo	48.5–49.5	–	–	0.36J
AAB6446	10-1230	Qbo	46.6–47.1	–	–	1.35J
AAB6447	10-1233	Alluvium	3.7–4.3	–	–	0.94
AAB6454	10-1233	Transitional	28.6–29.5	–	–	0.43J
AAB6461	10-1231	Alluvium	4–4.5	–	–	1.38
AAB6473	10-1234	Alluvium	0.6–1	–	–	0.57J
AAB6478	10-1234	Alluvium	23.4–23.9	–	–	0.56J
AAB6485	10-1235	Alluvium	3.5–4.5	–	–	1.52J
AAB6492	10-1235	Transitional	33.1–33.7	–	–	5.67J
AAB6498	10-1235	Pumice	48.9–49.4	–	–	10.45J
AAB6500	10-1235	Pumice	43.6–44.1	–	–	4.32J
AAB6569	10-1215	Alluvium	21.7–22.2	–	–	1 220.8
AAB6580D	10-1215	Alluvium	26.6–27.1	–	–	2 686.5
AAB6580	10-1215	Alluvium	26.6–27.1	–	–	2 930
AAB6583D	10-2220	Alluvium	14–14.5	–	–	34.3
AAB6583	10-2220	Alluvium	14–14.5	–	–	37.2
AAB6584	10-2220	Alluvium	17–17.5	–	–	40 325.8
AAB6584D	10-2220	Alluvium	17–17.5	–	–	41 880.8
AAB6585	10-2219	Alluvium	20.3–20.8	–		1 053
AAB6604	10-1223	Alluvium	16–16.5		0.0777	236J
AAB6612	10-1223	Transitional	37.5–38	–	–	0.723J
AAB6623D	10-2224	Transitional	37.5–38.3	–	–	1.64J
AAB9337	10-1201	Alluvium	11.1–11.8	51.02	–	506.6J
AAB9341	10-1201	Alluvium	16.9–17.5	13.12	–	4 103.4J
AAB9342D	10-1201	Alluvium	19.2–20	13.95	–	11 637.6J
AAB9248	10-2222	Alluvium	15.7–16.5	–	–	1.12J
AAB9253	10-2222	Qbo	40.6–41.6	–	–	0.764J
AAB9257	10-1225	Alluvium	16.4–16.9	–	–	10.7J
AAB9265	10-1225	Pumice	41.2–42.1	–	–	13
AAB9271	10-1294	Alluvium	26.5–27.1	–	–	1.19

TABLE 5.3.4-1 (CONTINUED)

PRSs 10-003(a-o) and 10-007 SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	AMERICIUM-241 (pCi/g)	CESIUM-137 (pCi/g)	STRONTIUM-90 (pCi/g)
			SAL[a]	22	5.1	5.9
AAB9309	10-1204	Alluvium	15.7–16.4	–	–	4 201.4
AAB9330	10-1207	Alluvium	25.5–26.1	–	–	0.75J
AAB9337D	10-1201	Alluvium	11.1–11.8	–	–	532.2J
AAB9341D	10-1201	Alluvium	16.9–17.5	–	–	5 137.8J
AAB9342	10-1201	Alluvium	19.2–20	–	–	12 735.3J
AAB9351	10-1209	Alluvium	14–14.7	–	–	0.808J
AAB9359	10-1209	Qbo	48.4–49.2	–	–	1.1J
AAB9360	10-1205	Alluvium	10–10.5	–	–	29.7J
AAB9361	10-1205	Alluvium	14.3–14.8	–	–	2 432.33
AAB9363	10-1205	Alluvium	19.5–20	–	–	3 570J
AAB9363D	10-1205	Alluvium	19.5–20	–	–	4 180J
AAB9364	10-1205	Alluvium	20–20.9	–	–	2 185.42
AAB9399	10-1205	Qbo	49.3–50	–	–	1.1J
AAB9428	10-2220	Alluvium	18–18.6	–	–	18 654

[a] SAL = Screening action level.
[b] – = The radionuclide was not detected.
[c] A "D" notation indicates that the sample is a duplicate analysis.
[d] A "J" notation indicates that the value is an estimated detected quantity (see Section 4.0).
[e] An "R" notation indicates that the value is a rejected quantity (see Section 4.0).
[f] Qbo = The Otowi Member of the Bandelier Tuff.

5.3.5 Human Health Assessment for Radiological Constituents at PRSs 10-003(a-o) and 10-007

This section presents the human health assessment for the radiological data collected from the area of PRSs 10-003(a-o) and 10-007.

5.3.5.1 Screening Assessment for Radiological Constituents at PRSs 10-003(a-o) and 10-007

This section discusses the SALs comparison for radionuclides detected at PRSs 10-003(a-o) and 10-007 at levels greater than minimum detectable activity.

Greater Than or Equal to SAL. Two radionuclides, americium-241 and strontium-90, were detected at concentrations greater than their respective SALs (see Table 5.3.4-1 and Fig. 5.3.3-1). Elevated americium-241 concentrations were measured in one borehole

(10-1201) drilled during the Phase I RFI. Further analytical assessment of the presence of americium-241 and plutonium isotopes (which are parents of americium-241) was conducted. Samples were collected from the original core of borehole 10-1201 in the intervals adjacent to the intervals in which gamma spectrometry results indicated the presence of americium-241. The results from these additional samples indicated that no plutonium isotopes nor americium-241 are present in the adjacent sections of core above background concentrations. Nonetheless, americium-241 will be retained as a COPC.

No SAL. All radionuclides had SALs for comparison.

Less than SAL. Cesium-137 was detected at a concentration less than SAL.

Because cesium-137 was the only radionuclide detected at levels below SAL, no multiple chemical evaluation is conducted. At the conclusion of this screening assessment, americium-241 and strontium-90 are retained as COPCs.

5.3.5.2 Extent of Contamination for Radiological Constituents at PRSs 10-003(a-o) and 10-007

The Central Area boreholes with strontium-90 activities exceeding SALs include boreholes 10-1201, 10-1204, 10-1205, 10-1212, 10-1215, 10-1223, 10-1225, 10-1227, 10-1228, 10-1230, 10-1235, 10-1239, 10-1241, 10-1242, 10-2210, 10-2211, 10-2219, and 10-2220. As shown in Fig. 5.3.3-1, these boreholes are bounded laterally by neighboring boreholes with strontium-90 concentrations below the SAL. In addition, the elevated values of strontium-90 are bounded by lower strontium-90 concentrations in samples collected at lower depths (see Table 5.3.4-1).

Borehole 10-1201 is the only Central Area location where americium-241 values exceeded the SAL. As shown in Fig. 5.3.3-1, this borehole is bounded laterally by neighboring boreholes with lower americium-241 concentrations. In addition, the elevated values of americium-241 are bounded by lower concentrations in samples collected at lower depths. Additional discussion of the vertical and lateral extent of contamination, as well as a comparison of the RFI data and FUSRAP data, is presented in Section 5.7.1 of this addendum.

5.3.5.3 Risk Assessment for Radiological Constituents at PRSs 10-003(a-o) and 10-007

This section discusses the dose assessment for the Central Area, PRSs 10-003(a-o) and 10-007. The dose assessment consists of identification of radionuclides of potential concern, exposure assessment, and development of dose contributions.

5.3.5.3.1 Identification of Radionuclides of Potential Concern for PRSs 10-003(a-o) and 10-007

The results of the screening assessment for the Central Area show that americium-241 and strontium-90 are retained as radionuclides of potential concern.

5.3.5.3.2 Exposure and Dose Assessment for PRSs 10-003(a-o) and 10-007

An exposure and dose assessment of the elevated strontium-90 and americium-241 at PRSs 10-003(a-o) and 10-007 was conducted to determine if the remaining strontium-90 and americium-241 pose a current or potential future health risk. Two scenarios were evaluated for their exposure potential:

- Current recreational use of the area, and
- Future residential use of the area.

Both scenarios were evaluated using the DOE RESRAD program with the LANL-specific default exposure and site parameters specified in Derivation and Use of Radionuclide Soil Cleanup Guidelines (Yu et al. 1993, 1177; Perona 1996, 1326). All dose evaluations include the evaluation of the parent nuclide and its radioactive decay progeny. Most of the detected activity and potential risk is from strontium-90/yttrium-90. Because strontium-90 and yttrium-90 have relatively short half-lives (approximately 29 years and 64 hours, respectively), all doses estimated for these radionuclides are highest in the present and decrease over time.

Current Recreational Use

The current recreational use scenario is based on the assumption that someone hiking through the area may be exposed to COPCs through inhalation of resuspended dust and incidental ingestion of soil. The highest level of surface contamination in the Central Area is 191 pCi/g of strontium-90, which was detected near a chamisa bush known to have taken up strontium-90 from the subsurface. The current recreational use scenario assumes that incidental ingestion of soil would occur in this area at the highest level (191 pCi/g). Surface sampling in Bayo Canyon indicates that contaminated areas such as this are likely to be limited and isolated. Therefore, the current recreational scenario also assumes that a single incident of atypically high soil ingestion would occur. The scenario assumes that such an exposure results from a small child deliberately ingesting soil, and that an estimated 10 g of soil are ingested (EPA 1996, 1304). These assumptions are expected to overestimate the potential dose in order to compensate for uncertainties in the database.

The results of the dose assessment for the current recreational scenario indicate that a dose of 0.3 mrem would be received assuming a single incident of atypically high soil ingestion, as described above. This would equate to an excess cancer risk of 1 in 10 000 000. The dose associated with inhalation of resuspended dust while hiking is less than 0.1 mrem/yr. Because the exposure assumptions are expected to overestimate dose and the estimated dose is well below the EPA guideline of 15 mrem/yr, current recreational use of this area does not pose a significant risk to human health. For details of the RESRAD calculations for this scenario, refer to Appendix C, section C-3.

Future Residential Use

The residential use scenario is based on the assumption that a house is built in the most highly contaminated area. The residential use scenario assumes that the contaminated area excavated for the home is 25 ft x 50 ft, which is the approximate size of the area containing all boreholes with average detected radionuclide activities of greater than 1 000 pCi/g. The scenario also assumes that the average strontium-90 activity in the 25 ft x 50 ft area is 5 419 pCi/g. This value is the actual average strontium-90 activity for the volume of soil contained in the 25 ft x 50 ft area to a depth of 20 ft, which includes the maximum detected strontium-90 value of 41 106 pCi/g in borehole 10-2220. This volume of soil also includes the detected values for americium-241, which average 15 pCi/g.

The exposure pathways for the residential use scenario include the following:

- Inhalation of resuspended dust,
- Ingestion of produce from a home garden,
- Ingestion of home-grown meat,
- Ingestion of home-grown milk, and
- Incidental soil ingestion.

Based on the groundwater model used in RESRAD, strontium-90 and americium-241 would not reach the water table prior to decay. Therefore, pathways associated with groundwater do not contribute to the exposure potential.

The results of the dose assessment for the future residential scenario indicate that an estimated dose of 2 570 mrem/yr would be received under the exposure assumptions described above. Of this dose, 93% is from ingestion of homegrown produce, 3% from direct radiation, 2% from meat ingestion, and less than 1% from milk ingestion, incidental soil ingestion, and inhalation of resuspended dust. Less than 0.1% of the dose resulted from americium-241. These results show that the potential dose is primarily due to ingestion of homegrown produce with strontium-90 contamination. Strontium-90 is readily taken up by plant roots. If edible plants were grown in the material containing elevated levels of strontium-90 (either through excavation or direct root intrusion), routine garden consumption alone would be associated with a radiological dose of more than 2 400 mrem/yr and a lifetime excess cancer risk of 1 in 100.

The total dose of 2 570 mrem/yr would be equivalent to a lifetime excess cancer risk of 1 in 100 over a thirty year exposure period. These results indicate that future residential use of this area may pose a significant risk to human health. If this area is developed for future residential use, remedial action may be warranted. For details of the RESRAD calculations for this scenario, refer to Appendix C, section C-4.

5.3.6 Ecological Assessment for Radiological Constituents at PRSs 10-003(a-o) and 10-007

The preliminary ecological screening assessment indicates that this site is located in a floodplain and is potentially within the foraging range of the spotted bat and peregrine falcon. These factors must be taken into consideration should any remedial action be undertaken at this site.

According to guidance from the International Atomic Energy Agency, human health assessment results for radionuclides are assumed to be protective of most animal populations (International Atomic Energy Agency 1992, 0983). As a result, the human health assessment results adequately represent the ecological concerns for this site.

5.3.7 Conclusions and Recommendations for PRSs 10-003(a-o) and 10-007

Several areas of elevated strontium-90 concentrations were detected in the area of PRSs 10-003(a-o) and 10-007. The highest strontium-90 results were from samples collected from depths between 11 and 18 ft.

In the current recreational scenario, a dose of 0.3 mrem would be received assuming a single incident of atypically high soil ingestion. This would equate to an excess cancer risk of 1 in 10 000 000. The dose associated with inhalation of resuspended dust while hiking is less than 0.1 mrem/yr. Both dose levels are well below the EPA guideline of 15 mrem/yr. Therefore, current recreational use of this area does not pose a significant risk to human health. However, because the chamisa bushes in the area are known to have taken up strontium-90 from the subsurface, an interim action will be conducted to remove the chamisa containing elevated levels of strontium-90 from this area.

In the future residential scenario, all of the elevated levels were averaged with other detected strontium-90 activities across a residential exposure unit. A dose of 2 400 mrem/yr would be received under the future residential scenario, primarily due to assumed routine ingestion of garden produce. This equates to a lifetime excess cancer risk of 1 in 100. Comparison of these risk estimates to the EPA recommended dose limit of 15 mrem/yr and the National Contingency Plan lifetime excess cancer limit range of 1 in 10 000 to 1 in 10 000 000 indicates an unacceptable risk level for residential use of this area. If the area is developed for residential or agricultural purposes, remedial action may be warranted.

PRSs 10-003(a-o) and 10-007 were also included in a site-wide risk evaluation, which is presented in Section 5.7.2 of this addendum.

5.4 PRS 10-004(a)

PRS 10-004(a) consists of a former sanitary septic tank (TA-10-40) that served the former personnel building (TA-10-21) at TA-10. No radiological constituents are retained as COPCs in the human health screening assessment for PRS 10-004(a), and this PRS is recommended for NFA.

5.4.1 History of PRS 10-004(a)

PRS 10-004(a) is discussed in Subsection 3.1.4 of the RFI Work Plan for OU 1079 (LANL 1992, 0783).

PRS 10-004(a) was a sanitary septic tank that served the personnel building (TA-10-21) at TA-10 from 1949 through 1963. The tank had a capacity of 1 060 gal., and discharged to a pit measuring 8 ft long x 12 ft deep. This septic system discharged to a drain line and outfall located in a stream channel approximately 200 ft north-northeast of PRS 10-002(a). PRS 10-004(a) was removed during the 1963 decontamination and decommissioning of TA-10. No information is available concerning the fate of the disposal pit associated with this PRS.

The COPCs for PRS 10-004(a) include strontium-90, total uranium, barium, cadmium, lead, beryllium, TAL metals, VOCs, and SVOCs. Only the radionuclides are discussed in this addendum.

5.4.2 Previous Investigations of PRS 10-004(a)

PRS 10-004(a) was investigated previous to the RFI. These previous investigations are described in Subsection 3.1.4.7.2 of the RFI Work Plan for OU 1079 and summarized below (LANL 1992, 0783).

During the 1977 FUSRAP survey, several boreholes were drilled and trenches were excavated around PRS 10-004(a). One trench was excavated across the area where the line led from the personnel building. Another was excavated across the septic tank location, and two more were excavated across the location of the line leading from the tank to the pit. Two boreholes were augered in and near the pit location. The auger holes and trenches indicated background or below background levels of gross alpha and gross beta activity. Gross alpha radioactivity ranged from 4 to 44 pCi/g and gross beta radioactivity ranged from 2 to 4 pCi/g.

5.4.3 Field Investigation of PRS 10-004(a)

The objective of the RFI at PRS 10-004(a) was to determine the presence or absence of contaminants at the site. The RFI was conducted in September and October 1994. The area of PRS 10-004(a) was characterized using one four-armed drilling array (Fig. 5.4.3-1). This array was centered on structure TA-10-40, and was oriented in the four cardinal directions. The array consisted of eight boreholes, each drilled to a depth of 50 ft bgs. Boreholes were spaced 10 ft apart along the arms of the array.

Samples collected from these boreholes were submitted for analysis for VOCs, SVOCs, TAL metals, gamma spectroscopy total uranium, and strontium-90. Fifty percent of the total number of samples sent to the fixed laboratory for analysis were also analyzed for high explosives. All appropriate QC samples, including duplicates, field blanks, and rinsate blanks, were collected during subsurface soil sampling activities. Sampling information is summarized in Table 5.4.4-1 of the RFI report. No elevated radioactivity was detected by field screening with hand-held instruments in any of the boreholes drilled at PRS 10-004(a). All boreholes were backfilled with drill cuttings and completed with a 2-ft thick concrete cap, except boreholes 10-1276 and 10-1267, which were completed as a groundwater monitoring well and a neutron access tube for long-term soil moisture monitoring, respectively.

For more information about the RFI field investigation at PRS 10-004(a), refer to Section 5.4.4 of the RFI report.

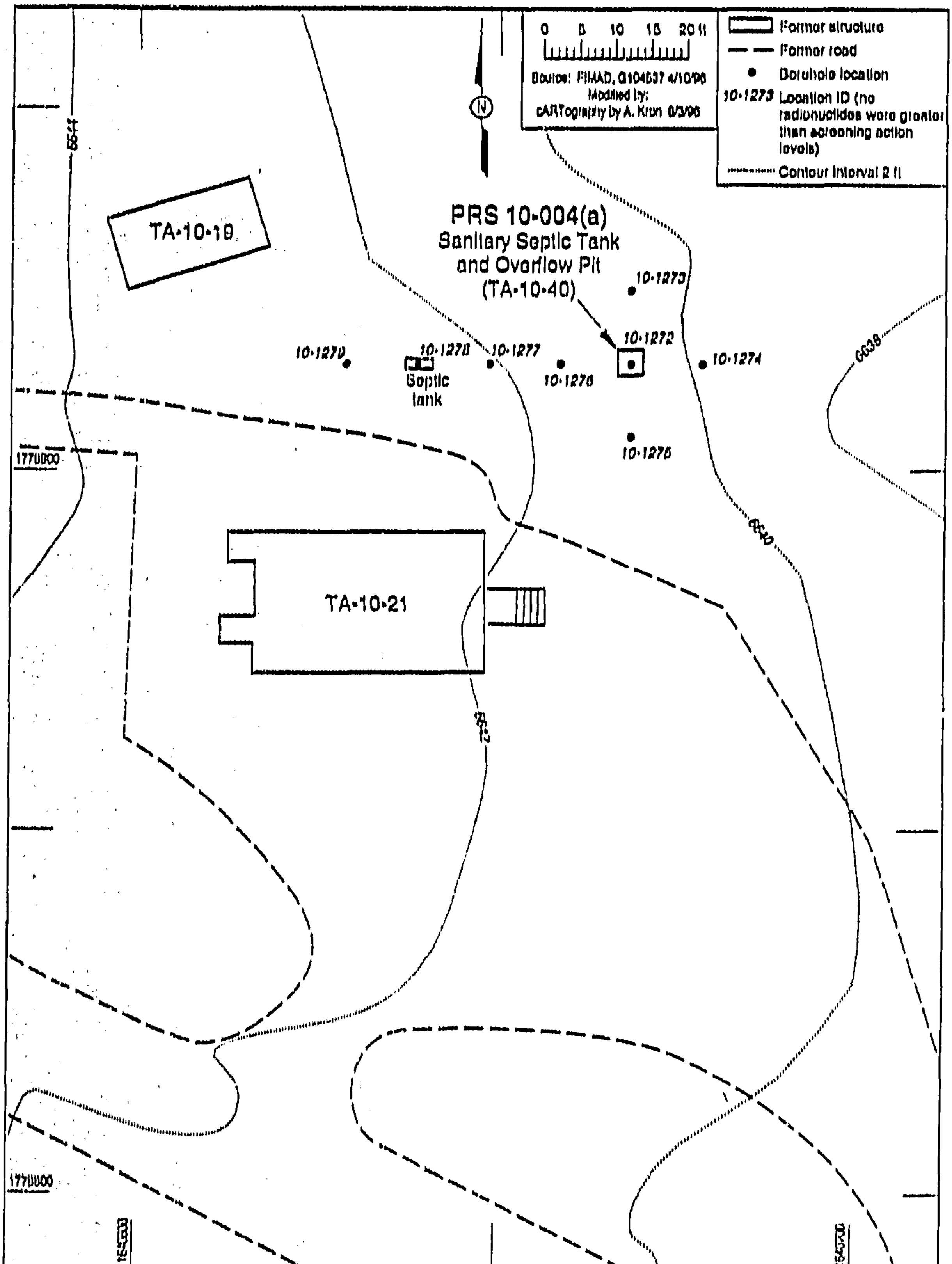


Fig. 5.4.3-1. Locations of PRS 10-004(a) samples.

5.4.4 Background Comparison for Radiological Constituents at PRS 10-004(a)

Radionuclides detected in the PRS 10-004(a) area were compared to the minimum detectable activity as described in Section 3.1 of this addendum. The results from PRS 10-004(a) samples with activities exceeding the minimum detectable activity are presented in Table 5.4.4-1. Strontium-90 was the only radionuclide detected at levels greater than the minimum detectable activity, and it will be carried forward in the screening assessment to the SALs comparison.

TABLE 5.4.4-1

PRS 10-004(a) SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	STRONTIUM-90 (pCi/g)
			SAL[a]	5.9
AAB9488	10-1276	Alluvium	2.5–3.5	0.78

[a] SAL = Screening action level.

5.4.5 Human Health Assessment for Radiological Constituents at PRS 10-004(a)

This section presents the human health assessment for radiological data collected from the PRS 10-004(a) area.

5.4.5.1 Screening Assessment for Radiological Constituents at PRS 10-004(a)

This section discusses the SALs comparison for PRS 10-004(a) radionuclides detected at levels greater than minimum detectable activity.

Greater Than or Equal to SAL. No radionuclide was detected at levels greater than or equal to the SAL.

No SAL. All radionuclides had SALs for comparison.

Less than SAL. Strontium-90 was detected at levels less than the SAL (see Table 5.4.4-1).

Because strontium-90 was the only radionuclide detected at levels below SAL, no multiple chemical evaluation is conducted. At the conclusion of this screening assessment, no radionuclides are retained as COPCs.

5.4.5.2 Extent of Contamination for Radiological Constituents at PRS 10-004(a)

No radionuclides were retained as COPCs in the screening assessment for PRS 10-004(a).

5.4.5.3 Risk Assessment for Radiological Constituents at PRS 10-004(a)

No dose assessment was conducted for PRS 10-004(a) because no radionuclides were retained as COPCs in the screening assessment.

5.4.6 Ecological Assessment for Radiological Constituents at PRS 10-004(a)

The preliminary ecological screening assessment indicates that this site is located in a floodplain and is potentially within the foraging range of the spotted bat and peregrine falcon. These factors must be taken into consideration should any remedial action be undertaken at this site.

According to guidance from the International Atomic Energy Agency, human health assessment results for radionuclides are assumed to be protective of most animal populations (International Atomic Energy Agency 1992, 1993). As a result, the human health assessment results adequately represent the ecological concerns for this site.

5.4.7 Conclusions and Recommendations for PRS 10-004(a)

Based on the results from the Phase I RFI, no radionuclides are present at levels exceeding SALs at PRS 10-004(a). In addition, no RCRA constituents were detected above SALs (see Section 5.4.7 of the RFI report). Therefore, PRS 10-004(a) is recommended for NFA.

5.5 PRS 10-004(b)

PRS 10-004(b) consists of a former sanitary septic tank (TA-10-38) that served the former radiochemistry laboratory. No radiological constituents are retained as COPCs in the human health screening assessment for PRS 10-004(b), and this PRS is recommended for NFA.

5.5.1 History of PRS 10-004(b)

PRS 10-004(b) is discussed in Subsection 3.1.4 of the RFI Work Plan for OU 1079 (LANL 1992, 0783).

PRS 10-004(b) was a 540-gal. sanitary septic tank that served the radiochemistry laboratory. It was constructed of reinforced concrete and measured 4 ft x 10 ft x 4 ft deep. This tank handled sanitary waste, but is suspected to have also received liquid wastes from the radiochemistry laboratory (TA-10-1). The overflow from PRS 10-004(b) drained through a 4-in. diameter vitrified clay open-joint drain pipe to the stream channel. PRS 10-004(b) was used from 1944 to 1963. PRS 10-004(b) was removed during the 1963 decontamination and decommissioning of TA-10.

The COPCs for PRS 10-004(b) include strontium-90, total uranium, barium, cadmium, lead, beryllium, TAL metals, VOCs, and SVOCs. Only the radionuclides are discussed in this addendum.

5.5.2 Previous Investigations of PRS 10-004(b)

PRS 10-004(b) was investigated previous to the RFI. These previous investigations are described in Subsection 3.1.4.8.2 of the RFI Work Plan for OU 1079 and summarized below (LANL 1992, 0783).

During the 1963 decontamination and decommissioning, readings from PRS 10-004(b) prior to its removal were less than 5.0 mR/hr. In 1973, a test hole designated M-2 was drilled to a depth of 18.9 ft near the outfall of PRS 10-004(b). Sample analyses indicated strontium-90 surface and subsurface contamination, while plutonium levels were at background. Five additional test holes were drilled near test hole M-2 in 1974. These holes indicated above background gross beta radioactivity.

During the 1977 FUSRAP survey, trenching was performed along the line leading from the radiochemistry laboratory (TA-10-1) to PRS 10-004(b), and then along the outfall line leading from 10-004(b) to the stream bed leach field. Many samples were collected along the trench, and they indicated gross beta radioactivity of up to 48 pCi/g and gross alpha radioactivity of up to 62 pCi/g.

5.5.3 Field Investigation of PRS 10-004(b)

The objective of the RFI at PRS 10-004(b) was to characterize the nature, concentration, and lateral and vertical extent of potential subsurface contamination related to historical activities at the site. The RFI was conducted in June and July 1994. The area of PRS 10-004(b) was characterized using one four-armed drilling and sampling array (Fig. 5.5.3-1). This array was centered on structure TA-10-38, and was oriented slightly east of north following a line of trenching remaining from previous investigations. The east-west arms of this array are oriented to align with structure TA-10-39, which was examined as part of the Central Area. The array consisted of 7 boreholes, each drilled to a depth of 50 ft bgs. Boreholes were spaced 10 ft apart along the arms of the array.

Samples collected from these boreholes were submitted for analysis for SVOCs, TAL metals, gamma spectroscopy, total uranium, and strontium-90. All appropriate QC samples, including duplicates, field blanks, and rinsate blanks, were collected during subsurface soil sampling activities. Sampling information is summarized in Table 5.5.4-1 of the RFI report. Radioactive field screening with hand-held instruments indicated that beta/gamma radiation was detected in borehole 10-1271 at levels greater than background. Elevated levels were not confirmed by MRAL analyses of samples collected from the borehole. Boreholes were backfilled with drill cuttings and completed with a 2-ft thick concrete cap.

For more information about the RFI field activities at PRS 10-004(b), refer to Section 5.5.4 of the RFI report.

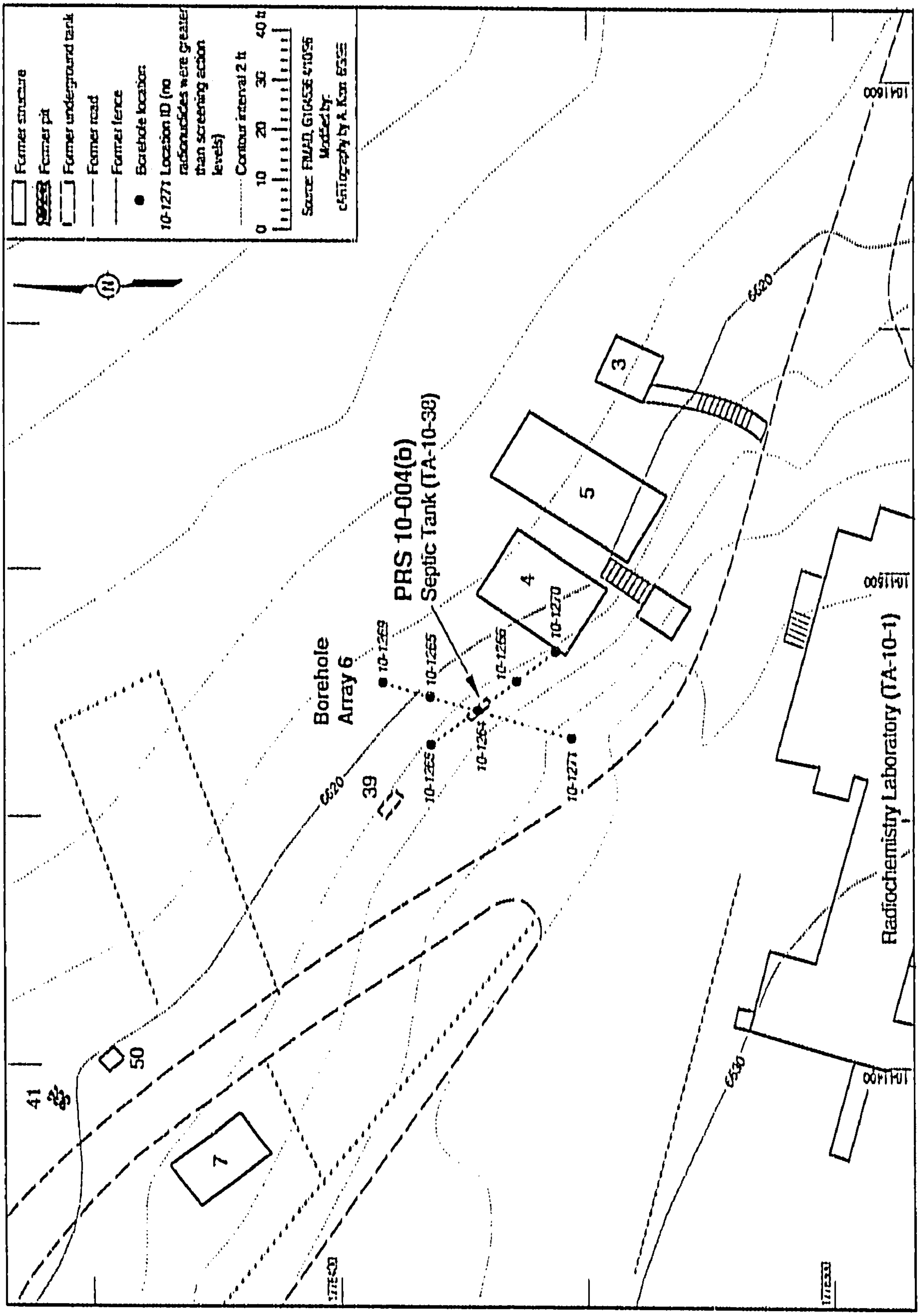


Fig. 5.5.3-1. Locations of PRS 10-004(b) samples.

5.5.4 Background Comparison for Radiological Constituents at PRS 10-004(b)

Radionuclides detected in the PRS 10-004(b) area were compared to the minimum detectable activity as described in Section 3.1 of this addendum. The results from PRS 10-004(b) samples with activities exceeding minimum detectable activity are presented in Table 5.5.4-1. Strontium-90 was the only radionuclide detected at levels greater than the minimum detectable activity, and it will be carried forward in the screening assessment to the SALs comparison.

TABLE 5.5.4-1

PRS 10-004(b) SOIL CONCENTRATIONS FOR RADIONUCLIDES WITH VALUES GREATER THAN THE MINIMUM DETECTABLE ACTIVITY

SAMPLE ID	SAMPLE LOCATION	MATRIX	DEPTH (ft)	STRONTIUM-90 (pCi/g)
			SAL[a]	5.9
AAB2893	10-1264	Alluvium	3.5–4.1	2.54
AAB2963	10-1270	Alluvium	4–4.8	0.8J[b]
AAB2964	10-1270	Alluvium	4–4.8	1.1J
AAB2977	10-1270	Transitional	45.5–46	1J
AAB2978	10-1270	Transitional	34.3–34.8	0.4J

[a] SAL = Screening action level.
[b] J = Value is an estimated detected quantity (see Section 4.0).

5.5.5 Human Health Assessment for Radiological Constituents at PRS 10-004(b)

This section presents the human health screening assessment for radiological data collected from the PRS 10-004(b) area.

5.5.5.1 Screening Assessment for Radiological Constituents at PRS 10-004(b)

This section discusses the SALs comparison for PRS 10-004(b) radionuclides detected at levels greater than minimum detectable activity.

Greater Than or Equal to SAL. No radionuclide was detected at levels greater than or equal to the SAL.

No SAL. All radionuclides had SALs for comparison.

Less than SAL. Strontium-90 was detected at levels less than the SAL (see Table 5.5.4-1).

Because strontium-90 was the only radionuclide detected at levels below SAL, no multiple chemical evaluation is conducted. At the conclusion of this screening assessment, no radionuclides are retained as COPCs.

5.5.5.2 Extent of Contamination for Radiological Constituents at PRS 10-004(b)

No radionuclides were retained as COPCs in the screening assessment for PRS 10-004(b).

5.5.5.3 Risk Assessment for Radiological Constituents at PRS 10-004(b)

No dose assessment was conducted for PRS 10-004(b) because no radionuclides were retained as COPCs in the screening assessment.

5.5.6 Ecological Assessment for Radiological Constituents at PRS 10-004(b)

The preliminary ecological screening assessment indicates that this site is located in a floodplain and is potentially within the foraging range of the spotted bat and peregrine falcon. These factors must be taken into consideration should any remedial action be undertaken at this site.

According to guidance from the International Atomic Energy Agency, human health assessment results for radionuclides are assumed to be protective of most animal populations (International Atomic Energy Agency 1992, 0983). As a result, the human health assessment results adequately represent the ecological concerns for this site.

5.5.7 Conclusions and Recommendations for PRS 10-004(b)

Based on the results from the Phase I RFI, no radionuclides are present at levels exceeding SALs at PRS 10-004(b). In addition, no RCRA constituents were detected above SALs (see Section 5.5.7 of the RFI report). Therefore, PRS 10-004(b) is recommended for NFA.

5.6 PRS 10-005

PRS 10-005 was an open pit used to contain shot debris swept from TA-10 firing sites and adjacent areas. No radiological constituents are retained as COPCs in the human health screening assessment for PRS 10-005, and this PRS is recommended for NFA.

5.6.1 History of PRS 10-005

PRS 10-005 is discussed in Subsection 3.1.4 of the RFI Work Plan for OU 1079 (LANL 1992, 0783).

PRS 10-005 was an open pit located approximately 62 ft west of the northwest firing point. It was used during the 1940s and 1950s to contain shot debris swept from the firing sites and adjacent areas. The dimensions of this pit are unknown, as are the quantities and types of materials that were placed into it. The debris may have contained small quantities of uranium, strontium-90, lead, high explosives residues, and possibly beryllium. In 1957, PRS 10-005 was excavated, the wastes burned, and the ash taken to Material Disposal Area C at TA-50. The specifics on how this operation was conducted, including pre- and post-burning activities are unknown.

The COPCs for PRS 10-005 include strontium-90, total uranium, lead, beryllium, barium, TAL metals, and high explosives. Only the radionuclides are discussed in this addendum.

5.6.2 Previous Investigations of PRS 10-005

PRS 10-005 was investigated previous to the RFI. These previous investigations are described in Subsection 3.1.4.9.2 of the RFI Work Plan for OU 1079 and summarized below (LANL 1992, 0783).

The TA-10 FUSRAP survey in 1977 encompassed this disposal area. Results of that survey demonstrated that the highest surface gross alpha and gross beta activity were measured in the firing sites that encompassed this disposal area. However, the proximity of the firing sites to this disposal area lead to ambiguity about the surface disposal area's contributions to the measured soil radioactivity.

During the 1986 Comprehensive Environmental Assessment and Response Program (CEARP) field survey, the extent of this disposal area (observed as a depression) was determined, as well as the presence of residual metal debris within the depression.

5.6.3 Field Investigation of PRS 10-005

The objective of the RFI at PRS 10-005 was to determine the presence or absence of contaminants at the site. The RFI was conducted in October and November 1994. The area of PRS 10-005 was intended to be characterized using one four-armed sampling array centered on the suspected location of the pit, a shallow, linear surface depression west of the firing sites (Fig. 5.6.3-1). The original dimensions and precise location of the center of the disposal pit were unknown. Because of the large dimensions of the existing depression and the lack of information regarding the location of the pit, a four-armed drilling array centered on the existing depression was deemed impractical. Therefore, the array was replaced with a series of boreholes aligned along the center of the depression. The first borehole (10-1284) was drilled at the western end of the linear depression with the succeeding four boreholes (10-1283 through 10-1280) spaced approximately 15 ft apart and extending downslope in an easterly direction. The boreholes were 50-ft deep. A four-armed array was to be extended to the north and south if radioactivity was detected by field screening in any of the five boreholes. However, no elevated radioactivity or VOCs were detected in the PRS 10-005 boreholes.

Samples collected from these boreholes were submitted for analysis for VOCs, SVOCs, TAL metals, gamma spectroscopy, total uranium, and strontium-90. More than fifty percent of the total number of samples sent to the fixed laboratory for analysis were also analyzed for high explosives. All appropriate QC samples, including duplicates, field blanks, and rinsate blanks, were collected during subsurface soil sampling activities. Sampling information is summarized in Table 5.6.4-1 of the RFI report. Radioactivity field screening data indicated that no radioactivity was detected above background levels in this drilling array. Boreholes were backfilled with drill cuttings and completed with a 2-ft-thick concrete cap.

For more information about the RFI field activities at PRS 10-005, refer to Section 5.6.4 of the RFI report.

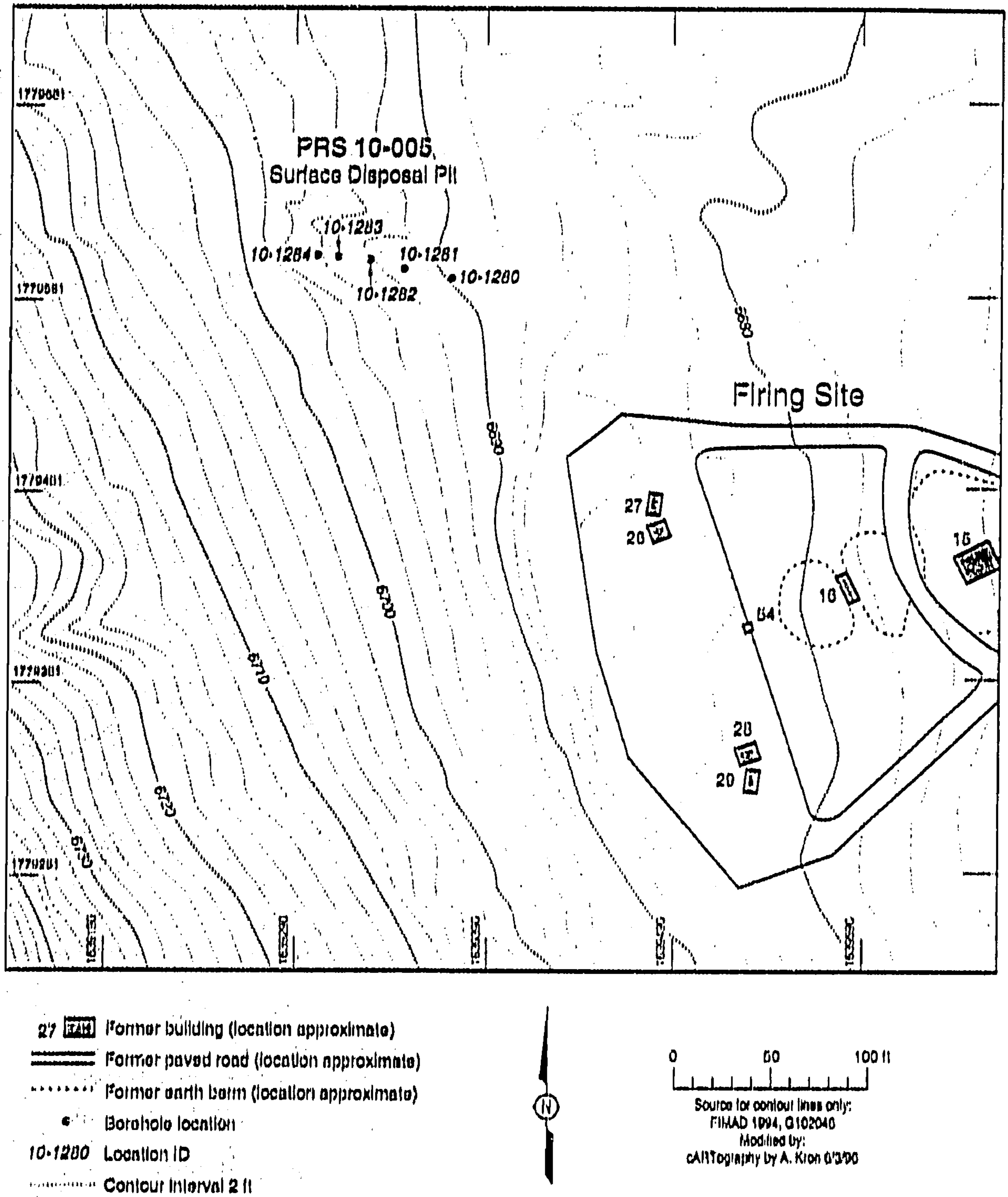


Fig. 5.6.3-1. Locations of PRS 10-005 samples.

5.6.4 Background Comparison for Radiological Constituents at PRS 10-005

Radionuclides detected in the PRS 10-004(b) area were compared to the minimum detectable activity as described in Section 3.1 of this addendum. No radionuclides were detected at values exceeding minimum detectable activity.

5.6.5 Human Health Assessment for Radiological Constituents at PRS 10-005

No human health screening assessment was conducted for PRS 10-005 because no radiological COPCs were detected at levels exceeding minimum detectable activity.

5.6.6 Ecological Assessment for Radiological Constituents at PRS 10-005

The preliminary ecological screening assessment indicates that this site is located in a floodplain and is potentially within the foraging range of the spotted bat and peregrine falcon. These factors must be taken into consideration should any remedial action be undertaken at this site.

According to guidance from the International Atomic Energy Agency, human health assessment results for radionuclides are assumed to be protective of most animal populations (International Atomic Energy Agency 1992, 0983). As a result, the human health assessment results adequately represent the ecological concerns for this site.

5.6.7 Conclusions and Recommendations for PRS 10-005

Based on the results from the Phase I RFI, no radionuclides are present at levels exceeding SALs at PRS 10-005. In addition, no RCRA constituents were detected above SALs (see Section 5.6.7 of the RFI report). Therefore, PRS 10-005 is recommended for NFA.

5.7 Site-Wide Evaluation

5.7.1 Site-Wide Evaluation of the Extent of Contamination

This section presents a comparison of the extent of elevated radionuclides in the RFI and FUSRAP data sets. The screening assessment for the radionuclide data in this subsurface investigation indicated that elevated concentrations of strontium-90 were present in two PRS aggregates: 10-002(b) and the Central Area [10-003(a-o) and 10-007]. In addition, elevated values of americium-241 were measured in one location at PRSs 10-003(a-o) and 10-007. The extent of americium-241 was bounded at 11 to 20 ft. The remainder of this section considers the extent of elevated strontium-90 values.

Elevated values of strontium-90 were expected based on previous investigations in Bayo Canyon. These previous investigations are discussed the RFI Work Plan for OU 1079 (LANL 1992, 0783). The previous data that are most relevant to this investigation are from the FUSRAP Program for Bayo Canyon (Mayfield et al. 1979, 06-0041). Section 3.0 of the RFI Work Plan for OU 1079 presents figures showing FUSRAP sampling locations, and Appendix B of the work plan presents the FUSRAP data (LANL 1992, 0783).

5.7.1.1 Vertical Extent of Contamination

This section presents a comparison of the vertical extent of elevated strontium-90 in the RFI and FUSRAP data sets. The vertical extent of contamination for each data set is graphically displayed using scatter plots. The scatter plots for the FUSRAP data are presented in Fig. 5.7.1-1, and the scatter plots for the RFI data are presented in Fig. 5.7.1-2.

In all of these scatter plots, strontium-90 is plotted as a function of depth below ground surface. In both the FUSRAP and RFI data, most strontium-90 results are in the -1 to +1 range, which most likely results from instrument or measurement noise. In each data set, there are only a limited number of samples that are significantly elevated above other values in the data set. A linear scale is useful in representing these values, but tends to obscure the majority of the results (Figs. 5.7.1-1a and 5.7.1-2a). A natural log-transformation was used to provide another display of the relationship between strontium-90 activity and depth (Figs. 5.7.1-1b and 5.7.1-2b). The log-transformation clarifies patterns in the lower range of the data.

In the FUSRAP data, the highest strontium-90 activities were measured in the 10 to 20 ft bgs depth interval, with lower activities measured in the 20 to 30 ft bgs depth interval (Fig. 5.7.1-1). Values consistent with instrument noise were recorded in the 0 to 10 ft bgs depth interval and the depth interval at greater than 30 ft bgs.

In the RFI data, the highest strontium-90 activities were also measured in the 10 to 20 ft bgs depth interval, with lower activities in the 20 to 30 ft bgs depth interval (Fig. 5.7.1-2). As with the FUSRAP data, most of the RFI values in the 0 to 10 ft bgs depth interval and the depth interval greater than 30 ft bgs were within the range for instrument noise. One important difference in the RFI data is the presence of a small number of elevated strontium-90 activities in the 0 to 10 ft depth interval. However, there is no evidence that significant vertical downward migration of strontium-90 has occurred in this area of Bayo Canyon.

The most significant comparison between the RFI and FUSRAP data is the difference of a factor of 10 in the maximum values for each data set. The RFI maximum is approximately 10 times higher than the FUSRAP maximum. This discrepancy occurs because the building debris landfill, PRS 10-007, was sampled in the RFI investigation but not in the FUSRAP study.

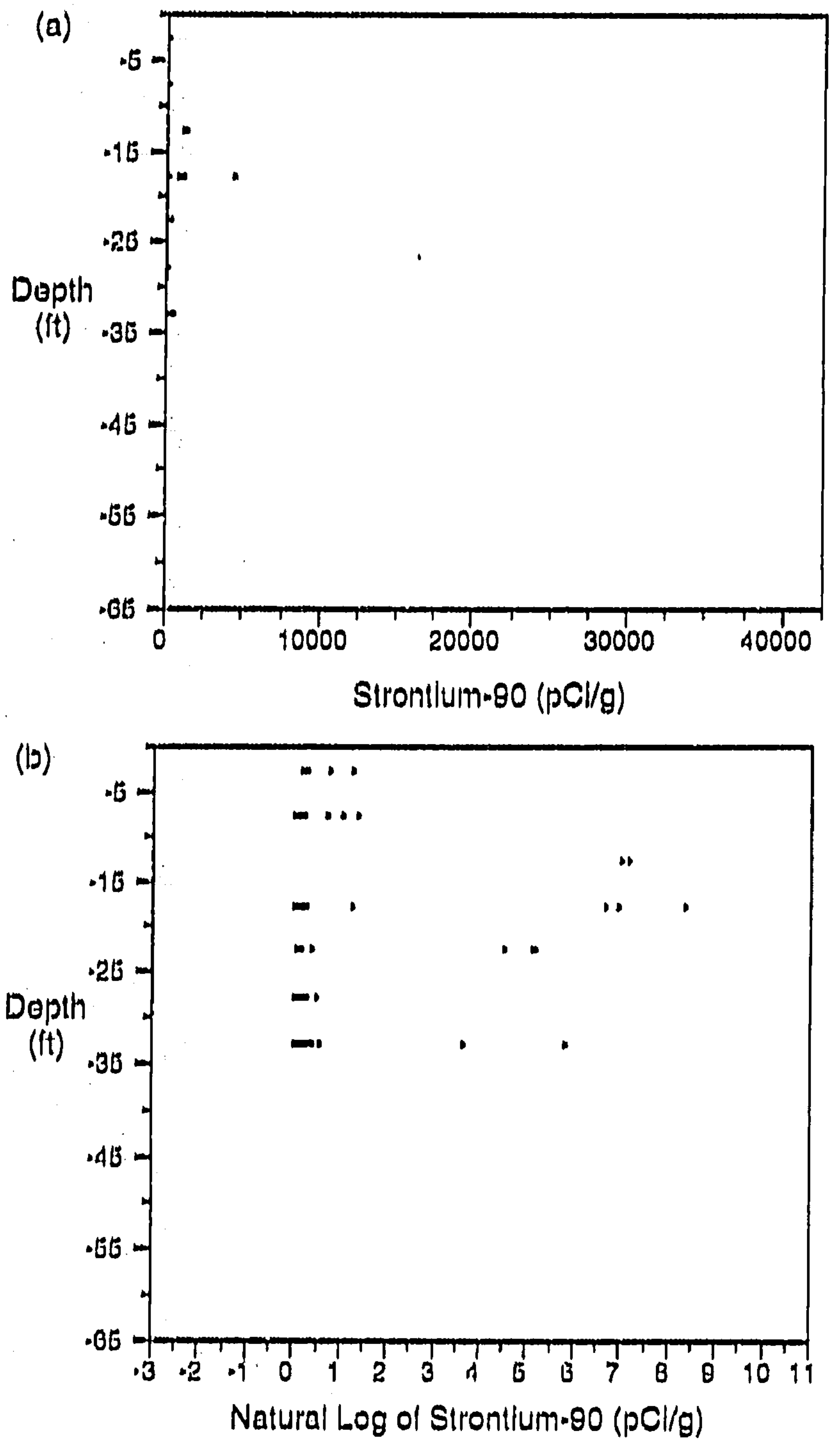


Fig. 5.7.1-1. Strontium-90 concentration versus depth below ground level for the FUSRAP data.

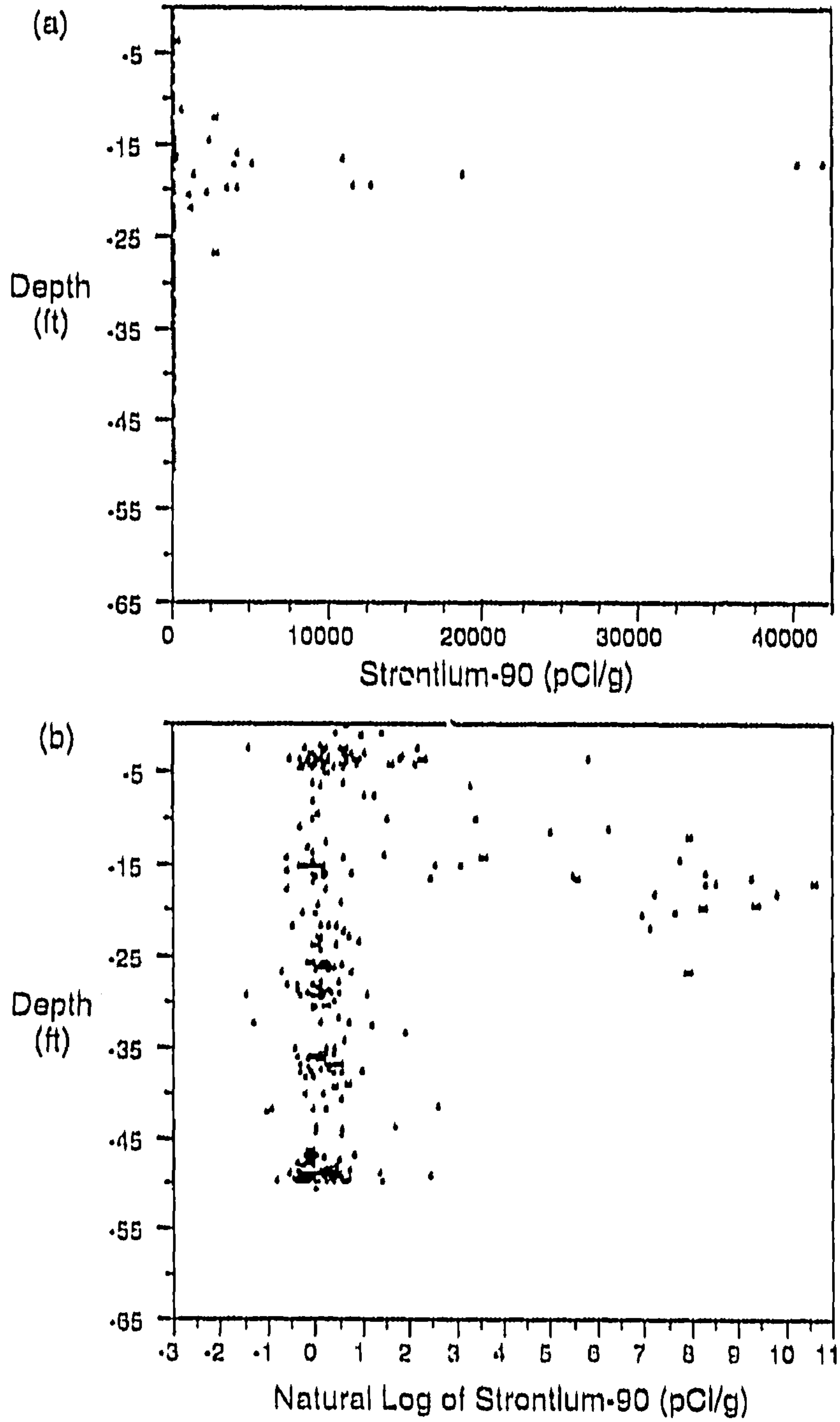


Fig. 5.7.1-2. Strontium-90 concentration versus depth below ground level for the RFI data.

5.7.1.2 Lateral Extent of Contamination

This section presents a comparison of the lateral extent of elevated strontium-90 in the RFI and FUSRAP data sets. Based on process knowledge of activities in Bayo Canyon, the data for this area can be addressed as part of one of two spatial aggregates. The first spatial aggregate is the Central Area [PRSs 10-003(a-o) and 10-007], which includes the drain lines, disposal pits, and landfill associated with the former radiochemistry laboratory. The second spatial group is associated with PRS 10-002(b), which is a disposal pit (TA-10-48) located 100 ft from the nearest Central Area drain line.

The lateral extent of contamination in the Central Area for both the FUSRAP and RFI data is graphically displayed in Fig. 5.7.1-3. The lateral extent of contamination at PRS 10-002(b) for both the FUSRAP and RFI data is graphically displayed in Fig. 5.7.1-4. In each figure, the FUSRAP and RFI borehole locations are labeled with the average concentration measured for all samples from that borehole. Because the FUSRAP investigation focused on laboratory analysis of gross beta counts, there are limited analytical data available from that investigation for strontium-90. As a result, a statistical model was developed to estimate strontium-90 activity for a particular location based on gross beta counts measured at that location. This statistical model is presented in Fig. 5.7.1-5, and the values presented in Figs. 5.7.1-3 and 5.7.1-4 are interpolated values of strontium-90 based on this model. These interpolated values were also used in the risk assessments presented previously in this report.

TA-10 Central Area. As discussed above, the maximum value in the RFI data is approximately 10 times higher than the FUSRAP maximum because the building debris landfill, PRS 10-007, was sampled in the RFI but not in the FUSRAP study. The RFI expanded the investigation area to include PRS 10-007 in order to more fully define the volume of subsurface material with elevated radionuclide activities. As shown in Fig. 5.7.1-3, PRS 10-007 yielded the highest strontium-90 activities measured in any Bayo Canyon investigation.

With one exception, the elevated strontium-90 activities are bounded laterally by boreholes with average values at or near instrument error levels (0 to 1 pCi/g). The single exception is borehole 10-2220, which has an average strontium-90 activity of 12 617 pCi/g. Borehole 10-2220 has no bounding value directly east. However, there are low values to the north, southeast, and south of this location. Therefore, the RFI boreholes adequately bound the lateral extent of elevated strontium-90 values.

In general, the collocated (or neighboring) boreholes from the FUSRAP study and the RFI show similar values. For example, RFI borehole 10-1201 averaged 5 775 pCi/g and collocated FUSRAP borehole 43e averaged 2 337 pCi/g. Thus, there are no gross or subtle indications of significant lateral movement of the elevated strontium-90 values.

PRS 10-002(b) Area. The strontium-90 activities in the area of PRS 10-002(b) are low relative to activities in the Central Area. In addition, the elevated values are limited to four borehole locations. Two of these locations were collocated FUSRAP boreholes (48bb and 49bb-5), and two were RFI boreholes (10-1257 and 10-1289). Borehole 10-1257 is a neighbor to the FUSRAP boreholes with elevated readings. Borehole 10-1289 is located 25 ft to the east-southeast of the FUSRAP boreholes with elevated readings. Thus, there are no gross or subtle indications of significant lateral movement of the elevated strontium-90 values.

The PRS 10-002(b) boreholes with elevated readings are generally bounded laterally by boreholes with averages at or near instrument error (0 to 1 pCi/g). The single exception is borehole 10-1289, which has an average strontium-90 activity of 38 pCi/g. Borehole 10-1289 has no bounding value directly north or south. However, there are low values to the west, northwest, southeast, and east of this location. Thus, the RFI boreholes adequately bound the lateral extent of elevated strontium-90 values.

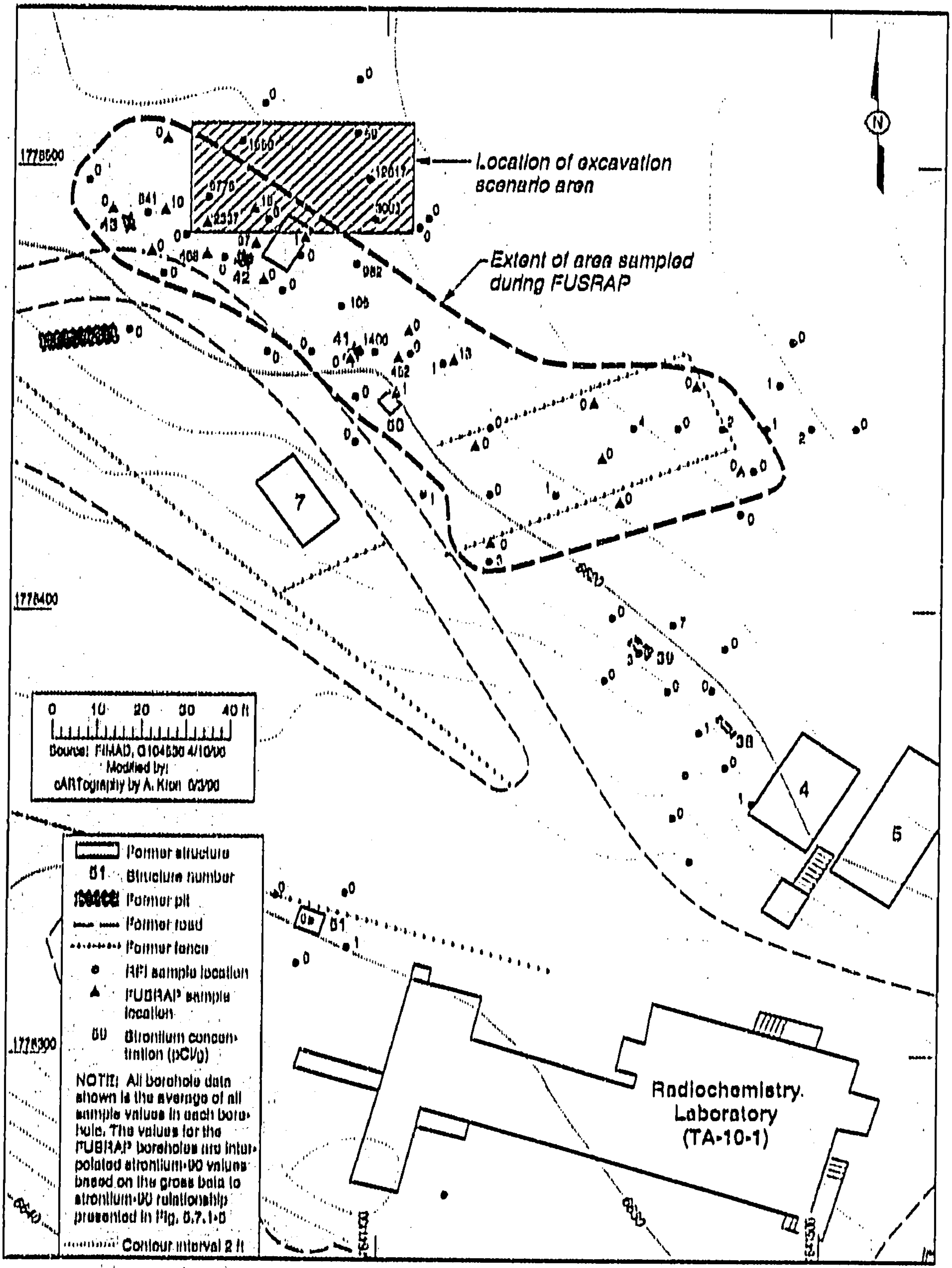


Fig. 5.7.1-3. Comparison of average strontium-90 concentrations for Central Area RFI and FUSRAP boreholes.

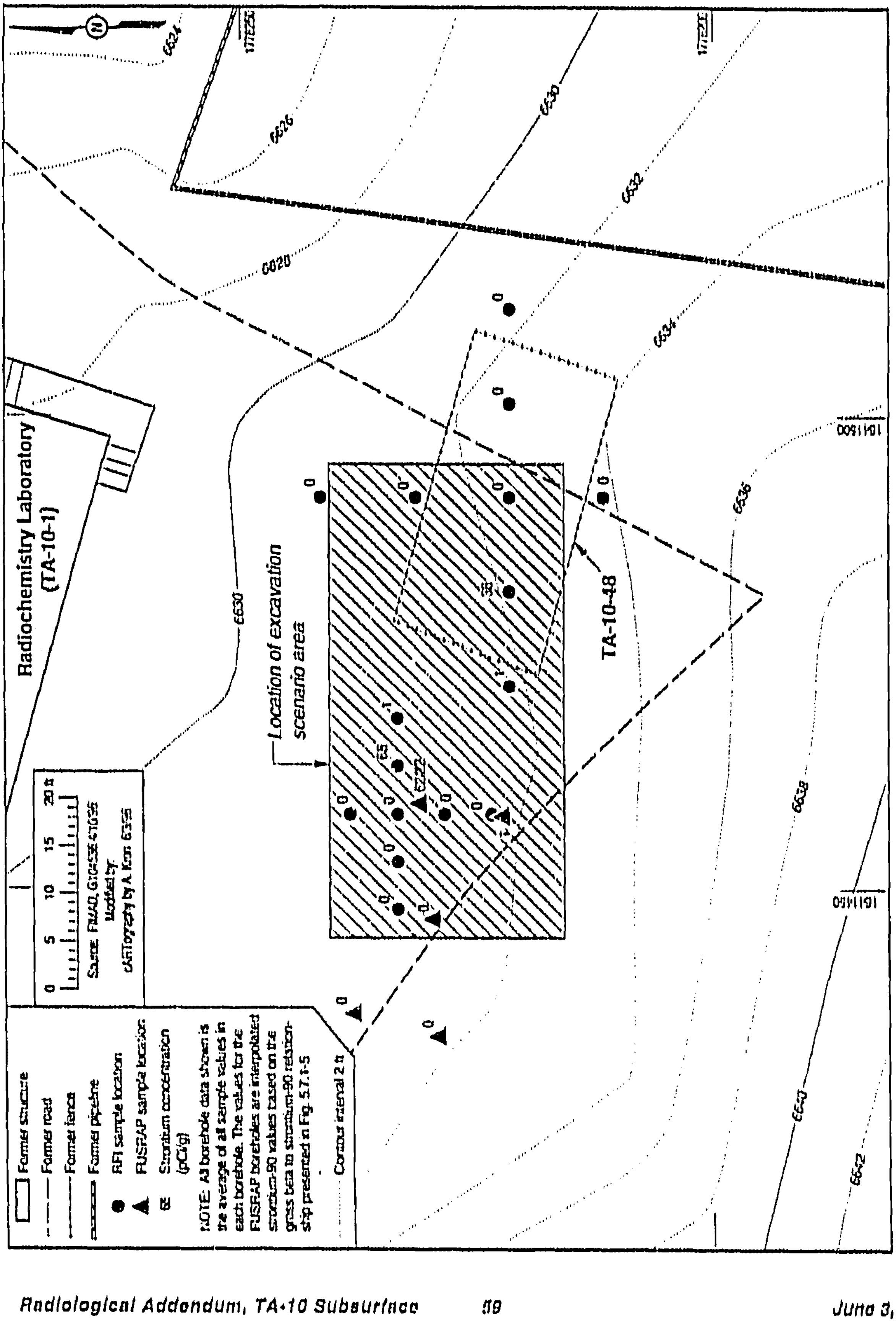
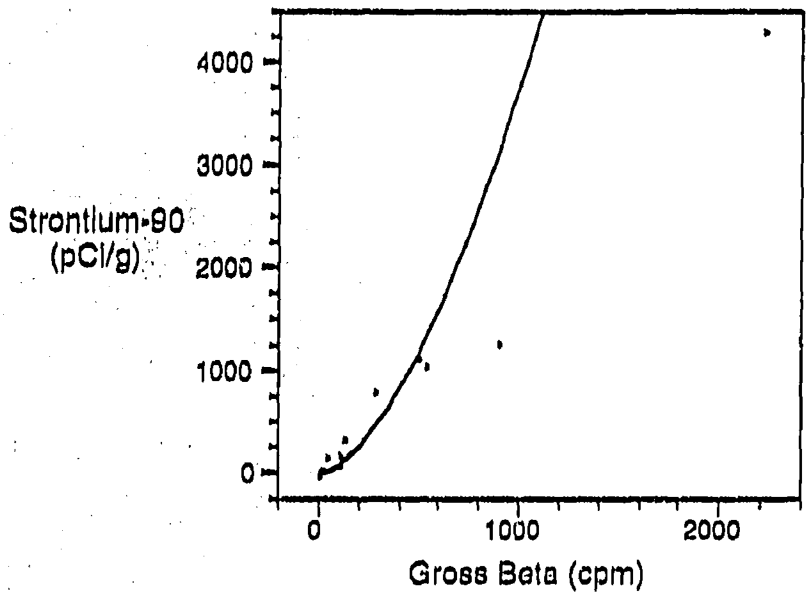


Fig. 5.7.1-4. Comparison of average strontium-90 concentrations for PRS 10-002(b) RFI and FUSRAP boreholes.



This relationship was used to estimate the activity of strontium-90 for FUSRAP samples where only gross beta was measured. The statistically fitted relationship was based on a natural log transformation of both variables, and yielded the following equation:

Log(90Sr (pCi/g)) = -3.3033 + 1.6683 Log(Gross-beta), where r^2=0.879 for 43 sample values.

The r^2 provides an assessment of the goodness of fit of this relationship, and suggests that approximately 90% of the variability in strontium-90 can be explained by this fitted relationship to gross beta counts. Thus, gross beta is an excellent predictor of strontium-90 activity.

Fig. 5.7.1-5. Relationship between FUSRAP strontium-90 laboratory data (in pCi/g) and gross beta data (in counts per minutes or CPM).

5.7.2 Site-Wide Risk Evaluation

In two of the six investigation areas, the Central Area [PRSs 10-003(a-o) and 10-007] and PRS 10-002(b), radionuclides were retained as COPCs as a result of the screening assessments. The risk assessments for these areas indicate that while these sites pose acceptable risk levels in a current recreational land-use scenario, they pose unacceptable risk levels in a future residential land-use scenario. Because these areas are located adjacent to each other, it is likely that recreational use of one area would also include recreational use of the other, creating additive exposures. Therefore, these two areas were considered together in a site-wide risk evaluation. In the site-wide risk evaluation, recreational use of Bayo Canyon was assumed to include not only the current use of Bayo Canyon, which is principally hiking, but also potential future uses, which could include camping, hunting, and ingestion of edible plants (although native edible plants such as pinon nuts and prickly pear fruit are not currently growing in the area).

Site-Wide Current Recreational Use

The exposure routes for the current recreational use scenario of hiking through the area include direct radiation, inhalation of resuspended dust, and incidental ingestion of soil. At PRS 10-002(b) these pathways are associated with a dose of 0.5 mrem/yr (see Section 5.2.5.3.2), while at PRSs 10-003(a-o) and 10-007 these pathways are associated with a dose of 0.4 mrem/yr (see Section 5.3.5.3.2). The combined exposure for these areas is 0.9 mrem/yr, which is well below the EPA dose guideline of 15 mrem/yr.

Site-Wide Future Recreational Use

The future recreational use scenario includes the additional pathways of edible plant ingestion and ingestion of meat obtained while hunting. The combined exposure for these areas is dominated by the high exposure potential of the Central Area [PRSs 10-003(a-o) and 10-007], which has subsurface strontium-90 activities of more than 100 times the subsurface activities at PRS 10-002(b). In addition, the area of contamination for the Central Area is more than 15 times that of PRS 10-002(b). Further, the exposure assumptions are conservative in nature, and any incremental time spent at PRS 10-002(b) will be covered by the assumptions for the Central Area. Therefore, only the Central Area was considered in this evaluation.

The exposure pathways for the future recreational use scenario include the following:

- Ingestion of edible plants,
- Ingestion of meat from hunting,
- Inhalation of resuspended dust,
- Direct ground radiation, and
- Incidental soil ingestion.

Evaluation of this scenario involves consideration of the contaminants found 10 ft below the surface (averaging 6 322 pCi/g of strontium-90 and 15 pCi/g of americium-241), as well as the elevated strontium-90 found at the surface (averaging 64 pCi/g strontium-90).

Ingestion of edible plants. The elevated strontium-90 found below the surface can be accessed by plants. Many plants that grow in Bayo Canyon have root depths of greater than 10 ft, including chamisa, pinon, juniper, oak, saltbush, sagebrush, and prickly pear (Wenzel et al. 1987, 0227). Highly elevated levels of strontium-90 (90 500 pCi/g dry weight and 5 930 pCi/g dry weight) were found in chamisa plants growing at PRSs 10-003(a-o) and 10-007 (Fresquez 1995, 06-0142). Because the chamisa bushes in the area are known to have taken up strontium-90 from the subsurface, an interim action will be conducted to remove the chamisa containing elevated levels of strontium-90 from this area.

Several kinds of edible plants are known to grow in areas such as Bayo Canyon. These include pinon (which has edible nuts), prickly pear (which has edible fruit), sage (which is an herb), and juniper (which is an ash used in native American cooking). Currently, none of these edible plants are growing in the area of PRSs 10-002(b), 10-003(a-o), or 10-007. However, they could potentially grow in this area in the future. This risk assessment assumes that 4 kg per year of edible plants growing in this area would be consumed. The results for this exposure pathway indicate that plant consumption would be associated with a dose of 102 mrem/yr (entirely from strontium-90).

Ingestion of meat from hunting. Plant uptake also provides a route of exposure for foraging animals, which might then be hunted and consumed by humans. Deer are found in Bayo Canyon and are known to forage on chamisa and other deep rooted plants (such as perennial grasses). In this assessment, it is assumed that a foraging deer would consume 1 kg of plants per day from the Central Area. It is further assumed that a human would consume 34 kg of this deer meat throughout a year. Meat ingestion under these and other RESRAD assumptions would lead to dose of 13 mrem/yr (entirely from strontium-90).

Remaining pathways. The remaining pathways (inhalation of resuspended dust, direct ground radiation, and incidental soil ingestion) are associated with contamination found at the surface. The four surface soil samples collected near chamisa bushes known to have taken up strontium-90 from the subsurface were used to evaluate exposure from these pathways. The average strontium-90 activity of these four samples is 64 pCi/g. The direct radiation pathway is associated with a dose of 0.1 mrem/yr, inhalation is associated with a dose of 0.004 mrem/yr, and incidental soil ingestion is associated with a dose of 0.03 mrem/yr.

The total dose associated with all pathways in the site-wide future recreational scenario is 115 mrem/yr. This is equivalent to an excess cancer risk of 8 in 10 000 per year or 8 in 1 000 if all of these activities were conducted for ten years throughout a lifetime. The doses associated with the pathways of inhalation of resuspended dust, direct ground radiation, and incidental soil ingestionare all well below the 15 mrem/yr guideline and contribute very little to the total dose. Inhalation of resuspended dust and incidental soil ingestion are each associated with an excess cancer risk level below 1 in 1 000 000 per year of exposure, and direct ground radiation has an excess cancer risk level of 2 in 1 000 000 per year of exposure. The dose associated with ingestion of meat from hunting, 13 mrem/yr, is also below the EPA guideline of 15 mrem/yr. Ingestion of edible plants is the primary contributor to the total dose at 102 mrem/yr. Combined, the meat and plant ingestion exposure pathways are associated with a lifetime excess cancer risk greater than 1 in 10 000. For details of the RESRAD calculations for this scenario, refer to Appendix C, section C-5.

5.7.3 Site-Wide Conclusions

The results of the individual risk assessments for PRS 10-002(b) and the Central Area indicate that these sites pose acceptable risk levels in a current recreational land-use scenario, assuming that the primary activity in this area of Bayo Canyon is hiking. In the site-wide risk evaluation for the current recreational use scenario, the combined exposure for these areas is 0.9 mrem/yr, which is well below the EPA dose guideline of 15 mrem/yr. Therefore, current use of the area for hiking is not associated with an unacceptable health risk level.

The site-wide risk evaluation also considered a future recreational use scenario that included the exposure pathways of ingestion of meat from hunting and ingestion of edible plants. The total dose associated with all pathways in the site-wide future recreational scenario is 115 mrem/yr. Of this total dose, 102 mrem/yr were associated with ingestion of edible plants, and 13 mrem/yr were associated with ingestion of meat from hunting (assuming that a deer had consumed contaminated plants in the area). It is important to note that edible plants such as pinon, prickly pear, sage, and juniper are not currently growing at PRS 10-002(b) or the Central Area. However, chamisa bushes, which are edible by deer, do grow in the area. An interim action will be conducted to remove the chamisa containing elevated levels of strontium-90 from this area. In addition, the potential for future surface contamination from plant uptake will be evaluated and, if necessary, remedial alternatives will be considered.

In addition to recreational use of the canyon, future residential use was evaluated individually for PRS 10-002(b) and the Central Area. The results for the residential use scenario indicate unacceptable risk levels, due primarily to ingestion of garden produce. If Bayo Canyon is developed for residential or agricultural purposes, remedial action may be warranted.

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APPENDIX A ANALYTICAL DATA

All analytical data, including data from the mobile chemistry analytical laboratory (MCAL) and mobile radiological analytical laboratory (MRAL), are available in the Facility for Information Management, Analysis, and Display (FIMAD) database. If the FIMAD database is not accessible, data will be provided upon request. A hard copy of the data is available from the Records Processing Facility (RPF) under "Analytical Data for the Subsurface Investigation of TA-10."

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APPENDIX B DATA QUALITY EVALUATION TABLES

TABLE B-1

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
18323	AAB6209	X[a]	X	X	ICP/MS[b]	All data are valid without qualification.
	AAB6307	X	X	X	ICP/MS	All data are valid without qualification.
18709	AAB2944	X			KPA[c]	Uranium data qualified J[d] for low recovery in quality control (QC) sample.
	AAB2946	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB2947	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6120	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6151	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6152	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6155	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6157	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6162	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6166	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB6168	X			KPA	Uranium data qualified J for low recovery in QC sample.
18710	AAB3004	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB3005	X			KPA	Uranium data qualified J for low recovery in QC sample.
18713	AAB3016	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3017	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3018	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6244	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6251	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6256	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6257	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
18710	AAB3019	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3020	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3030	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3031	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3032	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3033	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
10726	AAB3062	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3064	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3066	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
10727	AAB3069	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3072	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3073	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
10729	AAB3074	X			KPA	Uranium data qualified R for recovery of <1% in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3080	X			KPA	Uranium data qualified R for recovery of <1% in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3085	X			KPA	Uranium data qualified R for recovery of <1% in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3088	X			KPA	Uranium data qualified R for recovery of <1% in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB3090	X			KPA	Uranium data qualified R for recovery of <1% in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
10731	AAB6421	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6422	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6423	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6426	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6432	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6433	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6434	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6439	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
18731 *continued*	AAB6444	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6445	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6446	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
18741	AAB6321	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6322	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6330	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6335	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
	AAB6336	X			KPA	Uranium data qualified J for low recovery in QC sample. Strontium-90 data qualified J for high recovery in QC sample.
18742	AAB6447	X			KPA	All data are valid without qualification.
18743	AAB6338	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
	AAB6343	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
	AAB6348	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
	AAB6349	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
	AAB6461	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
	AAB6465	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
	AAB6471	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
	AAB6472	X	X		ICP/MS	Uranium data qualified J for low recovery in QC sample.
18782	AAB6581	X	X	X	ICP/MS	All data are valid without qualification.
	AAB6585	X	X	X	ICP/MS	All data are valid without qualification.
18898	AAB2963	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB2964	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB2977	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB2978	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB6182	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB6186	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB6193	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB6194	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB6197	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB6198	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
10898 continued	AAB0205	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB0206	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB0207	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB0211	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
	AAB0214	X			ICP/MS	Uranium and strontium-90 data qualified J for low recovery in QC and matrix spike samples, respectively.
10900	AAB0202	X			ICP/MS	All data are valid without qualification.
	AAB0203	X			ICP/MS	All data are valid without qualification.
10932	AAB2988	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB2989	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB2990	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB2991	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB3001	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB3002	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB3003	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB0228	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB0231	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB0232	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB0241	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB0243	X			KPA	Uranium data qualified J for low recovery in QC sample.
10990	AAB2845	X			ICP/MS	All data are valid without qualification.
	AAB2861	X			ICP/MS	All data are valid without qualification.
	AAB8860	X			ICP/MS	All data are valid without qualification.
	AAB2867	X			ICP/MS	All data are valid without qualification.
10994	AAB2906	X			ICP/MS	All data are valid without qualification.
	AAB2915	X			ICP/MS	All data are valid without qualification.
	AAB2916	X			ICP/MS	All data are valid without qualification.
	AAB2917	X			ICP/MS	All data are valid without qualification.
	AAB0124	X			ICP/MS	All data are valid without qualification.
	AAB0125	X			ICP/MS	All data are valid without qualification.
	AAB0126	X			ICP/MS	All data are valid without qualification.
	AAB0139	X			ICP/MS	All data are valid without qualification.
	AAB0141	X			ICP/MS	All data are valid without qualification.
	AAB0143	X			ICP/MS	All data are valid without qualification.
10014	AAB0883	X			ICP/MS	All data are valid without qualification.
	AAB0884	X	X		ICP/MS	All data are valid without qualification.
10101	AAB3046	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample. Uranium data qualified J for low recovery in QC sample.
	AAB3047	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample. Uranium data qualified J for low recovery in QC sample.
	AAB3067	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample. Uranium data qualified J for low recovery in QC sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
19101 continued	AAB3059	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample. Uranium data qualified J for low recovery in QC sample.
	AAB3000	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample. Uranium data qualified J for low recovery in QC sample.
	AAB0292	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample. Uranium data qualified J for low recovery in QC sample.
19102	AAB0454	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0455	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0459	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample. Uranium data qualified J for low recovery in QC sample.
	AAB0460	X			KPA	Strontium-90 data qualified R for recovery of <10% in QC sample.
19104	AAB3087	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0313	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0317	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0320	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0414	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0415	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0416	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0420	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
19100	AAB0350	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0353	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0354	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0355	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0360	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0362	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0473	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0478	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0483	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0484	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0485	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
10100 continued	AAB0492	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0493	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0494	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0498	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB0500	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
10074	AAB0509	X	X	X	KPA	Gamma spectroscopy and total uranium data qualified J. The analytical laboratory used a sample amount that was too small for proper quantitation.
	AAB0580	X	X	X	KPA	Gamma spectroscopy and total uranium data qualified J. The analytical laboratory used a sample amount that was too small for proper quantitation.
	AAB0300	X	X	X	KPA	Gamma spectroscopy and total uranium data qualified J. The analytical laboratory used a sample amount that was too small for proper quantitation.
	AAB9420	X	X	X	KPA	Gamma spectroscopy and total uranium data qualified J. The analytical laboratory used a sample amount that was too small for proper quantitation.
10004	AAB0303	X			KPA	Strontium-90 data qualified J for low recovery in QC and laboratory control samples.
	AAB0304	X			KPA	Strontium-90 data qualified J for low recovery in QC and laboratory control samples.
	AAB0371	X			KPA	Strontium-90 data qualified J for low recovery in QC and laboratory control samples.
	AAB0370	X			KPA	Strontium-90 data qualified J for low recovery in QC and laboratory control samples.
	AAB0378	X			KPA	Strontium-90 data qualified J for low recovery in QC and laboratory control samples.
10006	AAB0379	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Uranium data qualified J for internal standards outside control limits.
	AAB0384	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0300	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0501	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Uranium data qualified J for internal standards outside control limits.
	AAB0507	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0510	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0511	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB0512	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
10700	AAB2882	X	X		KPA	All data are valid without qualification.
	AAB2883	X	X		KPA	All data are valid without qualification.
	AAB2884	X	X		KPA	All data are valid without qualification.
	AAB2883	X	X		KPA	All data are valid without qualification.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
19700	AAB3034	X			KPA	All data are valid without qualification.
	AAB3042	X			KPA	All data are valid without qualification.
	AAB3044	X			KPA	All data are valid without qualification.
	AAB3046	X			KPA	Strontium-90 data qualified J for high matrix spike recovery.
	AAB6258	X			KPA	All data are valid without qualification.
	AAB6264	X			KPA	All data are valid without qualification.
	AAB6268	X			KPA	All data are valid without qualification.
	AAB6270	X			KPA	All data are valid without qualification.
	AAB6271	X			KPA	All data are valid without qualification.
	AAB6272	X			KPA	All data are valid without qualification.
	AAB6281	X			KPA	All data are valid without qualification.
	AAB6288	X			KPA	All data are valid without qualification.
	AAB6289	X			KPA	All data are valid without qualification.
19763	AAB2861	X			KPA	All data are valid without qualification.
19764	AAB6169	X			KPA	All data are valid without qualification.
	AAB6180	X			KPA	All data are valid without qualification.
	AAB6181	X			KPA	All data are valid without qualification.
19770	AAB2933	X			KPA	All data are valid without qualification.
	AAB2934	X			KPA	All data are valid without qualification.
	AAB2935	X			KPA	All data are valid without qualification.
19771	AAB2920	X	X		KPA	All data are valid without qualification.
	AAB2928	X	X		KPA	All data are valid without qualification.
	AAB2929	X	X		KPA	All data are valid without qualification.
19773	AAB2839	X			KPA	All data are valid without qualification.
	AAB2843	X			KPA	All data are valid without qualification.
	AAB2844	X			KPA	All data are valid without qualification.
19780	AAB2949	X			KPA	Uranium data qualified J for low recoveries in QC sample.
	AAB2958	X			KPA	Uranium data qualified J for low recoveries in QC sample.
	AAB2959	X			KPA	Uranium data qualified J for low recoveries in QC sample.
	AAB2962	X			KPA	Uranium data qualified J for low recoveries in QC sample.
	AAB2970	X			KPA	Uranium data qualified J for low recoveries in QC sample.
19794	AAB2980	X			KPA	All data are valid without qualification.
	AAB2981	X			KPA	All data are valid without qualification.
19804	AAB6392	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB6395	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB6403	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB6404	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB6520	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB6524	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB6525	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
10606	AAB0400	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB0020	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB0027	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB0032	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB0030	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB0030	X			KPA	Uranium and strontium-90 data qualified J for low matrix spike recoveries.
10607	AAB0400	X	X	X	KPA	Strontium-90 and isotopic uranium data qualified J for high recovery in laboratory control sample. Total uranium data qualified J for internal standards outside control limits.
	AAB0410	X	X	X	KPA	Strontium-90 and isotopic uranium data qualified J for high recovery in laboratory control sample. Total uranium data qualified J for internal standards outside control limits.
	AAB0070	X			KPA	Strontium-90 and isotopic uranium data qualified J for high recovery in laboratory control sample. Total uranium data qualified J for internal standards outside control limits.
10608	AAB0037	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Total uranium data qualified J for high recovery in laboratory control sample.
	AAB0038	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Total uranium data qualified J for high recovery in laboratory control sample.
	AAB0030	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Total uranium data qualified J for high recovery in laboratory control sample.
	AAB0040	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Total uranium data qualified J for high recovery in laboratory control sample.
	AAB0050	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Total uranium data qualified J for high recovery in laboratory control sample.
	AAB0051	X			KPA	Strontium-90 data qualified J for low recovery in QC sample. Total uranium data qualified J for high recovery in laboratory control sample.
10609	AAB0052	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
	AAB0059	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
	AAB0062	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
	AAB0063	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
19809 continued	AAB6585	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
	AAB6586	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
	AAB8647	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
	AAB8651	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
	AAB8652	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for high recovery in laboratory control sample and a low recovery in QC sample.
19811	AAB6587	X			KPA	All data are valid without qualification.
	AAB6588	X			KPA	All data are valid without qualification.
	AAB6589	X			KPA	All data are valid without qualification.
	AAB6594	X			KPA	All data are valid without qualification.
	AAB8653	X			KPA	All data are valid without qualification.
	AAB8661	X			KPA	All data are valid without qualification.
	AAB8665	X			KPA	All data are valid without qualification.
	AAB8666	X			KPA	All data are valid without qualification.
19812	AAB8668	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample.
	AAB8674	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample.
	AAB8678	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample.
	AAB8679	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample.
19814	AAB8680	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample.
	AAB8685	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample.
	AAB8686	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for internal standards outside control limits.
	AAB8687	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Total uranium data qualified J for internal standards outside control limits.
	AAB8688	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample.
19815	AAB8691	X			KPA	Strontium-90 and uranium data qualified J for low recovery in QC samples.
	AAB8697	X			KPA	Strontium-90 and uranium data qualified J for low recovery in QC samples.
	AAB8719	X			KPA	Strontium-90 and uranium data qualified J for low recovery in QC samples.
	AAB8722	X			KPA	Strontium-90 and uranium data qualified J for low recovery in QC samples.
	AAB8727	X			KPA	Strontium-90 and uranium data qualified J for low recovery in QC samples.
	AAB8728	X			KPA	Strontium-90 and uranium data qualified J for low recovery in QC samples.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
10878	AAB9207	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9200	X			KPA	All data are valid without qualification.
	AAB9205	X			KPA	All data are valid without qualification.
	AAB9207	X			KPA	All data are valid without qualification.
	AAB9448	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9451	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9454	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
10880	AAB9248	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9251	X			KPA	All data are valid without qualification.
	AAB9253	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9254	X			KPA	Uranium data qualified J for low matrix spike recovery.
	AAB9255	X			KPA	All data are valid without qualification.
	AAB9256	X			KPA	All data are valid without qualification.
	AAB9438	X			KPA	All data are valid without qualification.
	AAB9439	X			KPA	All data are valid without qualification.
	AAB9440	X			KPA	Uranium data qualified J for low spike recovery.
	AAB9441	X			KPA	All data are valid without qualification.
10884	AAB6000	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB8701	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in QC sample.
	AAB8700	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in QC sample.
10886	AAB9422	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
	AAB9424	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
	AAB9427	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
10887	AAB9236	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
	AAB9230	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
	AAB9242	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
	AAB9240	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
	AAB9247	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
19887 continued	AAB9429	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
	AAB9433	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike sample. Uranium data qualified J for low recovery in matrix spike sample.
19888	AAB8815	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB8817	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB8818	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB8823	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB8841	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB8842	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
19890	AAB8712	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB8714	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB8715	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB9204	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB9205	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB9209	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
	AAB9210	X			KPA	Strontium-90 data qualified J for low recovery in matrix spike and QC samples.
19892	AAB9003	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9004	X	X	X	KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9010	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9012	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9014	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9211	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9218	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9222	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9223	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9224	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9227	X	X	X	KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9231	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.
	AAB9234	X			KPA	Total uranium and strontium-90 data qualified J for low matrix spike recoveries.

TABLE D-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
19904	AAB2888	X			KPA	All data are valid without qualification.
	AAB2903	X			KPA	All data are valid without qualification.
	AAB2904	X			KPA	All data are valid without qualification.
	AAB2905	X			KPA	All data are valid without qualification.
20012	AAB9037	X	X	X	ICP/MS	Strontium-90 data qualified J for heterogeneity shown in duplicate analysis.
	AAB9041	X	X	X	ICP/MS	Strontium-90 data qualified J for heterogeneity shown in duplicate analysis.
	AAB9042	X	X	X	ICP/MS	Strontium-90 data qualified J for heterogeneity shown in duplicate analysis.
20066	AAB9455	X			KPA	All data are valid without qualification.
	AAB9461	X			KPA	All data are valid without qualification.
	AAB9464	X			KPA	All data are valid without qualification.
	AAB9468	X			KPA	All data are valid without qualification.
20070	AAB9269	X			KPA	All data are valid without qualification.
	AAB9271	X			KPA	All data are valid without qualification.
	AAB9272	X			KPA	All data are valid without qualification.
	AAB9274	X			KPA	All data are valid without qualification.
	AAB9277	X			KPA	All data are valid without qualification.
20073	AAB9498	X			KPA	All data are valid without qualification.
	AAB9508	X			KPA	All data are valid without qualification.
	AAB9509	X			KPA	All data are valid without qualification.
	AAB9511	X			KPA	All data are valid without qualification.
20077	AAB9278	X			KPA	All data are valid without qualification.
	AAB9281	X			KPA	All data are valid without qualification.
	AAB9283	X			KPA	All data are valid without qualification.
	AAB9286	X			KPA	All data are valid without qualification.
	AAB9287	X			KPA	All data are valid without qualification.
	AAB9289	X			KPA	All data are valid without qualification.
	AAB9288	X			KPA	All data are valid without qualification.
	AAB9290	X			KPA	All data are valid without qualification.
	AAB9465	X			KPA	All data are valid without qualification.
	AAB9469	X			KPA	All data are valid without qualification.
	AAB9474	X			KPA	All data are valid without qualification.
	AAB9476	X			KPA	All data are valid without qualification.
	AAB9477	X			KPA	All data are valid without qualification.
	AAB9480	X			KPA	All data are valid without qualification.
	AAB9481	X			KPA	All data are valid without qualification.
	AAB9484	X			KPA	All data are valid without qualification.
	AAB9487	X			KPA	All data are valid without qualification.
	AAB9488	X			KPA	All data are valid without qualification.
	AAB9489	X			KPA	All data are valid without qualification.
	AAB9494	X			KPA	All data are valid without qualification.
	AAB9497	X			KPA	All data are valid without qualification.
20080	AAB9297	X			KPA	All data are valid without qualification.
	AAB9300	X			KPA	All data are valid without qualification.
	AAB9301	X			KPA	All data are valid without qualification.
	AAB9302	X			KPA	All data are valid without qualification.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
20080 continued	AAB9303	X			KPA	All data are valid without qualification.
	AAB9304	X			KPA	All data are valid without qualification.
	AAB9308	X			KPA	All data are valid without qualification.
20082	AAB9310	X			KPA	Uranium data qualified J for low internal standards.
	AAB9313	X			KPA	Uranium data qualified J for low internal standards.
	AAB9316	X			KPA	Uranium data qualified J for low internal standards.
	AAB9512	X			KPA	Uranium data qualified J for low internal standards.
	AAB9513	X			KPA	Uranium data qualified J for low internal standards.
	AAB9514	X			KPA	Uranium data qualified J for low internal standards.
	AAB9517	X			KPA	Uranium data qualified J for low internal standards.
	AAB9520	X			KPA	Uranium data qualified J for low internal standards.
	AAB9523	X			KPA	Uranium data qualified J for low internal standards.
20083	AAB9524	X			KPA	All data are valid without qualification.
	AAB9527	X			KPA	All data are valid without qualification.
	AAB9528	X			KPA	All data are valid without qualification.
	AAB9533	X			KPA	All data are valid without qualification.
	AAB9535	X			KPA	All data are valid without qualification.
20084	AAB9317	X			KPA	All data are valid without qualification.
	AAB9322	X			KPA	All data are valid without qualification.
	AAB9324	X			KPA	All data are valid without qualification.
	AAB9328	X			KPA	All data are valid without qualification.
20086	AAB9369	X			KPA	All data are valid without qualification.
	AAB9375	X			KPA	All data are valid without qualification.
20087	AAB9380	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB9381	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB9386	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB9389	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB9390	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB9392	X			KPA	Uranium data qualified J for low recovery in QC sample.
	AAB9394	X			KPA	Uranium data qualified J for low recovery in QC sample.
20109	AAB9338	X			KPA	Strontium-90 data qualified J for a low recovery in laboratory control sample.
	AAB9339	X			KPA	Strontium-90 data qualified J for a low recovery in laboratory control sample.
20111	AAB9347	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB9350	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB9544	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB9546	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB9549	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB9554	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.
	AAB9555	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in QC sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
20113	AAB9327	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
	AAB9330	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
	AAB9333	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
	AAB9336	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
	AAB9332	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
	AAB9334	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
	AAB9539	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
	AAB9543	X			KPA	Uranium and strontium-90 data qualified J for low recoveries in laboratory control and QC samples, respectively.
20232	AAB9301	X	X	X		Isotopic uranium data qualified J for high recovery in laboratory control sample.
	AAB9304	X	X	X		Isotopic uranium data qualified J for high recovery in laboratory control sample.
20315	AAB2833	X			KPA	All data are valid without qualification.
20325	AAB9360	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in matrix spike and laboratory control samples, respectively.
	AAB9363	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in matrix spike and laboratory control samples, respectively.
20328	AAB9366	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9597	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9599	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9568	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9571	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9572	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9573	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9576	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
	AAB9580	X			KPA	Strontium-90 data qualified J for low recovery in QC sample.
20332	AAB9361	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.
	AAB9364	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR TA-10 SUBSURFACE AGGREGATE RADIONUCLIDE ANALYSES

REQUEST NUMBER	SAMPLE ID	STRONTIUM-90	GAMMA SPECTROSCOPY	ISOTOPIC URANIUM	TOTAL URANIUM	COMMENTS
20332 continued	AAB9357	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.
	AAB9359	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.
	AAB9556	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.
	AAB9558	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.
	AAB9503	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.
	AAB9507	X			KPA	Strontium-90 and uranium data qualified J for low recoveries in QC sample.
20343	AAB0142	X			KPA	All data are valid without qualification.
	AAB0144	X			KPA	All data are valid without qualification.
20370	AAB2073	X			KPA	All data are valid without qualification.
	AAB0215	X			KPA	All data are valid without qualification.
	AAB0222	X			KPA	All data are valid without qualification.
	AAB0226	X	X	X	KPA	All data are valid without qualification.
	AAB0227	X			KPA	All data are valid without qualification.
20436	AAB0122	X			KPA	All data are valid without qualification.

[a] X = Analysis performed. A blank indicates that the sample was not submitted for this analysis.
[b] ICP/MS = Sample was analyzed for total uranium using inductively coupled plasma/mass spectroscopy.
[c] KPA = Sample was analyzed for total uranium using kinetic phosphorescence analysis.
[d] J = Estimated detected quantity.
[e] R = Rejected quantity.

TABLE B-2

DATA QUALITY EVALUATION FOR ADDITIONAL TA-10 SAMPLES COLLECTED TO FURTHER ASSESS THE PRESENCE OF AMERICIUM-241

REQUEST NUMBER	SAMPLE ID	GAMMA SPECTROSCOPY	ISOTOPIC PLUTONIUM	COMMENTS
2010	0110-00-0001	X	X	All data are valid without qualification.
	0110-00-0002	X	X	All data are valid without qualification.

APPENDIX C RISK ASSESSMENT CALCULATIONS

This appendix contains the risk assessment calculations for all of the risk assessments performed for the TA-10 Subsurface Aggregate. The following sections are included:

- Section C-1: RESRAD Summary Report for the PRS 10-002(b) Current Recreational Scenario
- Section C-2: RESRAD Summary Report for the PRS 10-002(b) Future Residential Scenario
- Section C-3: RESRAD Summary Report for the PRSs 10-003(a-o) and 10-007 Current Recreational Scenario
- Section C-4: RESRAD Summary Report for the PRSs 10-003(a-o) and 10-007 Future Residential Scenario
- Section C-5: RESRAD Summary Report for the Site-Wide Future Recreational Scenario

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SECTION C-1 RESRAD SUMMARY REPORT FOR THE PRS 10-002(B) CURRENT RECREATIONAL SCENARIO

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Part I: Mixture Sums and Single Radionuclide Guidelines
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Dose Conversion Factor (and Related) Parameter Summary
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(1)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(1)
D-34	Food transfer factors:			
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(1,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(1,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(1,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	3.000E+01	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.300E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E-03	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	5.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	5.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	5.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	1.000E+04	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Sr-90	3.400E+02	0.000E+00	---	S1(1)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(1)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone effective porosity	2.000E-01	2.000E-01	---	EPCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	4.400E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Humidity in air (g/cm**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.990E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	4.800E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.200E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	Zero shows Simpson's rule.	EPS
R014	Density of saturated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	3.000E-01	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R015	Unsat. zone 2, thickness (m)	not used	0.000E+00	---	H(2)
R015	Unsat. zone 2, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(2)
R015	Unsat. zone 2, total porosity	not used	4.000E-01	---	TPUZ(2)
R015	Unsat. zone 2, effective porosity	not used	2.000E-01	---	EPUZ(2)
R015	Unsat. zone 2, soil-specific b parameter	not used	5.300E+00	---	BUZ(2)
R015	Unsat. zone 2, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(2)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	3.000E+01	---	DCNUCU(1,1)
R016	Unsaturated zone 2 (cm**3/g)	not used	3.000E+01	---	DCNUCU(1,2)
R016	Saturated zone (cm**3/g)	not used	3.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.071E-08	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R017	Inhalation rate (m**3/yr)	2.000E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-03	2.000E-04	---	MLINH
R017	Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	---	LM
R017	Exposure duration	8.000E+00	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	not used	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	3.000E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	not used	1.000E+00	1 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.000E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	not used	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	not used	1.000E+00	---	STOR_T(2)
STOR	Milk	not used	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	not used	2.000E+01	---	STOR_T(4)
STOR	Fish	not used	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	not used	7.000E+00	---	STOR_T(6)
STOR	Well water	not used	1.000E+00	---	STOR_T(7)
STOR	Surface water	not used	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	not used	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average annual wind speed (m/sec)	not used	2.000E+00	---	WIND
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	suppressed
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed

Contaminated Zone Dimensions

Area: 30.00 square meters
Thickness: 1.30 meters
Cover Depth: 0.00 meters

Initial Soil Concentrations, pCi/g

Sr-90 3.400E+02

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
TDOSE(t):	4.512E-01	4.511E-01	4.405E-01	3.550E-01	1.372E-01	4.173E-02	3.054E-06	2.007E-11	0.000E+00	0.000E+00
M(t):	3.008E-02	3.008E-02	2.937E-02	2.371E-02	9.147E-03	2.782E-03	2.030E-07	1.378E-12	0.000E+00	0.000E+00

Maximum TDOSE(t): 4.512E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	frac
Sr-90	0.000E+00	0.0000	4.408E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.222E-03	0.0
Total	0.000E+00	0.0000	4.408E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.222E-03	0.0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	frac
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.512E-01	1.00
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.512E-01	1.00

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E-03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	4.489E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.221E-03	0.0049
Total	0.000E+00	0.0000	4.489E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.221E-03	0.0049

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E-03 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.511E-01	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.511E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract
Sr-90	0.000E+00	0.0000	4.384E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.109E-03	0.004
Total	0.000E+00	0.0000	4.384E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.109E-03	0.004

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.405E-01	1.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.405E-01	1.000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	3.538E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.751E-03	0.0049
Total	0.000E+00	0.0000	3.538E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.751E-03	0.0049

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.556E-01	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.556E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract
Sr-90	0.000E+00	0.0000	1.365E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.750E-04	0.00
Total	0.000E+00	0.0000	1.365E-01	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.750E-04	0.00

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* frac
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.372E-01	1.00
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.372E-01	1.00

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	So[illegible] mrem/yr	So[illegible] fr[illegible]
Sr-90	0.000E+00	0.0000	4.152E-02	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.055E-0[illegible]	0.[illegible]
Total	0.000E+00	0.0000	4.152E-02	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.055E-0[illegible]	0.[illegible]

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fr[illegible]
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.173E-02	1.[illegible]
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.173E-02	1.[illegible]

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	3.039E-08	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.504E-08	0.0049
Total	0.000E+00	0.0000	3.039E-08	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.504E-08	0.0049

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.054E-08	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.054E-08	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	2.057E-11	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.018E-13	0.0049
Total	0.000E+00	0.0000	2.057E-11	0.9951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.018E-13	0.0049

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.007E-11	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.007E-11	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Branch Fraction	DSR(j,t) (mrem/yr)/(pCi/g) t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Sr-90	Sr-90	1.000E+00	1.327E-03	1.327E-03	1.290E-03	1.046E-03	4.036E-04	1.227E-04	8.982E-09	6.081E-14	0.000E+00	0.000E+00

Branch Fraction is the cumulative factor for the j't h principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 15 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Sr-90	1.130E+04	1.130E+04	1.160E+04	1.434E+04	3.717E+04	1.222E+05	1.670E+09	*1.365E+14	*1.365E+14	*1.365E+14

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Sr-90	3.400E+02	0.000E+00	1.327E-03	1.130E+04	1.327E-03	1.130E+04

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+0
Sr-90	Sr-90	1.000E+00	4.512E-01	4.511E-01	4.405E-01	3.550E-01	1.372E-01	4.173E-02	3.054E-08	2.007E-11	0.000E+00	0.000E+0

BRF(i) is the branch fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+0
Sr-90	Sr-90	1.000E+00	3.400E+02	3.400E+02	3.320E+02	2.680E+02	1.034E+02	3.145E+01	2.302E-03	1.558E-08	0.000E+00	0.000E+0

BRF(i) is the branch fraction of the parent nuclide.

TA-10-002(b)

CURRENT RECREATIONAL SCENARIO

HEALTH RISK REPORT

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Part III: Intake Quantities and Health Risk Factors
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Cancer Risk Slope Factors Summary Table
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
SF-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
SF-1	Sr-90+D	1.00E-08	1.00E-08*	SLPF(1,1)
SF-2	Inhalation, slope factors, 1/(pCi):			
SF-2	Sr-90+D	6.00E-11	6.00E-11	SLPF(1,2)
SF-3	Ingestion, slope factors, 1/(pCi):			
SF-3	Sr-90+D	5.00E-11	5.00E-11	SLPF(1,3)

Note: Default values followed by '*' were derived by multiplying the dose conversion factors with 7.3E-7 (risk/mrem). For external radiation, the dose conversion factors used for this derivation were obtained from the EPA's Federal Guidance Report No.12, and for inhalation and ingestion, the dose conversion factors were the ones used in RESRAD default database.

Default values followed by '$' were obtained from 'Estimating Radiogenic Cancer Risks', EPA 402-R-93-076, June, 1994.

Default values followed by '#' were taken from individual radionuclides given in HEAST.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Sr-90	3.427E+02	0.000E+00	0.000E+00	0.000E+00	1.452E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.452E+0

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	0.000E+00	0.0000	2.128E-07	0.9668	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.318E-09	0.0332
Total	0.000E+00	0.0000	2.128E-07	0.9668	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.318E-09	0.0332

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.201E-07	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.201E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	0.000E+00	0.0000	2.128E-07	0.9668	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.318E-09	0.0332
Total	0.000E+00	0.0000	2.128E-07	0.9668	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.318E-09	0.0332

SECTION C-2 RESRAD SUMMARY REPORT FOR THE PRS 10-002(B) FUTURE RESIDENTIAL SCENARIO

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Part I: Mixture Sums and Single Radionuclide Guidelines
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Dose Conversion Factor (and Related) Parameter Summary
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
D-1	Dose conversion factors for inhalation, mrem/pCi:			
D-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(1)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(1)
D-34	Food transfer factors:			
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(1,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(1,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(1,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.400E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	6.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Sr-90	3.710E+01	0.000E+00	---	S1(1)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(1)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.000E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone effective porosity	2.000E-01	2.000E-01	---	EPCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	4.400E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Humidity in air (g/cm**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.990E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	4.800E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.200E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	2.700E+07	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.000E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	3.000E-01	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Unsat. zone 1, thickness (m)	2.000E+02	4.000E+00	---	H(1)
R016	Unsat. zone 1, soil density (g/cm**3)	1.600E+00	1.500E+00	---	DENSUZ(1)
R016	Unsat. zone 1, total porosity	5.000E-01	4.000E-01	---	TPUZ(1)
R016	Unsat. zone 1, effective porosity	4.000E-01	2.000E-01	---	EPUZ(1)
R016	Unsat. zone 1, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(1)
R016	Unsat. zone 1, hydraulic conductivity (m/yr)	3.000E+00	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	3.600E+01	3.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	3.600E+01	3.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.130E-06	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	8.000E-05	2.000E-04	---	MLINH
R017	Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	---	LM
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	not used	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	8.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	8.000E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	not used	1.000E+00	1 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Fruits, vegetables and grain consumption (kg/yr)	1.240E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	0.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	0.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	7.000E-02	-1	---	FPLANT
R018	Contamination fraction of meat	7.000E-03	-1	---	FMEAT
R018	Contamination fraction of milk	7.000E-03	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	5.000E+00	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	not used	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	not used	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average annual wind speed (m/sec)	not used	2.000E+00	---	WIND
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	suppressed
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	140.00 square meters	Sr-90	3.710E+01
Thickness:	0.60 meters		
Cover Depth:	0.00 meters		

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.701E+01	1.661E+01	1.584E+01	1.341E+01	8.330E+00	1.574E+00	1.347E-02	7.811E-10
M(t):	1.134E+00	1.108E+00	1.056E+00	8.939E-01	5.553E-01	1.049E-01	8.980E-04	5.208E-11

Maximum TDOSE(t): 1.701E+01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	1.019E-02	0.0006	0.000E+00	0.0000	1.644E+01	0.9661	4.168E-01	0.0245	1.239E-01	0.0073	2.553E-02	0.0015
Total	0.000E+00	0.0000	1.019E-02	0.0006	0.000E+00	0.0000	1.644E+01	0.9661	4.168E-01	0.0245	1.239E-01	0.0073	2.553E-02	0.0015

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.701E+01	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.701E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	9.949E-03	0.0006	0.000E+00	0.0000	1.605E+01	0.9661	4.070E-01	0.0245	1.210E-01	0.0073	2.492E-02	0.001
Total	0.000E+00	0.0000	9.949E-03	0.0006	0.000E+00	0.0000	1.605E+01	0.9661	4.070E-01	0.0245	1.210E-01	0.0073	2.492E-02	0.001

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.661E+01	1.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.661E+01	1.000

*Sum of all water independent and dependent pathways.

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           Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
                          As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

                           Water Independent Pathways (Inhalation excludes radon)

            Ground           Inhalation          Radon             Plant              Meat              Milk              Soil
Radio-  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
Nuclide mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract.
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Sr-90   0.000E+00 0.0000 8.487E-03 0.0005 0.000E+00 0.0000 1.530E+01 0.9661 3.881E-01 0.0245 1.154E-01 0.0073 2.377E-02 0.0015
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Total   0.000E+00 0.0000 8.487E-03 0.0005 0.000E+00 0.0000 1.530E+01 0.9661 3.881E-01 0.0245 1.154E-01 0.0073 2.377E-02 0.0015


           Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
                          As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

                                        Water Dependent Pathways

            Water              Fish             Radon             Plant              Meat              Milk         All Pathways*
Radio-  ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
Nuclide mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract. mrem/yr  fract.
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Sr-90   0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 1.584E+01 1.0000
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Total   0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 0.000E+00 0.0000 1.584E+01 1.0000

*Sum of all water independent and dependent pathways.
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	8.031E-03	0.0006	0.000E+00	0.0000	1.295E+01	0.9661	3.285E-01	0.0245	9.788E-02	0.0073	2.012E-02	0.0015
Total	0.000E+00	0.0000	8.031E-03	0.0006	0.000E+00	0.0000	1.295E+01	0.9661	3.285E-01	0.0245	9.788E-02	0.0073	2.012E-02	0.0015

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.341E+01	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.341E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ
Sr-90	0.000E+00	0.0000	4.989E-03	0.0006	0.000E+00	0.0000	8.048E+00	0.9661	2.041E-01	0.0245	6.068E-02	0.0073	1.250E-02	0.0015
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ
Total	0.000E+00	0.0000	4.989E-03	0.0006	0.000E+00	0.0000	8.048E+00	0.9661	2.041E-01	0.0245	6.068E-02	0.0073	1.250E-02	0.0015

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.330E+00	1.0000
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.330E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	9.420E-04	0.0000	0.000E+00	0.0000	1.521E+00	0.9661	3.850E-02	0.0245	1.147E-02	0.0073	2.301E-03	0.0015
Total	0.000E+00	0.0000	9.420E-04	0.0000	0.000E+00	0.0000	1.521E+00	0.9661	3.850E-02	0.0245	1.147E-02	0.0073	2.301E-03	0.0015

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.574E+00	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.574E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	8.007E-08	0.0000	0.000E+00	0.0000	1.301E-02	0.9661	3.300E-04	0.0245	9.813E-05	0.0073	2.021E-05	0.0015
Total	0.000E+00	0.0000	8.007E-08	0.0000	0.000E+00	0.0000	1.301E-02	0.9661	3.300E-04	0.0245	9.813E-05	0.0073	2.021E-05	0.0015

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.347E-02	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.347E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	4.078E-13	0.0000	0.000E+00	0.0000	7.547E-10	0.9661	1.914E-11	0.0245	5.690E-12	0.0073	1.172E-12	0.0015
Total	0.000E+00	0.0000	4.078E-13	0.0000	0.000E+00	0.0000	7.547E-10	0.9661	1.914E-11	0.0245	5.690E-12	0.0073	1.172E-12	0.0015

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.811E-10	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.811E-10	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

```
Parent  Product  Branch                           DSR(j,t)  (mrem/yr)/(pCi/g)
 (i)      (j)    Fraction  t= 0.000E+00 1.000E+00 3.000E+00 1.000E+01 3.000E+01 1.000E+02 3.000E+02 1.000E+03
------- ------- ---------     --------- --------- --------- --------- --------- --------- --------- ---------
Sr-90    Sr-90   1.000E+00     4.585E-01 4.478E-01 4.270E-01 3.614E-01 2.465E-01 4.242E-02 3.631E-04 2.105E-11
======= ======= =========     ========= ========= ========= ========= ========= ========= ========= =========
```

Branch Fraction is the cumulative factor for the j'th principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 15 mrem/yr

```
Nuclide
  (i)    t= 0.000E+00  1.000E+00  3.000E+00  1.000E+01  3.000E+01  1.000E+02  3.000E+02  1.000E+03
-------    ---------  ---------  ---------  ---------  ---------  ---------  ---------  ---------
Sr-90      3.271E+01  3.350E+01  3.513E+01  4.150E+01  6.081E+01  3.536E+02  4.131E+04  7.124E+11
=======    =========  =========  =========  =========  =========  =========  =========  =========
```

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

```
Nuclide  Initial        tmin        DSR(i,tmin) G(i,tmin) DSR(i,tmax) G(i,tmax)
  (i)     pCi/g        (years)                   (pCi/g)               (pCi/g)
------- --------- ---------------- ---------  ---------  ---------  ---------
Sr-90   3.710E+01     0.000E+00     4.585E-01  3.271E+01  4.585E-01  3.271E+01
======= ========= ================ =========  =========  =========  =========
```

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (J)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Sr-90	Sr-90	1.000E+00	1.701E+01	1.601E+01	1.584E+01	1.341E+01	8.330E+00	1.574E+00	1.347E-02	7.811E-10

BRF(i) is the branch fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (J)	Parent (i)	BRF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Sr-90	Sr-90	1.000E+00	3.710E+01	3.623E+01	3.454E+01	2.924E+01	1.810E+01	3.432E+00	2.937E-02	1.703E-09

BRF(i) is the branch fraction of the parent nuclide.

TA-10-002(b)

FUTURE RESIDENTIAL SCENARIO

HEALTH RISK REPORT

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Part III: Intake Quantities and Health Risk Factors
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Cancer Risk Slope Factors Summary Table
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Sr-90+D	1.90E-08	1.90E-08*	SLPF(1,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Sr-90+D	6.90E-11	6.90E-11	SLPF(1,2)
Sf-3	Ingestion, slope factors, 1/(pCi):			
Sf-3	Sr-90+D	5.60E-11	5.60E-11	SLPF(1,3)

Note: Default values followed by '*' were derived by multiplying the dose conversion factors with 7.3E-7 (risk/mrem). For external radiation, the dose conversion factors used for this derivation were obtained from the EPA's Federal Guidance Report No.12, and for inhalation and ingestion, the dose conversion factors were the ones used in RESRAD default database.

Default values followed by '$' were obtained from 'Estimating Radiogenic Cancer Risks', EPA 402-R-93-076, June, 1994.

Default values followed by '#' were taken from individual radionuclides given in HEAST.

TA-10-003(a-o) and 10-007

CURRENT RECREATIONAL SCENARIO

HEALTH RISK REPORT

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Part III: Intake Quantities and Health Risk Factors
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Cancer Risk Slope Factors Summary Table
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Sr-90+D	1.00E-08	1.00E-08*	SLPF(1,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Sr-90+D	6.90E-11	6.90E-11	SLPF(1,2)
Sf-3	Ingestion, slope factors, 1/(pCi):			
Sf-3	Sr-90+D	5.00E-11	5.00E-11	SLPF(1,3)

Note: Default values followed by '*' were derived by multiplying the dose conversion factors with 7.3E-7 (risk/mrem). For external radiation, the dose conversion factors used for this derivation were obtained from the EPA's Federal Guidance Report No.12, and for inhalation and ingestion, the dose conversion factors were the ones used in RESRAD default database.

Default values followed by '$' were obtained from 'Estimating Radiogenic Cancer Risks', EPA 402-R-93-076, June, 1994.

Default values followed by '#' were taken from individual radionuclides given in HEAST.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	4.821E+01	0.000E+00	0.000E+00	0.000E+00	4.531E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.531E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CHRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	1.863E-06	0.9137	9.980E-08	0.0490	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.013E-08	0.0373
Total	1.863E-06	0.9137	9.980E-08	0.0490	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.013E-08	0.0373

Excess Cancer Risks CHRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.038E-06	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.038E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CHRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	1.863E-06	0.9137	9.980E-08	0.0490	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.013E-0[illegible]	0.03[illegible]
Total	1.863E-06	0.9137	9.980E-08	0.0490	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.013E-0[illegible]	0.03[illegible]

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.038E-08	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.038E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	4.510E+01	0.000E+00	0.000E+00	0.000E+00	4.247E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.247E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	1.773E-06	0.9149	9.354E-08	0.0483	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.135E-08	0.0368
Total	1.773E-06	0.9149	9.354E-08	0.0483	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.135E-08	0.0368

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.938E-06	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.938E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	1.773E-06	0.9149	9.354E-08	0.0483	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.135E-08	0.03
Total	1.773E-06	0.9149	9.354E-08	0.0483	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.135E-08	0.03

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File : TA10CAMP.DAT

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.938E-08	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.938E-08	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QIHT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon) Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	3.948E+01	0.000E+00	0.000E+00	0.000E+00	3.711E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.711E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground risk	fract.	Inhalation risk	fract.	Plant risk	fract.	Meat risk	fract.	Milk risk	fract.	Soil risk	fract.
Sr-90	1.601E-06	0.9175	8.173E-08	0.0468	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.235E-08	0.0357
Total	1.601E-06	0.9175	8.173E-08	0.0468	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.235E-08	0.0357

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water risk	fract.	Fish risk	fract.	Plant risk	fract.	Meat risk	fract.	Milk risk	fract.	All Pathways** risk	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E-06	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground risk	fract.	Inhalation risk	fract.	Radon risk	fract.	Plant risk	fract.	Meat risk	fract.	Milk risk	fract.	Soil risk	fract.
Sr-90	1.601E-06	0.9175	8.173E-08	0.0468	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.235E-08	0.035
Total	1.601E-06	0.9175	8.173E-08	0.0468	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.235E-08	0.035

Total Excess Cancer Risk CHRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E-06	1.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E-06	1.000

***CHRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Sr-90	2.270E+01	0.000E+00	0.000E+00	0.000E+00	2.140E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.140E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	1.064E-06	0.9276	4.712E-08	0.0411	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.594E-08	0.0313
Total	1.064E-06	0.9276	4.712E-08	0.0411	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.594E-08	0.0313

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.147E-06	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.147E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS1(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract
Sr-90	1.064E-06	0.9276	4.712E-08	0.0411	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.594E-0[illegible]	0.031
Total	1.064E-06	0.9276	4.712E-08	0.0411	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.594E-0[illegible]	0.031

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Total Excess Cancer Risk CHRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.147E-06	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.147E-06	1.0000

***CHRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As µCi/yr at t= 3.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.00
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.00

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.000

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+0

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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Total Excess Cancer Risk CHRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

***CHRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	7.778E+00	1.074E+05	2.724E+03	8.100E+02	1.008E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.111E+05

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	1.010E-08	0.0001	1.805E-04	0.9666	4.577E-06	0.0245	1.301E-06	0.0073	2.803E-07	0.0015
Total	0.000E+00	0.0000	1.010E-08	0.0001	1.805E-04	0.9666	4.577E-06	0.0245	1.301E-06	0.0073	2.803E-07	0.0015

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.807E-04	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.807E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	1.010E-08	0.0001	0.000E+00	0.0000	1.805E-04	0.9666	4.577E-06	0.0245	1.301E-06	0.0073	2.803E-07	0.0015
Total	0.000E+00	0.0000	1.010E-08	0.0001	0.000E+00	0.0000	1.805E-04	0.9666	4.577E-06	0.0245	1.301E-06	0.0073	2.803E-07	0.0015

SECTION C-3 RESRAD SUMMARY REPORT FOR THE PRSS 10-003(A-O) AND 10-007 CURRENT RECREATIONAL SCENARIO

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Part I: Mixture Sums and Single Radionuclide Guidelines
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Dose Conversion Factor (and Related) Parameter Summary
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
D-1	Dose conversion factors for inhalation, mrem/pCi:			
D-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(1)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(1)
D-34	Food transfer factors:			
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(1,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(1,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(1,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.500E-02	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Sr-90	1.910E+02	0.000E+00	---	S1(1)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(1)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.000E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone effective porosity	2.000E-01	2.000E-01	---	EPCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	4.400E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Humidity in air (g/cm**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.090E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	4.800E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.200E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	Zero shows Simpson's rule.	EPS
R014	Density of saturated zone (g/cm**3)	1.000E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	3.000E-01	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R016	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R016	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R016	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R016	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R016	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	3.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	3.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.597E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R017	Inhalation rate (m**3/yr)	2.000E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-03	2.000E-04	---	MLINH
R017	Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	---	LM
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	3.000E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	1 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	not used	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	not used	1.000E+00	---	STOR_T(2)
STOR	Milk	not used	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	not used	2.000E+01	---	STOR_T(4)
STOR	Fish	not used	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	not used	7.000E+00	---	STOR_T(6)
STOR	Well water	not used	1.000E+00	---	STOR_T(7)
STOR	Surface water	not used	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	not used	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average annual wind speed (m/sec)	not used	2.000E+00	---	WIND
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed

Summary : TA 10-003(a-o) and TA 10-007 CURRENT RECREATIONAL SCENARIO
File : TA10CAMP.DAT

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Sr-90	1.010E+02
Thickness:	0.03 meters		
Cover Depth:	0.00 meters		

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.505E-01	1.422E-01	1.205E-01	7.901E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00
M(t):	1.003E-02	9.482E-03	8.434E-03	5.287E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Maximum TDOSE(t): 1.505E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil frac
Sr-90	8.038E-02	0.5342	6.310E-02	0.4107	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.833E-03	0.04
Total	8.038E-02	0.5342	6.310E-02	0.4107	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.833E-03	0.04

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* frac
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.505E-01	1.00
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.505E-01	1.00

*Sum of all water independent and dependent pathways.

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Summary : TA 10-003(a-o) and TA 10-007 CURRENT RECREATIONAL SCENARIO
File   : TA10CAMP.DAT

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	frac
Sr-90	7.053E-02	0.5381	5.920E-02	0.4102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.408E-03	.04
Total	7.053E-02	0.5381	5.920E-02	0.4102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.408E-03	0.04

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	frac
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.422E-01	1.00
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.422E-01	1.00

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	6.911E-02	0.5463	5.173E-02	0.4089	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.678E-03	0.0449
Total	6.911E-02	0.5463	5.173E-02	0.4089	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.678E-03	0.0449

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.265E-01	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.265E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	4.591E-02	0.5811	2.982E-02	0.3774	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.274E-03	0.0414
Total	4.591E-02	0.5811	2.982E-02	0.3774	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.274E-03	0.0414

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.901E-02	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.901E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Branch Fraction	DSR(j,t) (mrem/yr)/(pCi/g) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Sr-90	Sr-90	1.000E+00	7.878E-04	7.448E-04	6.804E-04	4.138E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Branch Fraction is the cumulative factor for the j'th principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 15 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Sr-90	1.904E+04	2.014E+04	2.205E+04	3.625E+04	*1.365E+14	*1.365E+14	*1.365E+14	*1.365E+14

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Sr-90	1.010E+02	0.000E+00	7.878E-04	1.904E+04	7.878E-04	1.904E+04

Summary : TA 10-003(a-o) and TA 10-007 CURRENT RECREATIONAL SCENARIO
File : TA10CAMP.DAT

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Sr-90	Sr-90	1.000E+00	1.505E-01	1.422E-01	1.285E-01	7.901E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Sr-90	Sr-90	1.000E+00	1.910E+02	1.865E+02	1.778E+02	1.503E+02	9.307E+01	1.739E+01	1.442E-01	7.484E-03

BRF(i) is the branch fraction of the parent nuclide.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	*Water Independent Pathways (Inhalation w/o radon)* Inhalation	Plant	Meat	Milk	Soil	*Water Dependent Pathways* Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.00[illegible]E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0

RESRAD, Version 5.61 T½ Limit = 0.5 year 08/30/00 18:22 Page 18
Intrisk : TA 10-003(a-e) and TA 10-007 CURRENT RECREATIONAL SCENARIO
File : TA10CAMP.DAT

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

SECTION C-4 RESRAD SUMMARY REPORT FOR THE PRSS 10-003(A-O) AND 10-007 FUTURE RESIDENTIAL SCENARIO

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Part I: Mixture Sums and Single Radionuclide Guidelines

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Dose Conversion Factor (and Related) Parameter Summary
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Am-241	4.440E-01	4.440E-01	DCF2(1)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(2)
B-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(3)
B-1	Th-229+D	2.160E+00	2.160E+00	DCF2(4)
B-1	U-233	1.350E-01	1.350E-01	DCF2(5)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Am-241	3.640E-03	3.640E-03	DCF3(1)
D-1	Np-237+D	4.440E-03	4.440E-03	DCF3(2)
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(3)
D-1	Th-229+D	4.030E-03	4.030E-03	DCF3(4)
D-1	U-233	2.890E-04	2.890E-04	DCF3(5)
D-34	Food transfer factors:			
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(1,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(1,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(1,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(2,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(3,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(3,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(3,3)
D-34				
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(5,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(5,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(5,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(1,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(2,2)
D-5				
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(3,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)
D-5				
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(5,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(5,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.400E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	0.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Am-241	1.500E+01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Sr-90	5.419E+03	0.000E+00	---	S1(3)
R012	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(3)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.000E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone effective porosity	2.000E-01	2.000E-01	---	EPCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	4.400E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Humidity in air (g/cm**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.090E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	4.800E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.200E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	2.700E+07	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.000E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	3.000E-01	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R010	Unsat. zone 1, thickness (m)	2.000E+02	4.000E+00	---	H(1)
R010	Unsat. zone 1, soil density (g/cm**3)	1.000E+00	1.500E+00	---	DENSUZ(1)
R010	Unsat. zone 1, total porosity	5.000E-01	4.000E-01	---	TPUZ(1)
R010	Unsat. zone 1, effective porosity	4.000E-01	2.000E-01	---	EPUZ(1)
R010	Unsat. zone 1, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(1)
R010	Unsat. zone 1, hydraulic conductivity (m/yr)	3.000E+00	1.000E+01	---	HCUZ(1)
R010	Distribution coefficients for Am-241				
R010	Contaminated zone (cm**3/g)	1.300E+02	2.000E+01	---	DCNUCC(1)
R010	Unsaturated zone 1 (cm**3/g)	1.300E+02	2.000E+01	---	DCNUCU(1,1)
R010	Saturated zone (cm**3/g)	1.300E+02	2.000E+01	---	DCNUCS(1)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	3.133E-07	ALEACH(1)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R010	Distribution coefficients for Sr-90				
R010	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(3)
R010	Unsaturated zone 1 (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCU(3,1)
R010	Saturated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCS(3)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	1.130E-03	ALEACH(3)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R010	Distribution coefficients for daughter Np-237				
R010	Contaminated zone (cm**3/g)	3.950E-01	-1.000E+00	---	DCNUCC(2)
R010	Unsaturated zone 1 (cm**3/g)	3.950E-01	-1.000E+00	---	DCNUCU(2,1)
R010	Saturated zone (cm**3/g)	3.950E-01	-1.000E+00	---	DCNUCS(2)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	8.730E-05	ALEACH(2)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R010	Distribution coefficients for daughter Th-229				
R010	Contaminated zone (cm**3/g)	5.000E+02	6.000E+04	---	DCNUCC(4)
R010	Unsaturated zone 1 (cm**3/g)	5.000E+02	6.000E+04	---	DCNUCU(4,1)
R010	Saturated zone (cm**3/g)	5.000E+02	6.000E+04	---	DCNUCS(4)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	8.150E-06	ALEACH(4)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R010	Distribution coefficients for daughter U-233				
R010	Contaminated zone (cm**3/g)	7.290E+00	5.000E+01	---	DCNUCC(5)
R010	Unsaturated zone 1 (cm**3/g)	7.290E+00	5.000E+01	---	DCNUCU(5,1)
R010	Saturated zone (cm**3/g)	7.290E+00	5.000E+01	---	DCNUCS(5)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	5.530E-03	ALEACH(5)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	9.000E-05	2.000E-04	---	MLINH
R017	Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	---	LM
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	8.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	8.000E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	1 shows circular AREA.	FS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.240E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	0.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	0.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	7.000E-02	-1	---	FPLANT
R018	Contamination fraction of meat	7.000E-03	-1	---	FMEAT
R018	Contamination fraction of milk	7.000E-03	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	5.000E+00	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	not used	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	not used	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average annual wind speed (m/sec)	not used	2.000E+00	---	WIND
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	140.00 square meters	Am-241	1.500E+01
Thickness:	0.00 meters	Sr-90	5.419E+03
Cover Depth:	0.00 meters		

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.570E+03	2.509E+03	2.393E+03	2.020E+03	1.259E+03	2.390E+02	3.598E+00	5.124E-01
M(t):	1.713E+02	1.673E+02	1.595E+02	1.351E+02	8.390E+01	1.598E+01	2.399E-01	3.416E-02

Maximum TDOSE(t): 2.570E+03 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	3.571E-01	0.0001	1.390E+00	0.0005	0.000E+00	0.0000	5.308E-01	0.0002	0.850E-04	0.0000	3.912E-05	0.0000	2.455E-01	0.0001
Sr-90	8.210E+01	0.0320	1.488E+00	0.0006	0.000E+00	0.0000	2.401E+03	0.9343	0.088E+01	0.0237	1.810E+01	0.0070	3.728E+00	0.001
Total	8.252E+01	0.0321	2.884E+00	0.0011	0.000E+00	0.0000	2.401E+03	0.9345	0.089E+01	0.0237	1.810E+01	0.0070	3.974E+00	0.001

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.530E+00	0.001
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.507E+03	0.999
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.570E+03	1.000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	3.605E-01	0.0001	1.394E+00	0.0000	0.000E+00	0.0000	5.297E-01	0.0002	6.845E-04	0.0000	3.906E-05	0.0000	2.451E-01	0.0001
Sr-90	8.023E+01	0.0320	1.453E+00	0.0000	0.000E+00	0.0000	2.344E+03	0.9343	5.945E+01	0.0237	1.768E+01	0.0070	3.641E+00	0.0015
Total	8.060E+01	0.0321	2.047E+00	0.0011	0.000E+00	0.0000	2.345E+03	0.9345	5.945E+01	0.0237	1.768E+01	0.0070	3.886E+00	0.0015

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.526E+00	0.0010
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.507E+03	0.9990
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.509E+03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	3.554E-01	0.0001	1.390E+00	0.0006	0.000E+00	0.0000	5.281E-01	0.0002	6.824E-04	0.0000	3.693E-05	0.0000	2.443E-01	0.0001
Sr-90	7.650E+01	0.0320	1.386E+00	0.0006	0.000E+00	0.0000	2.235E+03	0.9342	5.669E+01	0.0237	1.686E+01	0.0070	3.471E+00	0.0015
Total	7.685E+01	0.0321	2.775E+00	0.0012	0.000E+00	0.0000	2.236E+03	0.9344	5.669E+01	0.0237	1.686E+01	0.0070	3.716E+00	0.0016

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.518E+00	0.0011
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.390E+03	0.9989
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.393E+03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	3.614E-01	0.0002	1.374E+00	0.0007	0.000E+00	0.0000	5.222E-01	0.0003	6.749E-04	0.0000	3.860E-05	0.0000	2.416E-01	0.0001
Sr-90	6.475E+01	0.0320	1.173E+00	0.0006	0.000E+00	0.0000	1.892E+03	0.9340	4.799E+01	0.0237	1.427E+01	0.0070	2.939E+00	0.0015
Total	6.511E+01	0.0321	2.547E+00	0.0013	0.000E+00	0.0000	1.893E+03	0.9343	4.799E+01	0.0237	1.427E+01	0.0070	3.180E+00	0.0016

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.500E+00	0.0012
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.023E+03	0.9988
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.026E+03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	3.404E-01	0.0003	1.331E+00	0.0011	0.000E+00	0.0000	5.058E-01	0.0004	8.539E-04	0.0000	3.728E-05	0.0000	2.340E-01	0.0002
Sr-90	4.023E+01	0.0319	7.287E-01	0.0006	0.000E+00	0.0000	1.175E+03	0.9334	2.981E+01	0.0237	8.883E+00	0.0070	1.825E+00	0.0014
Total	4.057E+01	0.0322	2.059E+00	0.0016	0.000E+00	0.0000	1.176E+03	0.9338	2.981E+01	0.0237	8.883E+00	0.0070	2.059E+00	0.0016

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.412E+00	0.0019
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.257E+03	0.9981
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.259E+03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-	áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
ááááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá
Am-241	3.044E-01	0.0013	1.100E+00	0.0050	0.000E+00	0.0000	4.523E-01	0.0019	5.856E-04	0.0000	3.333E-05	0.0000	2.091E-01	0.0009
Sr-90	7.001E+00	0.0317	1.377E-01	0.0006	0.000E+00	0.0000	2.221E+02	0.9268	5.033E+00	0.0235	1.675E+00	0.0070	3.449E-01	0.0014
ááááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá
Total	7.005E+00	0.0330	1.327E+00	0.0056	0.000E+00	0.0000	2.226E+02	0.9287	5.033E+00	0.0235	1.675E+00	0.0070	5.541E-01	0.0023

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-	áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá		áááááááááááááááá	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
ááááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.155E+00	0.0090
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.375E+02	0.9910
ááááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá	ááááááááá	áááááá
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.396E+02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	2.214E-01	0.0615	8.630E-01	0.2399	0.000E+00	0.0000	3.289E-01	0.0914	4.279E-04	0.0001	2.420E-05	0.0000	1.518E-01	0.0422
Sr-90	6.505E-02	0.0181	1.178E-03	0.0003	0.000E+00	0.0000	1.901E+00	0.5283	4.820E-02	0.0134	1.433E-02	0.0040	2.052E-03	0.0006
Total	2.864E-01	0.0796	8.642E-01	0.2402	0.000E+00	0.0000	2.230E+00	0.6197	4.863E-02	0.0135	1.436E-02	0.0040	1.547E-01	0.0430

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.596E+00	.4351
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.033E+00	.5649
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.598E+00	.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	7.314E-02	0.1428	2.810E-01	0.5484	0.000E+00	0.0000	1.087E-01	0.2121	1.402E-04	0.0003	7.918E-08	0.0000	4.941E-02	0.0964
Sr-90	3.772E-09	0.0000	6.833E-11	0.0000	0.000E+00	0.0000	1.102E-07	0.0000	2.705E-09	0.0000	6.312E-10	0.0000	1.712E-10	0.0000
Total	7.314E-02	0.1428	2.810E-01	0.5484	0.000E+00	0.0000	1.087E-01	0.2121	1.402E-04	0.0003	7.919E-08	0.0000	4.941E-02	0.0964

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.124E-01	1.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.175E-07	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.124E-01	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Branch Fraction	DSR(j,t) (mrem/yr)/(pCi/g) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	1.687E-01	1.684E-01	1.679E-01	1.660E-01	1.608E-01	1.437E-01	1.042E-01	3.392E-02
Am-241	Np-237	1.000E+00	0.000E+00	5.117E-07	1.531E-06	5.073E-06	1.497E-05	4.700E-05	1.201E-04	2.412E-04
Am-241	U-233	1.000E+00	0.000E+00	2.931E-14	2.407E-13	2.000E-12	2.350E-11	2.511E-10	2.027E-09	1.601E-08
Am-241	Th-229	1.000E+00	0.000E+00	3.056E-17	8.185E-16	3.016E-14	8.007E-13	2.890E-11	7.172E-10	2.013E-08
Am-241	dDSR(j)		1.687E-01	1.684E-01	1.679E-01	1.660E-01	1.608E-01	1.437E-01	1.044E-01	3.416E-02
Sr-90	Sr-90	1.000E+00	4.737E-01	4.625E-01	4.411E-01	3.734E-01	2.320E-01	4.383E-02	3.751E-04	2.175E-11

Branch Fraction is the cumulative factor for the j'th principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 15 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	8.893E+01	8.907E+01	8.936E+01	9.036E+01	9.330E+01	1.044E+02	1.437E+02	4.391E+02
Sr-90	3.166E+01	3.243E+01	3.401E+01	4.017E+01	6.467E+01	3.423E+02	3.999E+04	6.896E+11

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Am-241	1.500E+01	0.000E+00	1.687E-01	8.893E+01	1.687E-01	8.893E+01
Sr-90	5.419E+03	0.000E+00	4.737E-01	3.166E+01	4.737E-01	3.166E+01

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                         Individual Nuclide Dose Summed Over All Pathways
                           Parent Nuclide and Branch Fraction Indicated

Nuclide Parent   BRF(i)                                 DOSE(j,t), mrem/yr
  (j)     (i)           t= 0.000E+00 1.000E+00 3.000E+00 1.000E+01 3.000E+01 1.000E+02 3.000E+02 1.000E+03
─────── ─────── ─────────   ───────── ───────── ───────── ───────── ───────── ───────── ───────── ─────────
Am-241  Am-241  1.000E+00   2.530E+00 2.520E+00 2.518E+00 2.480E+00 2.411E+00 2.155E+00 1.564E+00 5.088E-01

Np-237  Am-241  1.000E+00   0.000E+00 7.075E-06 2.297E-05 7.610E-05 2.245E-04 7.058E-04 1.802E-03 3.618E-03

U-233   Am-241  1.000E+00   0.000E+00 4.397E-13 3.701E-12 3.099E-11 3.534E-10 3.706E-09 3.040E-08 2.402E-07

Th-229  Am-241  1.000E+00   0.000E+00 4.585E-16 1.228E-14 4.524E-13 1.210E-11 4.344E-10 1.076E-08 3.019E-07

Sr-90   Sr-90   1.000E+00   2.507E+03 2.507E+03 2.390E+03 2.023E+03 1.257E+03 2.375E+02 2.033E+00 1.179E-07
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BRF(i) is the branch fraction of the parent nuclide.


                             Individual Nuclide Soil Concentration
                           Parent Nuclide and Branch Fraction Indicated

Nuclide Parent   BRF(i)                                 S(j,t), pCi/g
  (j)     (i)           t= 0.000E+00 1.000E+00 3.000E+00 1.000E+01 3.000E+01 1.000E+02 3.000E+02 1.000E+03
─────── ─────── ─────────   ───────── ───────── ───────── ───────── ───────── ───────── ───────── ─────────
Am-241  Am-241  1.000E+00   1.500E+01 1.498E+01 1.493E+01 1.476E+01 1.430E+01 1.278E+01 9.270E+00 3.016E+00

Np-237  Am-241  1.000E+00   0.000E+00 4.854E-06 1.454E-05 4.818E-05 1.421E-04 4.469E-04 1.141E-03 2.291E-03

U-233   Am-241  1.000E+00   0.000E+00 1.062E-11 9.548E-11 1.056E-09 9.400E-09 1.004E-07 8.113E-07 6.412E-06

Th-229  Am-241  1.000E+00   0.000E+00 3.344E-16 9.017E-15 3.329E-13 8.900E-12 3.190E-10 7.922E-09 2.223E-07

Sr-90   Sr-90   1.000E+00   5.418E+03 5.292E+03 5.040E+03 4.271E+03 2.653E+03 5.013E+02 4.290E+00 2.488E-07
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BRF(i) is the branch fraction of the parent nuclide.
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TA-10-003(a-o) and 10-007

FUTURE RESIDENTIAL SCENARIO

HEALTH RISK REPORT

Table of Contents

Part III: Intake Quantities and Health Risk Factors

Cancer Risk Slope Factors Summary Table
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Am-241	4.00E-09	4.00E-09	SLPF(1,1)
Sf-1	Np-237+D	4.00E-07	4.00E-07	SLPF(2,1)
Sf-1	Sr-90+D	1.90E-08	1.90E-08*	SLPF(3,1)
Sf-1	Th-229+D	6.00E-07	6.00E-07	SLPF(4,1)
Sf-1	U-233	3.50E-11	3.50E-11	SLPF(5,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Am-241	3.80E-08	3.00E-08	SLPF(1,2)
Sf-2	Np-237+D	3.50E-08	3.50E-08	SLPF(2,2)
Sf-2	Sr-90+D	6.90E-11	6.90E-11	SLPF(3,2)
Sf-2	Th-229+D	8.30E-08	8.30E-08	SLPF(4,2)
Sf-2	U-233	1.40E-08	1.40E-08	SLPF(5,2)
Sf-3	Ingestion, slope factors, 1/(pCi):			
Sf-3	Am-241	3.30E-10	3.30E-10	SLPF(1,3)
Sf-3	Np-237+D	3.00E-10	3.00E-10	SLPF(2,3)
Sf-3	Sr-90+D	5.60E-11	5.60E-11	SLPF(3,3)
Sf-3	Th-229+D	3.00E-10	3.00E-10	SLPF(4,3)
Sf-3	U-233	4.50E-11	4.50E-11	SLPF(5,3)

Note: Default values followed by '*' were derived by multiplying the dose conversion factors with 7.3E-7 (risk/mrem). For external radiation, the dose conversion factors used for this derivation were obtained from the EPA's Federal Guidance Report No.12, and for inhalation and ingestion, the dose conversion factors were the ones used in RESRAD default database.

Default values followed by '$' were obtained from 'Estimating Radiogenic Cancer Risks', EPA 402-R-93-076, June, 1994.

Default values followed by '#' were taken from individual radionuclides given in HEAST.

Amount of Intake Quantities QIHT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	3.145E+00	1.458E+02	1.884E-01	1.075E-02	6.745E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.134E+02
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Sr-90	1.130E+03	1.569E+07	3.979E+05	1.183E+05	2.437E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.623E+07
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.128E-06	0.0000	3.679E-06	0.0001	1.443E-06	0.0000	1.865E-09	0.0000	1.064E-10	0.0000	6.678E-07	0.0000
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	1.904E-03	0.0652	2.352E-06	0.0001	2.636E-02	0.9033	6.685E-04	0.0229	1.988E-04	0.0068	4.094E-05	0.0014
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.905E-03	0.0653	6.031E-06	0.0002	2.636E-02	0.9034	6.685E-04	0.0229	1.988E-04	0.0068	4.161E-05	0.0014

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.920E-06	0.0002
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.918E-02	0.9998
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.918E-02	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.120E-09	0.0000	3.070E-06	0.0001	0.000E+00	0.0000	1.443E-08	0.0000	1.865E-09	0.0000	1.064E-10	0.0000	6.678E-07	0.000
Sr-90	1.904E-03	0.0652	2.362E-06	0.0001	0.000E+00	0.0000	2.636E-02	0.9033	6.685E-04	0.0229	1.988E-04	0.0068	4.094E-05	0.001
Total	1.905E-03	0.0653	5.431E-06	0.0002	0.000E+00	0.0000	2.636E-02	0.9034	6.685E-04	0.0229	1.988E-04	0.0068	4.161E-05	0.001

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.920E-06	0.000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.918E-02	0.999
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.918E-02	1.000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	3.140E+00	1.455E+02	1.881E-01	1.073E-02	6.734E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.131E+02
Np-237	1.018E-06	9.398E-04	4.007E-08	2.515E-08	2.183E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.650E-04
Sr-90	1.109E+03	1.532E+07	3.888E+05	1.155E+05	2.379E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.585E+07
Th-229	7.010E-17	4.340E-15	1.854E-17	7.080E-19	1.504E-15	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.863E-15
U-233	2.228E-12	3.998E-10	2.504E-12	3.737E-12	4.774E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.530E-10

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.120E-08	0.0000	3.673E-08	0.0001	1.441E-08	0.0001	1.802E-09	0.0000	1.002E-10	0.0000	6.607E-07	0.0000
Np-237	3.500E-11	0.0000	1.009E-12	0.0000	8.458E-12	0.0000	3.600E-14	0.0000	2.203E-18	0.0000	1.905E-13	0.0000
Sr-90	1.859E-03	0.0052	2.298E-08	0.0001	2.574E-02	0.9033	6.528E-04	0.0229	1.941E-04	0.0068	3.998E-05	0.0014
Th-229	3.189E-21	0.0000	1.745E-22	0.0000	4.088E-23	0.0000	2.003E-25	0.0000	7.047E-27	0.0000	1.024E-23	0.0000
U-233	8.052E-21	0.0000	9.349E-19	0.0000	5.395E-19	0.0000	3.401E-21	0.0000	5.045E-21	0.0000	6.440E-20	0.0000
Total	1.860E-03	0.0053	5.970E-08	0.0002	2.574E-02	0.9034	6.528E-04	0.0229	1.941E-04	0.0068	4.004E-05	0.0014

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.909E-08	0.0002
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.530E-11	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.849E-02	0.9998
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.420E-21	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.553E-18	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.850E-02	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

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Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.120E-06	0.0000	3.073E-06	0.0001	0.000E+00	0.0000	1.441E-06	0.0001	1.862E-09	0.0000	1.002E-10	0.0000	6.067E-07	0.0000
Sr-90	1.859E-03	0.0652	2.200E-06	0.0001	0.000E+00	0.0000	2.574E-02	0.9033	6.528E-04	0.0229	1.941E-04	0.0068	3.998E-05	0.0014
Total	1.860E-03	0.0653	5.273E-06	0.0002	0.000E+00	0.0000	2.574E-02	0.9034	6.528E-04	0.0229	1.941E-04	0.0068	4.064E-05	0.0014

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.909E-06	0.0002
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.849E-02	0.9998
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.850E-02	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Am-241	3.130E+00	1.451E+02	1.875E-01	1.070E-02	6.713E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.124E+02
Np-237	3.048E-06	2.811E-03	1.198E-05	7.508E-08	6.538E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.889E-03
Sr-90	1.058E+03	1.461E+07	3.705E+05	1.102E+05	2.289E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.511E+07
Th-229	1.890E-15	9.598E-14	3.030E-15	2.378E-17	4.055E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.398E-13
U-233	2.001E-11	2.737E-09	1.407E-11	2.090E-11	4.292E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.208E-09

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Am-241	1.122E-06	0.0000	3.802E-06	0.0001	1.438E-06	0.0001	1.858E-09	0.0000	1.059E-10	0.0000	6.840E-07	0.0000
Np-237	1.080E-10	0.0000	3.200E-12	0.0000	2.530E-11	0.0000	1.076E-13	0.0000	6.757E-16	0.0000	5.884E-13	0.0000
Sr-90	1.772E-03	0.0652	2.190E-06	0.0001	2.454E-02	0.9033	6.225E-04	0.0229	1.851E-04	0.0068	3.812E-05	0.0014
Th-229	8.599E-20	0.0000	4.707E-21	0.0000	1.030E-21	0.0000	3.272E-24	0.0000	2.500E-25	0.0000	4.378E-22	0.0000
U-233	5.440E-20	0.0000	8.404E-18	0.0000	3.695E-18	0.0000	1.900E-20	0.0000	3.031E-20	0.0000	5.794E-19	0.0000
Total	1.774E-03	0.0653	5.851E-06	0.0002	2.455E-02	0.9034	6.225E-04	0.0229	1.851E-04	0.0068	3.878E-05	0.0014

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.887E-06	0.0003
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.358E-10	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.717E-02	0.9997
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.217E-20	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.279E-17	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.717E-02	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.122E-06	0.0000	3.002E-06	0.0001	0.000E+00	0.0000	1.430E-06	0.0001	1.850E-09	0.0000	1.050E-10	0.0000	6.646E-07	0.000
Sr-90	1.772E-03	0.0652	2.100E-06	0.0001	0.000E+00	0.0000	2.454E-02	0.9033	6.225E-04	0.0229	1.851E-04	0.0068	3.812E-05	0.001
Total	1.774E-03	0.0653	5.051E-06	0.0002	0.000E+00	0.0000	2.455E-02	0.9034	6.225E-04	0.0229	1.851E-04	0.0068	3.878E-05	0.001

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.887E-06	0.000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.717E-02	0.999
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.717E-02	1.000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	3.095E+00	1.434E+02	1.854E-01	1.058E-02	8.038E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.100E+02
Np-237	1.010E-05	9.312E-03	3.957E-05	2.485E-07	2.188E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.509E-03
Sr-90	8.954E+02	1.237E+07	3.130E+05	9.325E+04	1.021E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.270E+07
Th-229	8.979E-14	3.322E-12	9.008E-15	8.720E-16	1.497E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.820E-12
U-233	2.215E-10	2.899E-08	1.211E-10	2.718E-10	4.750E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.213E-08

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Am-241	1.110E-08	0.0000	3.821E-08	0.0002	1.420E-08	0.0001	1.835E-09	0.0000	1.047E-10	0.0000	8.571E-07	0.0000
Np-237	3.533E-10	0.0000	1.060E-11	0.0000	8.381E-11	0.0000	3.501E-13	0.0000	2.237E-15	0.0000	1.050E-12	0.0000
Sr-90	1.500E-03	0.0052	1.854E-06	0.0001	2.078E-02	0.9033	5.209E-04	0.0229	1.507E-04	0.0008	3.227E-05	0.0014
Th-229	3.175E-18	0.0000	1.738E-19	0.0000	3.587E-20	0.0000	9.701E-23	0.0000	7.204E-24	0.0000	1.017E-20	0.0000
U-233	8.021E-19	0.0000	9.301E-17	0.0000	3.843E-17	0.0000	1.835E-19	0.0000	3.009E-18	0.0000	8.413E-18	0.0000
Total	1.502E-03	0.0053	5.474E-06	0.0002	2.078E-02	0.9033	5.209E-04	0.0229	1.507E-04	0.0008	3.292E-05	0.0014

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

	Water		Fish		Plant		Meat		Milk		All Pathways**	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.810E-06	0.0003
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.501E-10	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.300E-02	0.9997
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.401E-18	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.370E-16	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.300E-02	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.110E-06	0.0000	3.021E-06	0.0002	0.000E+00	0.0000	1.420E-06	0.0001	1.836E-09	0.0000	1.047E-10	0.0000	6.572E-07	0.00
Sr-90	1.500E-03	0.0652	1.854E-06	0.0001	0.000E+00	0.0000	2.078E-02	0.9033	5.269E-04	0.0229	1.567E-04	0.0068	3.227E-05	0.00
Total	1.502E-03	0.0653	5.474E-06	0.0002	0.000E+00	0.0000	2.078E-02	0.9033	5.269E-04	0.0229	1.567E-04	0.0068	3.292E-05	0.00

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.810E-06	0.00
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.300E-02	0.99
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.300E-02	1.00

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	2.897E+00	1.389E+02	1.795E-01	1.024E-02	6.428E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.034E+02
Np-237	2.979E-05	2.747E-02	1.107E-04	7.329E-07	6.391E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.822E-02
Sr-90	5.582E+02	7.683E+06	1.948E+05	5.793E+04	1.193E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.948E+06
Th-229	1.868E-12	8.733E-11	2.297E-13	1.082E-14	4.000E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.270E-10
U-233	1.971E-09	2.317E-07	9.901E-10	2.353E-09	4.227E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.774E-07

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.075E-06	0.0001	3.500E-06	0.0002	1.375E-06	0.0001	1.777E-09	0.0000	1.014E-10	0.0000	6.304E-07	0.0000
Np-237	1.042E-09	0.0000	3.128E-11	0.0000	2.472E-10	0.0000	1.050E-12	0.0000	6.500E-15	0.0000	5.752E-12	0.0000
Sr-90	9.321E-04	0.0652	1.151E-06	0.0001	1.291E-02	0.9031	3.273E-04	0.0229	9.732E-05	0.0068	2.004E-05	0.0014
Th-229	8.490E-17	0.0000	4.050E-18	0.0000	9.431E-19	0.0000	2.480E-21	0.0000	1.704E-22	0.0000	4.320E-19	0.0000
U-233	5.358E-16	0.0000	8.277E-16	0.0000	3.128E-16	0.0000	1.337E-18	0.0000	3.170E-18	0.0000	5.707E-17	0.0000
Total	9.332E-04	0.0653	4.658E-06	0.0003	1.291E-02	0.9032	3.273E-04	0.0229	9.732E-05	0.0068	2.008E-05	0.0014

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.595E-06	0.0005
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.328E-09	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.420E-02	0.9995
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.098E-17	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.208E-15	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.429E-02	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	1.070E-06	0.0001	3.500E-06	0.0002	0.000E+00	0.0000	1.376E-06	0.0001	1.770E-09	0.0000	1.014E-10	0.0000	6.364E-07	0.0000
Sr-90	9.321E-04	0.0002	1.161E-06	0.0001	0.000E+00	0.0000	1.291E-02	0.9031	3.273E-04	0.0229	9.732E-05	0.0068	2.004E-05	0.0014
Total	9.332E-04	0.0003	4.660E-06	0.0003	0.000E+00	0.0000	1.291E-02	0.9032	3.273E-04	0.0229	9.732E-05	0.0068	2.068E-05	0.0014

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.596E-06	0.0005
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.429E-02	0.9995
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.429E-02	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	2.679E+00	1.242E+02	1.004E-01	9.154E-03	5.740E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.818E+02
Np-237	9.388E-05	8.636E-02	3.009E-04	2.304E-06	2.009E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.874E-02
Sr-90	1.051E+02	1.452E+06	3.881E+04	1.095E+04	2.254E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.502E+06
Th-229	6.706E-11	3.117E-09	8.090E-12	5.799E-13	1.438E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.564E-09
U-233	2.106E-08	2.445E-06	1.025E-08	2.489E-08	4.517E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.932E-06

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	9.605E-07	0.0004	3.134E-06	0.0012	1.229E-06	0.0005	1.588E-09	0.0000	9.062E-11	0.0000	5.688E-07	0.0002
Np-237	3.277E-09	0.0000	9.837E-11	0.0000	7.773E-10	0.0000	3.302E-12	0.0000	2.074E-14	0.0000	1.809E-11	0.0000
Sr-90	1.761E-04	0.0651	2.176E-07	0.0001	2.439E-03	0.9016	6.185E-05	0.0229	1.839E-05	0.0068	3.787E-06	0.0014
Th-229	3.050E-15	0.0000	1.670E-16	0.0000	3.366E-17	0.0000	8.744E-20	0.0000	6.263E-21	0.0000	1.553E-17	0.0000
U-233	5.725E-17	0.0000	8.844E-15	0.0000	3.300E-15	0.0000	1.384E-17	0.0000	3.361E-17	0.0000	6.098E-16	0.0000
Total	1.771E-04	0.0655	3.352E-06	0.0012	2.440E-03	0.9020	6.185E-05	0.0229	1.839E-05	0.0068	4.356E-06	0.0016

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.894E-06	0.0022
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.174E-09	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.699E-03	0.9978
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.207E-15	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.286E-14	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.705E-03	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Am-241	8.038E-07	0.0004	3.134E-06	0.0012	0.000E+00	0.0000	1.230E-06	0.0005	1.592E-09	0.0000	9.064E-11	0.0000	5.688E-07	0.0002
Sr-90	1.761E-04	0.0651	2.176E-07	0.0001	0.000E+00	0.0000	2.438E-03	0.9016	6.185E-05	0.0229	1.839E-05	0.0068	3.787E-06	0.0014
Total	1.771E-04	0.0655	3.352E-06	0.0012	0.000E+00	0.0000	2.440E-03	0.9020	6.185E-05	0.0229	1.839E-05	0.0068	4.356E-06	0.0016

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.898E-06	0.0022
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.699E-03	0.9978
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.705E-03	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	1.943E+00	9.009E+01	1.104E-01	8.842E-03	4.109E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.31[illegible]E+02
Np-237	2.391E-04	2.204E-01	9.384E-04	5.881E-00	5.129E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.20[illegible]E-01
Sr-90	8.995E-01	1.242E+04	3.151E+02	9.368E+01	1.929E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.28[illegible]E+04
Th-229	1.881E-09	7.705E-08	1.995E-10	1.425E-11	3.582E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.12[illegible]E-07
U-233	1.701E-07	1.987E-05	8.204E-08	2.005E-07	3.048E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.30[illegible]E-05

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	6.909E-07	0.0254	2.274E-06	0.0830	8.019E-07	0.0320	1.152E-09	0.0000	6.575E-11	0.0000	4.127E-07	0.0151
Np-237	8.388E-09	0.0003	2.511E-10	0.0000	1.984E-09	0.0001	8.428E-12	0.0000	5.293E-14	0.0000	4.818E-11	0.0000
Sr-90	1.507E-06	0.0550	1.802E-09	0.0001	2.087E-05	0.7021	5.293E-07	0.0193	1.574E-07	0.0057	3.241E-08	0.0012
Th-229	7.555E-14	0.0000	4.135E-15	0.0000	8.322E-18	0.0000	2.154E-18	0.0000	1.539E-19	0.0000	3.847E-18	0.0000
U-233	4.024E-10	0.0000	7.144E-14	0.0000	2.050E-14	0.0000	1.108E-16	0.0000	2.707E-18	0.0000	4.925E-15	0.0000
Total	2.213E-06	0.0808	2.276E-06	0.0831	2.177E-05	0.7947	5.305E-07	0.0194	1.574E-07	0.0057	4.452E-07	0.0163

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.277E-06	0.1562
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.000E-08	0.0004
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.310E-05	0.8435
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.090E-14	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.038E-13	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.739E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	7.053E-07	0.0258	2.274E-08	0.0830	0.000E+00	0.0000	8.838E-07	0.0320	1.101E-09	0.0000	6.581E-11	0.0000	4.127E-07	0.0151
Sr-90	1.507E-08	0.0550	1.802E-09	0.0001	0.000E+00	0.0000	2.087E-05	0.7621	5.293E-07	0.0193	1.574E-07	0.0057	3.241E-08	0.0012
Total	7.213E-08	0.0808	2.276E-08	0.0831	0.000E+00	0.0000	2.177E-05	0.7947	5.305E-07	0.0194	1.574E-07	0.0057	4.452E-07	0.0163

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.287E-06	0.1565
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.310E-05	0.8435
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.738E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	6.323E-01	2.931E+01	3.787E-02	2.101E-03	1.358E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.291E+01
Np-237	4.803E-04	4.427E-01	1.881E-03	1.181E-05	1.030E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.549E-01
Sr-90	5.210E-08	7.205E-04	1.827E-05	5.432E-06	1.119E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.453E-04
Th-229	4.681E-08	2.161E-06	5.588E-09	3.987E-10	9.898E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.107E-06
U-233	1.344E-08	1.553E-04	6.464E-07	1.583E-06	2.884E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.864E-04

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	2.267E-07	0.1605	7.398E-07	0.5237	2.902E-07	0.2054	3.750E-10	0.0003	2.139E-11	0.0000	1.343E-07	0.0950
Np-237	1.680E-08	0.0119	5.043E-10	0.0004	3.985E-09	0.0028	1.693E-11	0.0000	1.063E-13	0.0000	9.271E-11	0.0001
Sr-90	8.740E-14	0.0000	1.080E-18	0.0000	1.210E-12	0.0000	3.070E-14	0.0000	9.120E-15	0.0000	1.880E-15	0.0000
Th-229	2.120E-12	0.0000	1.161E-13	0.0000	2.334E-14	0.0000	6.035E-17	0.0000	4.306E-18	0.0000	1.080E-14	0.0000
U-233	3.055E-15	0.0000	5.648E-13	0.0000	2.097E-13	0.0000	8.726E-16	0.0000	2.137E-15	0.0000	3.893E-14	0.0000
Total	2.435E-07	0.1724	7.403E-07	0.5240	2.942E-07	0.2082	3.919E-10	0.0003	2.151E-11	0.0000	1.344E-07	0.0951

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.391E-06	0.9848
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.140E-08	0.0151
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.340E-12	0.0000
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.271E-12	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.199E-13	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.413E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	2.435E-07	0.1724	7.403E-07	0.5240	0.000E+00	0.0000	2.942E-07	0.2082	3.919E-10	0.0003	2.150E-11	0.0000	1.344E-07	0.0951
Sr-90	8.740E-14	0.0000	1.080E-10	0.0000	0.000E+00	0.0000	1.210E-12	0.0000	3.070E-14	0.0000	9.126E-16	0.0000	1.880E-15	0.0000
Total	2.435E-07	0.1724	7.403E-07	0.5240	0.000E+00	0.0000	2.942E-07	0.2082	3.919E-10	0.0003	2.151E-11	0.0000	1.344E-07	0.0951

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.413E-06	1.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.340E-12	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.413E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

SECTION C-5 RESRAD SUMMARY REPORT FOR THE SITE-WIDE FUTURE RECREATIONAL SCENARIO

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Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Am-241	4.440E-01	4.440E-01	DCF2(1)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(2)
B-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(3)
B-1	Th-229+D	2.160E+00	2.160E+00	DCF2(4)
B-1	U-233	1.350E-01	1.350E-01	DCF2(5)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Am-241	3.640E-03	3.640E-03	DCF3(1)
D-1	Np-237+D	4.440E-03	4.440E-03	DCF3(2)
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(3)
D-1	Th-229+D	4.030E-03	4.030E-03	DCF3(4)
D-1	U-233	2.890E-04	2.890E-04	DCF3(5)
D-34	Food transfer factors:			
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(1,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(1,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(1,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(2,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(3,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(3,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(3,3)
D-34				
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(5,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(5,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(5,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(1,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(2,2)
D-5				
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(3,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)
D-5				
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(5,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(5,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.300E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E-03	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	5.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	5.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	5.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	1.000E+04	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Am-241	1.500E+01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Sr-90	6.322E+03	0.000E+00	---	S1(3)
R012	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(3)
R013	Cover depth (m)	3.300E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	1.800E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.800E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone effective porosity	2.000E-01	2.000E-01	---	EPCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	4.400E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Humidity in air (g/cm**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.990E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	4.800E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.200E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	2.700E+07	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.800E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	3.000E-01	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	2	1	---	NS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Unsat. zone 1, thickness (m)	2.000E+02	4.000E+00	---	H(1)
R016	Unsat. zone 1, soil density (g/cm**3)	1.600E+00	1.500E+00	---	DENSUZ(1)
R016	Unsat. zone 1, total porosity	5.000E-01	4.000E-01	---	TPUZ(1)
R016	Unsat. zone 1, effective porosity	4.000E-01	2.000E-01	---	EPUZ(1)
R016	Unsat. zone 1, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(1)
R016	Unsat. zone 1, hydraulic conductivity (m/yr)	3.000E+00	1.000E+01	---	HCUZ(1)
R016	Unsat. zone 2, thickness (m)	1.000E+02	0.000E+00	---	H(2)
R016	Unsat. zone 2, soil density (g/cm**3)	1.600E+00	1.500E+00	---	DENSUZ(2)
R016	Unsat. zone 2, total porosity	5.000E-01	4.000E-01	---	TPUZ(2)
R016	Unsat. zone 2, effective porosity	4.000E-01	2.000E-01	---	EPUZ(2)
R016	Unsat. zone 2, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(2)
R016	Unsat. zone 2, hydraulic conductivity (m/yr)	3.700E+02	1.000E+01	---	HCUZ(2)
R010	Distribution coefficients for Am-241				
R010	Contaminated zone (cm**3/g)	1.300E+02	2.000E+01	---	DCNUCC(1)
R010	Unsaturated zone 1 (cm**3/g)	1.300E+02	2.000E+01	---	DCNUCU(1,1)
R010	Unsaturated zone 2 (cm**3/g)	1.300E+02	2.000E+01	---	DCNUCU(1,2)
R010	Saturated zone (cm**3/g)	0.000E+00	2.000E+01	---	DCNUCS(1)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	3.355E-07	ALEACH(1)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R010	Distribution coefficients for Sr-90				
R010	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(3)
R010	Unsaturated zone 1 (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCU(3,1)
R010	Unsaturated zone 2 (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCU(3,2)
R010	Saturated zone (cm**3/g)	0.000E+00	3.000E+01	---	DCNUCS(3)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	1.210E-06	ALEACH(3)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R010	Distribution coefficients for daughter Np-237				
R010	Contaminated zone (cm**3/g)	3.950E-01	-1.000E+00	---	DCNUCC(2)
R010	Unsaturated zone 1 (cm**3/g)	3.950E-01	-1.000E+00	---	DCNUCU(2,1)
R010	Unsaturated zone 2 (cm**3/g)	3.950E-01	-1.000E+00	---	DCNUCU(2,2)
R010	Saturated zone (cm**3/g)	0.000E+00	-1.000E+00	---	DCNUCS(2)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	9.426E-05	ALEACH(2)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R010	Distribution coefficients for daughter Th-229				
R010	Contaminated zone (cm**3/g)	5.000E+02	6.000E+04	---	DCNUCC(4)
R010	Unsaturated zone 1 (cm**3/g)	5.000E+02	6.000E+04	---	DCNUCU(4,1)
R010	Unsaturated zone 2 (cm**3/g)	5.000E+02	6.000E+04	---	DCNUCU(4,2)
R010	Saturated zone (cm**3/g)	0.000E+00	6.000E+04	---	DCNUCS(4)
R010	Leach rate (/yr)	0.000E+00	0.000E+00	8.726E-08	ALEACH(4)
R010	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	7.290E+00	5.000E+01	---	DCHUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	7.290E+00	5.000E+01	---	DCHUCU(5,1)
R016	Unsaturated zone 2 (cm**3/g)	7.290E+00	5.000E+01	---	DCHUCU(5,2)
R016	Saturated zone (cm**3/g)	0.000E+00	5.000E+01	---	DCHUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.930E-00	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	9.000E-05	2.000E-04	---	MLINH
R017	Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	---	LM
R017	Exposure duration	2.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	7.700E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	1 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	4.000E+00	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	0.000E+00	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.000E+00	FPLANT
R018	Contamination fraction of meat	5.000E-01	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	1.000E+00	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	4.000E+00	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	not used	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	not used	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	not used	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average annual wind speed (m/sec)	not used	2.000E+00	---	WIND
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed

Contaminated Zone Dimensions

Area: 10000.00 square meters
Thickness: 3.30 meters
Cover Depth: 3.30 meters

Initial Soil Concentrations, pCi/g

Am-241	1.500E+01
Sr-90	6.322E+03

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
TDOSE(t):	1.142E+02	1.142E+02	1.117E+02	9.132E+01	3.724E+01	1.209E+01	1.612E-02	9.513E-03	7.294E-04	0.000E+00
M(t):	7.615E+00	7.615E+00	7.447E+00	6.088E+00	2.483E+00	8.063E-01	1.074E-03	6.342E-04	4.863E-05	0.000E+00

Maximum TDOSE(t): 1.142E+02 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		S[illegible]	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/y[illegible]	fra[illegible]
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.911E-02	0.0002	1.504E-05	0.0000	0.000E+00	0.0000	0.000E+[illegible]0	0.0[illegible]
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.015E+02	0.8883	1.274E+01	0.1110	0.000E+00	0.0000	0.000E+[illegible]0	0.0[illegible]
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.015E+02	0.8884	1.274E+01	0.1110	0.000E+00	0.0000	0.000E+[illegible]0	0.0[illegible]

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All P[illegible]thway[illegible]	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/y[illegible]	fra[illegible]
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.912E-[illegible]2	0.0[illegible]
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E+[illegible]2	0.9[illegible]
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E+[illegible]2	1.0[illegible]

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E-03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.911E-02	0.0002	1.504E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.015E+02	0.8883	1.274E+01	0.1116	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.015E+02	0.8884	1.274E+01	0.1116	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E-03 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.912E-02	0.0002
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E+02	0.9998
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E+02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.911E-02	0.0002	1.504E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.922E+01	0.8883	1.240E+01	0.1110	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.924E+01	0.8884	1.240E+01	0.1110	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.912E-02	0.0002
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.117E+02	0.9998
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.117E+02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.907E-02	0.0002	1.504E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.112E+01	0.8882	1.019E+01	0.1115	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.114E+01	0.8885	1.019E+01	0.1115	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.909E-02	0.0002
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.131E+01	0.9998
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.132E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.890E-02	0.0005	1.500E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.307E+01	0.8880	4.153E+00	0.1115	0.000E+00	0.0000	0.000E+00	0.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.309E+01	0.8885	4.153E+00	0.1115	0.000E+00	0.0000	0.000E+00	0.000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.892E-02	0.000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.722E+01	0.990
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.724E+01	1.000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.802E-02	0.0015	1.490E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.073E+01	0.8871	1.347E+00	0.1114	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.075E+01	0.8886	1.347E+00	0.1114	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.803E-02	0.0015
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.208E+01	0.9985
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.209E+01	1.0000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	1.494E-28	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.478E-02	0.9169	1.293E-05	0.0008	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.179E-03	0.0731	1.480E-04	0.0092	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.494E-28	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.595E-02	0.9900	1.609E-04	0.0100	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.479E-02	0.9177
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.327E-03	0.0823
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.612E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	3.955E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.503E-03	0.9989	1.000E-05	0.0011	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.131E-08	0.0000	1.421E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	3.955E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.503E-03	0.9989	1.000E-05	0.0011	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.513E-03	1.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.273E-08	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.513E-03	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	1.780E-04	0.2441	1.019E-04	0.2220	0.000E+00	0.0000	1.571E-04	0.2154	1.567E-04	0.2149	0.000E+00	0.0000	7.559E-05	0.10
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.00
Total	1.780E-04	0.2441	1.019E-04	0.2220	0.000E+00	0.0000	1.571E-04	0.2154	1.567E-04	0.2149	0.000E+00	0.0000	7.559E-05	0.10

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways mrem/yr	All Pathways fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.294E-0	1.000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+0	0.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.294E-0	1.000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

DSR(j,t) (mrem/yr)/(pCi/g)

Parent (i)	Product (j)	Branch Fraction	t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Am-241	Am-241	1.000E+00	1.275E-03	1.275E-03	1.275E-03	1.273E-03	1.261E-03	1.241E-03	9.800E-04	6.220E-04	1.351E-05	0.000E+00
Am-241	Np-237	1.000E+00	0.000E+00	3.052E-11	1.025E-08	1.029E-07	5.252E-07	1.074E-06	5.809E-06	1.180E-05	3.493E-05	0.000E+00
Am-241	U-233	1.000E+00	0.000E+00	1.800E-22	2.940E-16	1.931E-14	4.747E-13	1.957E-12	5.905E-11	2.834E-10	2.978E-08	0.000E+00
Am-241	Th-229	1.000E+00	0.000E+00	0.000E+00	3.577E-20	3.274E-17	4.148E-15	3.452E-14	5.447E-12	5.077E-11	1.470E-07	0.000E+00
Am-241	dDSR(j)		1.275E-03	1.275E-03	1.275E-03	1.273E-03	1.261E-03	1.242E-03	9.859E-04	6.342E-04	4.863E-05	0.000E+00
Sr-90	Sr-90	1.000E+00	1.807E-02	1.807E-02	1.767E-02	1.444E-02	5.887E-03	1.910E-03	2.098E-07	2.014E-12	0.000E+00	0.000E+00

Branch Fraction is the cumulative factor for the j'th principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j)
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 15 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Am-241	1.177E+04	1.177E+04	1.177E+04	1.179E+04	1.189E+04	1.208E+04	1.521E+04	2.365E+04	3.085E+05	*3.430E+12
Sr-90	8.303E+02	8.303E+02	8.491E+02	1.039E+03	2.548E+03	7.853E+03	7.148E+07	7.447E+12	*1.305E+14	*1.305E+14

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Am-241	1.500E+01	0.000E+00	1.275E-03	1.177E+04	1.275E-03	1.177E+04
Sr-90	8.322E+03	0.000E+00	1.807E-02	8.303E+02	1.807E-02	8.303E+02

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Am-241	Am-241	1.000E+00	1.912E-02	1.912E-02	1.912E-02	1.909E-02	1.891E-02	1.862E-02	1.470E-02	9.338E-03	2.027E-04	0.000E+00
Np-237	Am-241	1.000E+00	0.000E+00	4.577E-10	1.538E-07	1.543E-06	7.877E-06	1.612E-05	8.803E-05	1.749E-04	5.240E-04	0.000E+00
U-233	Am-241	1.000E+00	0.000E+00	2.700E-21	4.419E-15	2.896E-13	7.120E-12	2.938E-11	8.858E-10	3.950E-09	4.467E-07	0.000E+00
Th-229	Am-241	1.000E+00	0.000E+00	0.000E+00	5.300E-19	4.911E-16	6.223E-14	5.178E-13	8.171E-11	7.615E-10	2.214E-06	0.000E+00
Sr-90	Sr-90	1.000E+00	1.142E+02	1.142E+02	1.117E+02	9.131E+01	3.722E+01	1.208E+01	1.327E-03	1.273E-08	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Am-241	Am-241	1.000E+00	1.500E+01	1.500E+01	1.498E+01	1.478E+01	1.384E+01	1.278E+01	6.726E+00	3.016E+00	4.830E-03	1.620E-06
Np-237	Am-241	1.000E+00	0.000E+00	4.858E-09	4.854E-06	4.817E-05	2.329E-04	4.487E-04	1.627E-03	2.281E-03	2.005E-03	1.250E-03
U-233	Am-241	1.000E+00	0.000E+00	1.082E-17	1.082E-11	1.050E-09	2.582E-08	1.004E-07	2.030E-06	6.395E-06	4.616E-05	7.783E-05
Th-229	Am-241	1.000E+00	0.000E+00	0.000E+00	2.824E-16	3.320E-13	4.087E-11	3.198E-10	3.372E-08	2.219E-07	6.089E-06	3.002E-05
Sr-90	Sr-90	1.000E+00	6.322E+03	6.322E+03	6.173E+03	4.983E+03	1.923E+03	5.849E+02	4.284E-02	2.902E-07	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

TA-10-003(a-o) and 10-007

FUTURE RECREATIONAL SCENARIO

HEALTH RISK REPORT

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Part III: Intake Quantities and Health Risk Factors
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Cancer Risk Slope Factors Summary Table
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Am-241	4.00E-09	4.00E-09	SLPF(1,1)
Sf-1	Np-237+D	4.00E-07	4.00E-07	SLPF(2,1)
Sf-1	Sr-90+D	1.90E-08	1.90E-08*	SLPF(3,1)
Sf-1	Th-229+D	6.00E-07	6.00E-07	SLPF(4,1)
Sf-1	U-233	3.50E-11	3.50E-11	SLPF(5,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Am-241	3.90E-08	3.90E-08	SLPF(1,2)
Sf-2	Np-237+D	3.50E-08	3.50E-08	SLPF(2,2)
Sf-2	Sr-90+D	6.90E-11	6.90E-11	SLPF(3,2)
Sf-2	Th-229+D	8.30E-08	8.30E-08	SLPF(4,2)
Sf-2	U-233	1.40E-08	1.40E-08	SLPF(5,2)
Sf-3	Ingestion, slope factors, 1/(pCi):			
Sf-3	Am-241	3.30E-10	3.30E-10	SLPF(1,3)
Sf-3	Np-237+D	3.00E-10	3.00E-10	SLPF(2,3)
Sf-3	Sr-90+D	5.60E-11	5.60E-11	SLPF(3,3)
Sf-3	Th-229+D	3.00E-10	3.00E-10	SLPF(4,3)
Sf-3	U-233	4.50E-11	4.50E-11	SLPF(5,3)

Note: Default values followed by '*' were derived by multiplying the dose conversion factors with 7.0E-7 (risk/mrem). For external radiation, the dose conversion factors used for this derivation were obtained from the EPA's Federal Guidance Report No.12, and for inhalation and ingestion, the dose conversion factors were the ones used in RESRAD default database.

Default values followed by '$' were obtained from 'Estimating Radiogenic Cancer Risks', EPA 402-R-93-076, June, 1994.

Default values followed by '#' were taken from individual radionuclides given in HEAST.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon): Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways: Water	Fish	Plant	Meat	Milk	Total Ingestion*
Am-241	0.000E+00	5.250E+00	4.133E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.2[illegible]E+0[illegible]
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+0[illegible]
Sr-90	0.000E+00	6.632E+05	8.329E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.4[illegible]5E+0[illegible]
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+0[illegible]
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+0[illegible]

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	3.405E-08	0.0000	2.728E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	7.428E-04	0.8884	9.328E-05	0.1110	0.000E+00	0.0000	0.000E+00	0.0000
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	7.428E-04	0.8884	9.328E-05	0.1110	0.000E+00	0.0000	0.000E+00	0.0000

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.408E-08	0.0000
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.301E-04	1.0000
Th-229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.301E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil f
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.405E-08	0.0000	2.728E-11	0.0000	0.000E+00	0.0000	0.000E+00	0
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.428E-04	0.8884	9.328E-05	0.1110	0.000E+00	0.0000	0.000E+00	0
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.428E-04	0.8884	9.328E-05	0.1110	0.000E+00	0.0000	0.000E+00	0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathw risk	All pathw f
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.408E-08	0
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.301E-04	1
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.301E-04	1

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

TA-10-003(a-o) and 10-007

FUTURE RECREATIONAL SCENARIO

SURFACE COMPONENT

RESRAD SUMMARY REPORT

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Part I: Mixture Sums and Single Radionuclide Guidelines
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Dose Conversion Factor (and Related) Parameter Summary
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
D-1	Dose conversion factors for inhalation, mrem/pCi:			
D-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(1)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(1)
D-34	Food transfer factors:			
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(1,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(1,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(1,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.000E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E-03	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	5.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	5.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	5.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	1.000E+04	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Sr-90	9.400E+01	0.000E+00	---	S1(1)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(1)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.000E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone effective porosity	2.000E-01	2.000E-01	---	EPCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	4.400E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Humidity in air (g/cm**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.900E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	4.800E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.200E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	3.000E-01	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R018	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R018	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R018	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R018	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R018	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R018	Unsat. zone 2, thickness (m)	not used	0.000E+00	---	H(2)
R018	Unsat. zone 2, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(2)
R018	Unsat. zone 2, total porosity	not used	4.000E-01	---	TPUZ(2)
R018	Unsat. zone 2, effective porosity	not used	2.000E-01	---	EPUZ(2)
R018	Unsat. zone 2, soil-specific b parameter	not used	5.300E+00	---	BUZ(2)
R018	Unsat. zone 2, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(2)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	3.000E+01	---	DCNUCU(1,1)
R016	Unsaturated zone 2 (cm**3/g)	not used	3.000E+01	---	DCNUCU(1,2)
R016	Saturated zone (cm**3/g)	not used	3.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.331E-05	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	8.000E-05	2.000E-04	---	MLINH
R017	Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	---	LM
R017	Exposure duration	2.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	7.700E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	1 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	not used	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	not used	1.000E+00	---	STOR_T(2)
STOR	Milk	not used	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	not used	2.000E+01	---	STOR_T(4)
STOR	Fish	not used	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	not used	7.000E+00	---	STOR_T(6)
STOR	Well water	not used	1.000E+00	---	STOR_T(7)
STOR	Surface water	not used	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	not used	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average annual wind speed (m/sec)	not used	2.000E+00	---	WIND
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	active
9 -- radon	suppressed

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Sr-90	8.400E+01
Thickness:	0.30 meters		
Cover Depth:	0.00 meters		

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
TDOSE(t):	1.525E-01	1.525E-01	1.489E-01	1.201E-01	4.619E-02	1.391E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00
M(t):	1.017E-02	1.017E-02	9.928E-03	8.009E-03	3.079E-03	9.271E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Maximum TDOSE(t): 1.525E-01 mrem/yr   at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	1.209E-01	0.7928	4.118E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.752E-02	0.180
Total	1.209E-01	0.7928	4.118E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.752E-02	0.180

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.525E-01	1.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.525E-01	1.000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E-03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	1.209E-01	0.7920	4.118E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.752E-02	0.18[illegible]
Total	1.209E-01	0.7920	4.118E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.752E-02	0.1[illegible]

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E-03 years

Water Dependent Pathways

Radio- Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.525E-01	1.00[illegible]
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.525E-01	1.00[illegible]

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	1.100E-01	0.7026	4.021E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.687E-02	0.180
Total	1.100E-01	0.7026	4.021E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.687E-02	0.180

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.489E-01	1.000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.489E-01	1.000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract
Sr-90	9.521E-02	0.7925	3.245E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.109E-02	0.18
Total	9.521E-02	0.7925	3.245E-03	0.0270	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.109E-02	0.18

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.201E-0	1.00
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.201E-0	1.00

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	3.658E-02	0.7918	1.252E-03	0.0271	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.365E-03	0.1811
Total	3.658E-02	0.7918	1.252E-03	0.0271	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.365E-03	0.1811

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+01 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.619E-02	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.619E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	1.098E-02	0.7898	3.805E-04	0.0274	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.543E-03	0.1829
Total	1.098E-02	0.7898	3.805E-04	0.0274	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.543E-03	0.1829

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.391E-02	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.391E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 5.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Branch Fraction	DSR(j,t) (mrem/yr)/(pCi/g) t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Sr-90	Sr-90	1.000E+00	2.383E-03	2.383E-03	2.327E-03	1.877E-03	7.218E-04	2.173E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Branch Fraction is the cumulative factor for the j'th principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life   0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 15 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Sr-90	6.294E+03	6.294E+03	6.446E+03	7.991E+03	2.078E+04	6.903E+04	*1.365E+14	*1.365E+14	*1.365E+14	*1.365E+14

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Sr-90	6.400E+01	0.000E+00	2.383E-03	6.294E+03	2.383E-03	6.294E+03

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

DOSE(j,t), mrem/yr

Nuclide (j)	Parent (i)	BRF(i)	t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Sr-90	Sr-90	1.000E+00	1.525E-01	1.525E-01	1.489E-01	1.201E-01	4.019E-02	1.391E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

S(j,t), pCi/g

Nuclide (j)	Parent (i)	BRF(i)	t= 0.000E+00	1.000E-03	1.000E+00	1.000E+01	5.000E+01	1.000E+02	5.000E+02	1.000E+03	5.000E+03	1.000E+04
Sr-90	Sr-90	1.000E+00	6.400E+01	6.400E+01	6.249E+01	5.044E+01	1.845E+01	5.814E+00	4.310E-04	2.903E-09	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

TA-10-003(a-o) and 10-007

FUTURE RECREATIONAL SCENARIO

SURFACE COMPONENT

HEALTH RISK REPORT

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Part III: Intake Quantities and Health Risk Factors
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Cancer Risk Slope Factors Summary Table
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Sr-90+D	1.00E-08	1.90E-08*	SLPF(1,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Sr-90+D	6.00E-11	6.00E-11	SLPF(1,2)
Sf-3	Ingestion, slope factors, 1/(pCi):			
Sf-3	Sr-90+D	5.00E-11	5.00E-11	SLPF(1,3)

Note: Default values followed by '*' were derived by multiplying the dose conversion factors with 7.3E-7 (risk/mrem). For external radiation, the dose conversion factors used for this derivation were obtained from the EPA's Federal Guidance Report No.12, and for inhalation and ingestion, the dose conversion factors were the ones used in RESRAD default database.

Default values followed by '$' were obtained from 'Estimating Radiogenic Cancer Risks', EPA 402-R-93-076, June, 1994.

Default values followed by '#' were taken from individual radionuclides given in HEAST.

Amount of Intake Quantities QIHT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon) Inhalation	Plant	Meat	Milk	Soil	Water Dependent Pathways Water	Fish	Plant	Meat	Milk	Total Ingestion*
Sr-90	3.143E+00	0.000E+00	0.000E+00	0.000E+00	1.799E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.799E+

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Sr-90	1.807E-06	0.9007	4.338E-09	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.015E-07	0.0972
Total	1.807E-06	0.9007	4.338E-09	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.015E-07	0.0972

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.073E-06	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.073E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract
Sr-90	1.807E-06	0.9007	4.338E-09	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.015E-07	0.097
Total	1.807E-06	0.9007	4.338E-09	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.015E-07	0.097

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.073E-06	1.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.073E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides