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Date: September 8, 1995
Refer to: EM/ER:95-471

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SUBJECT: SUBMITTAL OF THE RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION (RFI) REPORT FOR TECHNICAL AREA (TA) 10, SOLID WASTE MANAGEMENT UNITS (SWMUs) 10-001(a,b,c,d)

Dear Mr. Honker:

Enclosed are two copies of the Los Alamos National Laboratory's RFI Report concerning TA-10, SWMUs 10-001(a,b,c,d). The report documents the field work performed as detailed in the approved RFI Work Plan for Operable Unit 1079 and the results of the sampling.

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,

Jorg Jansen, Program Manager
Environmental Restoration

Sincerely,

Theodore J. Taylor, Program Manager
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JJ/TT/rfr

Enclosures: Two Copies of RFI Report for TA-10

Environmental Restoration

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CERTIFICATION

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.

Document Title: The Resource Conservation And Recovery Act Facility Investigation Report For Technical Area 10, Solid Waste Management Units 10-001(a,b,c,d)

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RFI Report for

Solid Waste Management Units

10-001(a-d)

Field Unit 1

Environmental Restoration Project

Los Alamos
National Laboratory

September 5, 1995

A Department of Energy

Environmental Cleanup Program

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EXECUTIVE SUMMARY

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report describes the Phase I investigation performed at Technical Area (TA) 10, solid waste management units (SWMUs) 10-001(a-d).

TA-10, located in Bayo Canyon and also referred to as Bayo Site, was used from 1943 to 1961 as a firing site to conduct experiments using high explosives (HE) in conjunction with nuclear weapons research. TA-10 was constructed to test assemblies containing conventional HE and components made from depleted or natural uranium. The site consisted of firing pads, control buildings, battery buildings, and associated structures.

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

TA-10 was released to Los Alamos County in 1967 and remains under DOE administrative control. Portions of Bayo Canyon are currently open to the public for recreational use.

The RFI Work Plan for Operable Unit 1079 identifies the following as chemicals of potential concern (COPCs) at TA-10 firing sites: HE, lead, beryllium, barium, uranium, and strontium-90 (LANL 1992, 0783). Other COPCs that may have been dispersed by the explosives testing are semivolatile organic compounds (SVOCs).

The objective of the Phase I investigation associated with the SWMUs 10-001(a-d) was to determine if residual RCRA chemicals, particularly barium, beryllium, or lead exist in surficial deposits in the vicinity of the firing pads and to confirm there were no human health or ecological risks associated with the radiological constituents found in previous investigations. Earlier surface soil investigations indicated the presence of strontium-90 and uranium as the only residual radiological constituents from former firing site activities, according to the Formerly Utilized Manhattan Engineer District Atomic Energy Commission Sites Remedial Action Program (FUSRAP) Report. These earlier investigations suggested there were no unacceptable health risks from this radiological contamination (LANL 1992, 0783; Mayfield et al. 1979, 0818).

Results of the Phase I investigation indicate there are no COPCs present at concentrations that present a human health risk; therefore, SWMUs 10-001(a-d) are recommended for no further action (NFA).

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1.0 INTRODUCTION

This report presents results of the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at former Technical Area (TA) 10, solid waste management units (SWMUs) 10-001(a-d) at Los Alamos National Laboratory (LANL) (Fig. 1-1). Included in this report are the data assessment and analysis approach used in this investigation, and the site-specific results, conclusions, and recommendations for SWMUs 10-001(a-d).

1.1 Facility Background

TA-10, also referred to as Bayo Site, was located in Bayo Canyon between Kwage Mesa to the south and Otowi Mesa to the north (Fig. 1-2). TA-10 was used from 1943 to 1961 as a firing site to conduct experiments using high explosives (HE) 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.

TA-10 was constructed to test assemblies containing conventional HE and components made from depleted or natural uranium. The assemblies were loaded with a lanthanum-140 source of several hundred to several thousand curies for blast diagnostics. The lanthanum-140 (half-life 40.3 hr) was contaminated with a small amount of strontium-90 (half-life 28.8 yrs). The explosives detonations at TA-10 resulted in dispersion of radioactive materials, including uranium, lanthanum-140, and strontium-90, in the forms of aerosols and solid debris.

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

TA-10 was released to Los Alamos County in 1967 and remains under Department of Energy (DOE) administrative control. Portions of Bayo Canyon are currently open to the public for recreational use.

The specific areas under investigation for this report are the former firing sites' shot pads and the surrounding surface area comprising SWMUs 10-001(a-d). Each firing site contained a shot pad, a battery building, and a fire control building (Fig. 1-3).

The chemicals of potential concern (COPCs) at the firing sites are HE, uranium, strontium-90, lead, beryllium, and barium. Other COPCs that may have been dispersed by the explosives testing are semivolatile organic compounds (SVOCs).

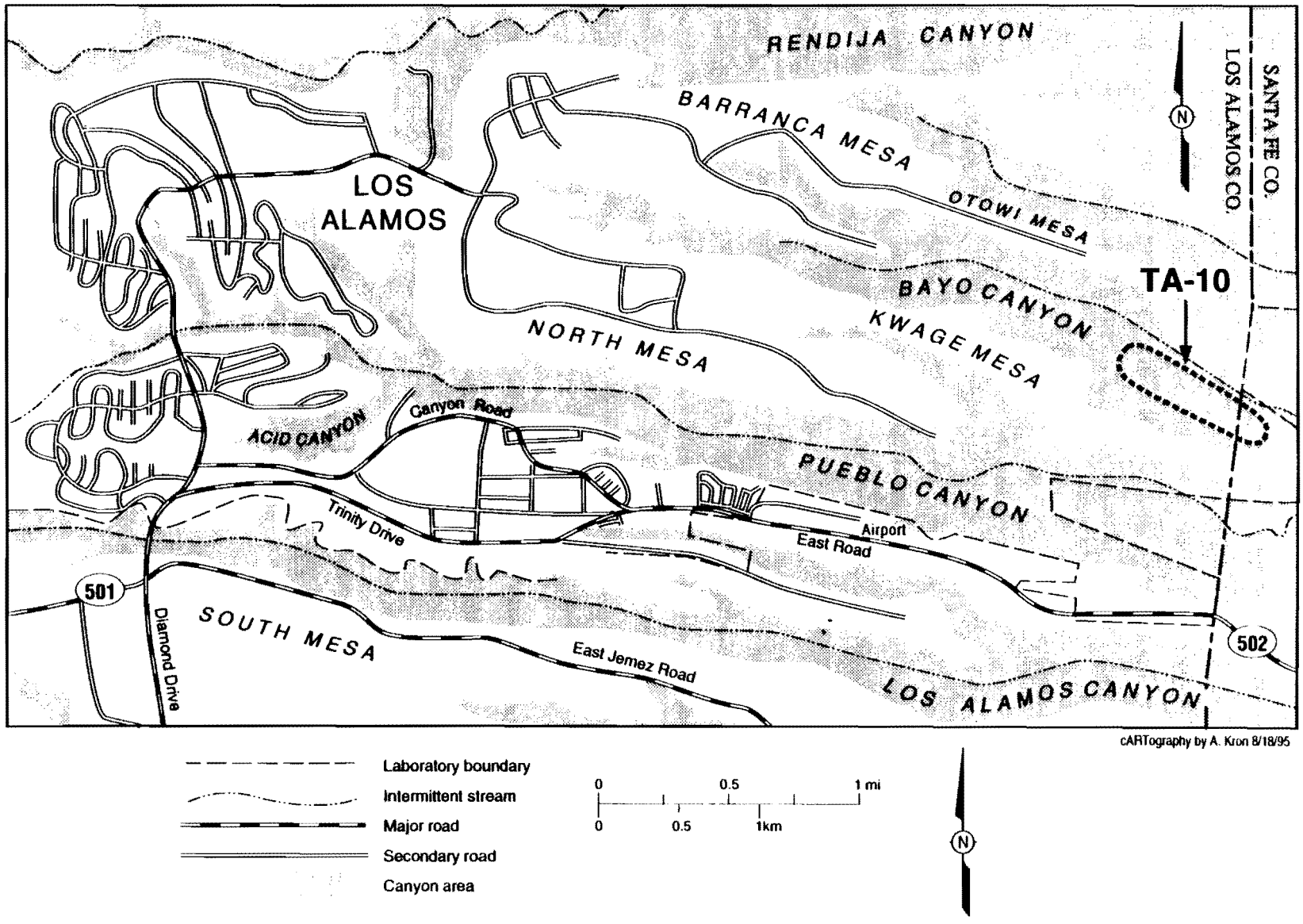

Fig. 1-1. General location of TA-10.

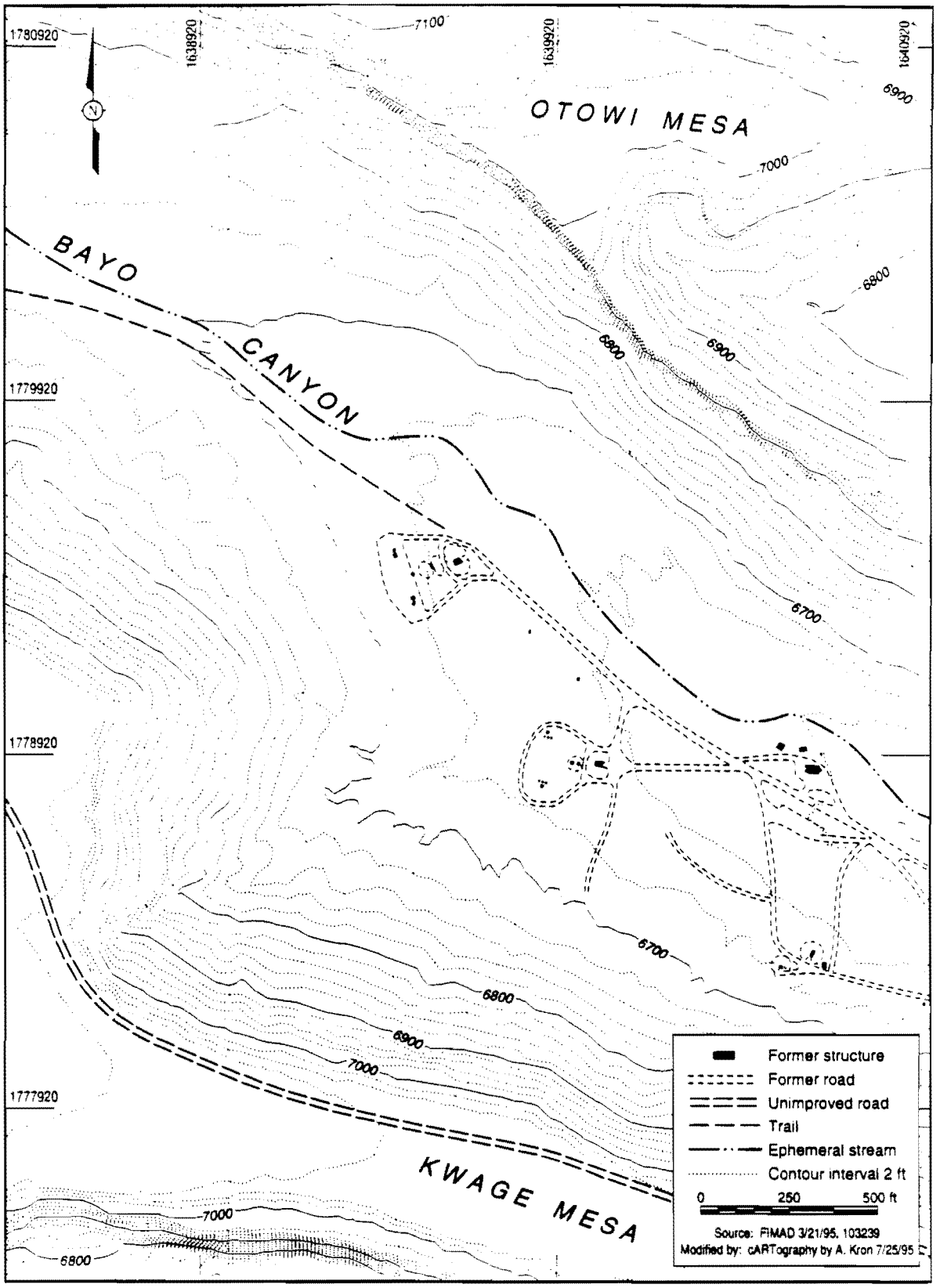

Fig. 1-2. Topographic map showing the firing sites and surrounding area at TA-10.

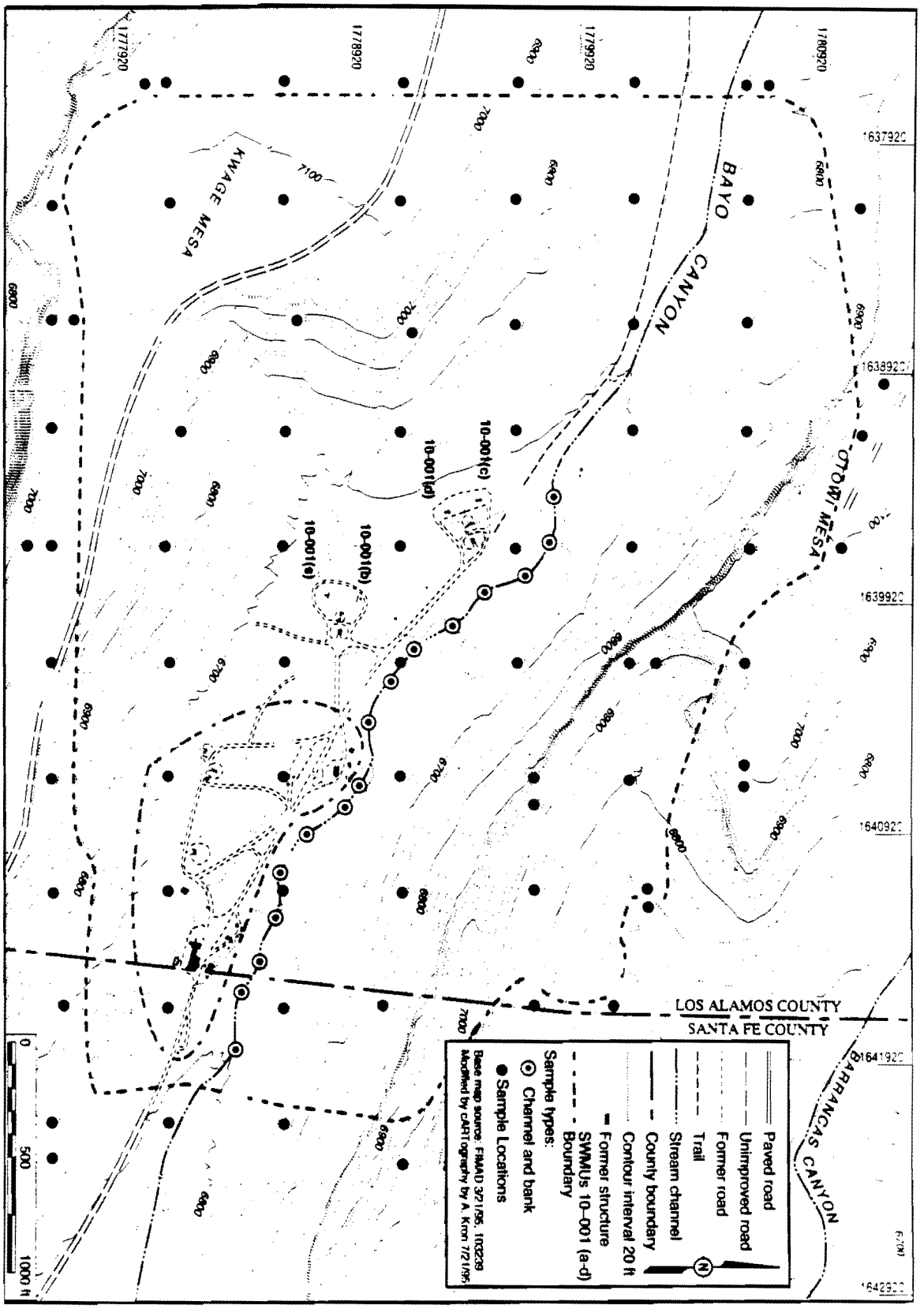

Fig. 1-3. Locations of firing sites and former buildings at SWMUs 10-001 (a-d).

1.2 Phase I Work Plan Overview

The objective of the Phase I investigation associated with the SWMUs 10-001(a-d) was to determine if residual RCRA chemicals, particularly barium, beryllium, or lead, exist in surficial deposits in the vicinity of the firing pads and to confirm there were no human health or ecological risks associated with the radiological constituents found in previous investigations. Surface soil investigations done for the MED/AEC Remedial Action Program (FUSRAP) Report , indicated strontium-90 and uranium were the only residual radiological constituents from the former firing site activities (Mayfield et al. 1979, 0818). These investigations suggested there were no unacceptable health risks from this radiological contamination (LANL 1992, 0783).

1.3 Field Activities

Field activities at TA-10 consisted of collecting surface soil and stream sediment samples for analysis. The soil sampling occurred within a grid established in the area potentially containing residual contamination dispersed from firing sites. The Bayo Canyon drainage was sampled along its length in the area suspected to be influenced by testing operations. Field activities were performed in accordance with the RFI Work Plan for Operable Unit 1079 (LANL 1992, 0783), DOE and LANL directives and policies, and LANL Environmental Restoration Program Standard Operating Procedures (SOPs) (LANL 1993, 0875).

2.0 ENVIRONMENTAL SETTING

2.1 Climate

The climate at TA-10 is similar to the climate of Los Alamos County in general. Los Alamos County has a semiarid, temperate mountain climate. Annual precipitation in the area averages about 18 in. Forty percent of the precipitation occurs as brief, intense thunderstorms during July and August. Snowfall averages 51 in. annually. In the summer months, maximum daily temperatures in the area are usually below 90°F, dropping into the 50s at night. Winter temperatures typically range from 30°F to 50°F during the day and from 15°F to 25°F at night, occasionally dropping to 0°F or below (LANL 1992, 0783).

2.2 Geology

TA-10 is located in Bayo Canyon. SWMUs 10-001(a-d) are located in the western portion of the site, several hundred yards west of the former TA-10 support facilities, at an elevation of about 6 600 to 6 740 ft and between Kwage Mesa to the south and Otowi Mesa to the north. Adjacent mesa tops range from about 7 000 ft to slightly over 7 100 ft. The upper portions of the canyon walls are vertical or near-vertical cliffs which are cut into the (upper) Tshirege Member of the Bandelier Tuff. From the base of the cliffs, steep slopes ranging from 10° to 30° lead downward to wide, gentle slopes, and then to a relatively flat canyon floor (Fig. 1-1). The slopes and canyon floor are mainly cut into the (lower) Otowi Member of the Bandelier Tuff. The slopes are overlain by talus and colluvium derived from the cliffs above. The canyon floor consists of broad, low-angle side slopes covered with colluvium from less than 1 ft thick to more than 6 ft thick, an inner canyon consisting of Quaternary-age terraces, and an active-braided stream channel with banks from 1.5 to 6 ft high. Between 20 to 26 ft of Quaternary stream alluvium underlies the canyon floor.

Alluvial and colluvial sediments in the bottom of Bayo Canyon are subdivided into deposits associated with four distinct geomorphic surfaces of different ages. The youngest units, those within and adjacent to the stream channel, contain metal fragments. Sediments in this area are up to 3.5 ft thick in places. The metal particles indicate that the sediments were deposited concurrent with, or subsequent to, use of TA-10 as a firing site (Drake and Inoue 1993, 06-0122).

2.3 Hydrogeology

The elevation of the main aquifer is about 6 000 ft above sea level, approximately 600 ft below the level of Bayo Canyon at the former site of TA-10. No perched or alluvial aquifers were suspected to be present in Bayo Canyon prior to RFI sampling conducted in 1994, and none were encountered during subsequent subsurface investigations. More than 80 holes were drilled to depths of approximately 50 ft as a part of the TA-10 subsurface characterization. The data for these boreholes are presented in a separate RFI report. The holes encountered only damp alluvium and Bandelier Tuff. Two holes were deepened and cased to the contact between the Bandelier Tuff and the underlying Puyé Formation, a depth of approximately 70 ft below the floor of Bayo Canyon. Because of uncertainty regarding whether a saturated zone might potentially (either permanently or seasonally) overlie the contact, one hole was completed as

a groundwater monitoring well and the second equipped with a suction lysimeter to measure formation pore water in unsaturated rock. To date, no saturated conditions have been observed. No connection between any surface water and the main aquifer within Bayo Canyon is known or suspected.

Surface water flow on the canyon slopes and bottom is mostly sheet flow generated during intense rainfall. Shallow tributary channels leading to the main channel collect water that flows over the cliffs and across the ground surface. The only sediment sampling station in Bayo Canyon is located at the intersection with Los Alamos Canyon, about two miles to the east.

The ephemeral stream in Bayo Canyon carries water only during intense thunderstorm activity, which occurs on an irregular basis. Individual flooding events may cause realignment of the main channel.

2.4 Wildlife Habitats and Threatened and Endangered Species

Ecosystems on the Pajarito Plateau support a large number of plant and animal species because of the number of plant communities convergent in this region. In Bayo Canyon, several plant communities are distributed based on elevational and aspect gradients. Each plant community has a number of habitats supporting characteristic fauna. Biological field surveys (Biggs 1993, 06-0101) were conducted throughout Bayo Canyon, including the upper, middle, and lower portions of the canyon on the north- and south-facing steep slopes, canyon bottom, and along the stream channel.

The western portions of the mesa tops (North Mesa/Kwage Mesa to the south and Barranca Mesa/Otowi Mesa to the north) support a ponderosa pine forest typified by ponderosa pine, Gambel's oak, and Rocky Mountain juniper overstory. The plant community type found west of the townsite and extends into Bayo Canyon supports characteristic fauna such as mule deer, Albert's squirrel, Steller's jay, montane vole, deer mouse, and pipistrelle bat. Threatened and endangered animals that regionally nest or forage in the ponderosa pine forest habitats include the meadow jumping mouse, peregrine falcon, northern goshawk, and spotted bat.

The north-facing slopes of Bayo Canyon have denser vegetation and retain more moisture than the mesa tops, south-facing slopes, or canyon bottoms. North-facing slopes in upper Bayo Canyon support a mixture of mixed conifer forest species and ponderosa pine forest species.

Ponderosa pine and, to a lesser degree, Douglas fir are the dominant overstory species. Wax currant and Gambel's oak are the major shrubs with mountain muhly and little bluestem the major grasses. Characteristic fauna include mule deer, red squirrel, and mountain cottontail. Threatened and endangered species that regionally nest or forage in the mixed conifer forest include meadow jumping mouse, Jemez Mountains salamander, northern goshawk, and Mexican spotted owl. North-facing slopes in the mid portion of the canyon support Ponderosa pine as the dominant species. At the confluence with Pueblo Canyon, the lower north-facing slopes are dominated by piñon pine and one-seed juniper.

The south-facing slopes are normally drier than adjacent north-facing slopes and have a lower and different type of vegetative cover. Dominant overstory species are piñon pine and one-seed juniper. Shrubs such as skunkbush sumac and oak are co-dominants. Blue grama is the common grass.

The canyon bottom contains ponderosa pine in the upper portions with piñon and juniper becoming dominant at the Bayo-Pueblo Canyon confluence. Common shrubs are the skunkbush sumac, rubber rabbitbrush, and big sagebrush. Blue grama and little bluestem are the common canyon bottom grasses. Bayo Canyon is considered a floodplain (Biggs 1993, 06-0101; McLin 1992, 0825) and contains a stream channel with intermittent runoff that does not contain a well-defined riparian plant community like the plant community found along the perennial stream in adjacent Pueblo Canyon.

The habitats that are found in the upper and mid portions of Bayo Canyon are not highly disturbed. Recovery in the lower portion of the canyon from the decontamination and decommissioning activities performed in the early 1960s and subsequent work in 1973 is evident (Mayfield et al. 1979, 0818). The decontamination work left the larger trees standing and encroachment of the forest is underway around the firing sites. In the lower portions of the canyon, the sagebrush and rabbitbrush tend to stabilize the disturbed areas, slowing the recovery of woodland species.

Biological surveys (Biggs 1993, 06-0101) did not find any threatened and endangered plant or animal species in Bayo Canyon. The spotted bat (*Euderma maculatum*), a federal candidate for protection and New Mexico State protected endangered species, may use the rocky cliffs as a roosting area. The northern goshawk (*Accipter gentilis*), federal candidate for protection, prefers ponderosa pine/oak and mixed conifer habitats, which covers only the north-facing slopes in the upper portion of the canyon. However, the goshawk tends to avoid humans, and its presence is unlikely because of the suburban areas on the mesa tops above the upper canyon.

The peregrine falcon (*Falco peregrinus*), federal endangered and New Mexico State endangered, nests in lower Pueblo Canyon and is expected to forage into middle Pueblo Canyon and adjacent Bayo Canyon. This area is considered one of the better nesting sites in New Mexico because the peregrine falcon occupied it during a time when the species was at its lowest numbers in the state.

3.0 APPROACH TO DATA ASSESSMENT AND ANALYSIS

3.1 Analytical Methodology

Field duplicates for 10% of all investigative surface samples were collected for quality assurance/quality control (QA/QC). Duplicate samples are utilized as a QC check of the fixed laboratory analytical methods.

All samples were submitted with chain-of-custody documentation to LANL's Sample Coordination Facility (SCF), now Sample Management Office (SMO), or to LANL's mobile radiochemical analytical laboratory (MRAL) for analysis. Selected samples were analyzed for target analyte list (TAL) metals: mercury by cold vaporization atomic absorption (CVAA) and Environmental Protection Agency (EPA) SW-846 method 7471; arsenic, selenium, lead, and thallium by graphite furnace atomic absorption (GFAA) and EPA SW-846 methods 7060, 7741, 7421, and 7841, respectively; and aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc by inductively coupled plasma emission spectroscopy (ICPES) and EPA SW-846 method 6010; and, in some cases, cyanide by colorimetry, EPA SW-846 method 9010. SVOC analyses were conducted using gas chromatography/mass spectroscopy (GC/MS), and EPA SW-846 method 8270 (solvent extraction/direct injection). HE were analyzed using high-performance liquid chromatography (HPLC) and EPA SW-846 method 8330. Fixed-laboratory radioactivity analyses were performed as follows: total uranium was determined using inductively coupled plasma mass spectroscopy (ICP/MS), EPA SW-846 method 6020 or kinetic phosphorescence analysis (KPA), strontium-90 was analyzed using gas flow proportional counting (GFPC) and, gamma activity was determined using gamma spectroscopy (EPA 1994, 1222).

For analyses conducted in the MRAL; percent moisture (by weight) analyses were conducted using a Denver Instruments IR100 Moisture Analyzer,™ tritium analyses were done using liquid scintillation (LS) counting, gross alpha and gross beta analyses were conducted using

a GFPC, and gross gamma analyses were conducted using a Bicron 5 in. X 7 in. sodium iodide (NaI) well counter.

3.1.1 Quality Assurance/Quality Control Activities

One-hundred and twenty samples were analyzed for TAL metals under 9 separate requests: 19499,19500, 19501, 19518, 19682, 19759, 19779, 19785, and 19792. A problem for all nine requests was that the samples were not analyzed until four to seven months after collection. This caused all of the samples to miss the recommended holding times for mercury (28 days) and cyanide (14 days). Cyanide was only analyzed in three requests: 19499, 19501, and 19518. A number of the sample analyses also exceeded the recommended holding time for TAL metals (six months). However, the following facts should be considered:

1. The holding times are based on unpreserved water samples, and all of the samples were solid samples collected in the top six inches of soil;

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the 28-day holding time for mercury) than water samples because of the nature of the soil samples;

3. The site was decommissioned over 30 years ago, so any metals released in the area have been exposed to the environment for over 30 years and would have already undergone any chemical transformations to which they might be susceptible in a sample collection jar.

4. Additionally, mercury and cyanide are not on the COPC list, but were analyzed as part of the TAL metals list. This was because the COPCs lead, beryllium, and barium are included in the TAL metals list, and it is more cost-effective to analyze the entire TAL metals list than to analyze a few specific analytes.

Therefore, it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because cyanide and mercury holding times were greatly exceeded, all of the cyanide and mercury data are qualified 'J' (estimated detected quantity) or 'UJ' (undetected estimated quantity). None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded and for the reasons stated above.

Two request numbers, 19501 and 19779, had no QC problems other than the holding times mentioned above. All data are valid except as noted above.

Many of the requests had problems with QC sample recoveries.

In request number 19499, the following elements had recoveries outside acceptable limits (80-120%) in the QC sample: aluminum (74%), arsenic (587%), chromium (68%), mercury (61%), vanadium (71%), and thallium (58%). All of these analytes in this request are qualified 'J' or 'UJ.'

In request number 19500, mercury (61%) and arsenic (587%) had recoveries outside acceptable limits in the QC sample. These two elements are qualified 'J' or 'UJ.'

In request number 19518, two QC samples had low recoveries for arsenic (70%, 67%) and chromium (66%, 63%). These two analytes in this request are qualified 'J' or 'UJ.'

In request number 19682, recoveries for aluminum (68%) and chromium (66%) were outside acceptable limits in the QC sample. These two elements are qualified 'J' or 'UJ.'

In request number 19759, recoveries for lead (244%) and chromium (69%) were outside acceptable limits in the QC sample. These two elements are qualified 'J' or 'UJ.'

Request number 19785 had aluminum (71%) and chromium (74%) outside allowed limits in one of two QC samples. Because the QC values had rather large uncertainties (up to 20%), the data for these elements are not qualified.

Request number 19792 had the same problem with aluminum and chromium as request number 19785. Again, because the QC values had rather large uncertainties (up to 20%), the data for these elements are not qualified.

Six samples were analyzed for SVOCs under request numbers 17772 and 17793. There were minor QC problems with both requests.

For request number 17772 there were low recoveries in the QC sample for anthracene (10%), o-dichlorobenzene (42%), 2-methylphenol (24%), and trichlorophenol (45%). Therefore, these analytes are qualified 'UJ' in the samples associated with this request.

For request number 17793 there were two problems. The continuing calibration had a greater than 25% difference for 4-chloroaniline and pentachlorophenol for all samples. Therefore, these two analytes are qualified 'UJ' for samples in this request. Also, di-n-butylphthalate

(1 600 ug/kg) and bis(2-ethylhexlyl)phthalate (13 ug/kg) were found in the method blank. These analytes were not detected in the samples above the quantitation level (about 330 ug/kg); therefore, the sample data are not affected.

Twenty-nine samples were analyzed for HE under 8 separate request numbers (17781, 17784, 17911, 17913, 17915, 17916, 17917, and 17919.) For 6 of the request numbers (17911, 17913, 17915, 17916, 17917, and 17919), the recommended holding time of 14 days was exceeded by 2 to 14 days. Because these holding times are only recommended (they apply mainly to liquid samples) and because of the reasons mentioned previously in reference to mercury, it is the validator's decision not to qualify the data because of the missed holding times.

Six of the eight requests had no QC problems (except as noted above). All of the data are not qualified and are valid.

In request number 17784, the analytes tetryl (methyl-2,4,6-trinitrophenylnitramine) and o-nitrotoluene were not detected in the QC sample. Because of the false negative values in the QC sample, these analytes are qualified 'UJ' in the samples in this request.

In request number 17915, tetryl , o-nitrotoluene, m-nitrotoluene, and had percent recoveries of less than 50%. Therefore, these analytes are qualified 'J' or 'UJ' for the samples in this request.

One hundred twenty samples were analyzed for strontium-90 and total uranium under 11 separate request numbers.

For seven of the requests (18990, 19705, 19765, 19769, 19772, 19766, and 20452) all of the QC parameters were within allowed limits and all of the data are valid without qualification.

For request number 19681, there was a low recovery of uranium in the QC sample (48% and 16%). Therefore, all of the uranium results for this request are qualified 'J.'

For request number 19705 there were high recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). Because of these high recoveries, all of the data are qualified 'J' for this request.

In request number 19762, the uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data in this request are qualified 'J.'

For request number 19768 there was a high recovery in the QC samples for uranium (130%). Because of this high recovery, all of the uranium data are qualified 'J' for this request.

Ten samples were analyzed for gamma activity using gamma spectroscopy in request number 19706. All QC parameters were within allowed limits for this analysis. A number of isotopes reported as detected in this analysis (americium-241, barium-140, cesium-144, cobalt-60, sodium-22, neptunium-237, and ruthenium-106) were reported present at levels below the detection limits of the instrument. Because gamma spectroscopy is a statistical method, it is possible to have data values scattered around zero in the positive and negative directions. All of the above-mentioned isotopes fall within the statistical range of zero and, therefore, are considered not detected in the samples in this request. Europium-152 was reported at levels slightly above the detection limit in several samples. However, this isotope has gamma lines which have interferences from background uranium-238 and thorium-232 daughters and, therefore, can lead to a misidentification. After uranium-238 and thorium-232 have been taken into account, europium-152 is also considered undetected in these samples. The only isotope found above instrument detection levels in these samples was cesium-137.

A summary of QA/QC results is presented in Appendix A, Table A-2.

3.2 Screening Assessment Methodology

Screening assessment of the data makes use of simple comparisons to determine which chemicals require further evaluation and which do not. Chemicals requiring further evaluation are retained as COPCs. Figure 3-1 shows the decision logic used in the data analysis and screening assessment process. Screening is conducted on all COPCs detected at a site. COPCs that are not detected are eliminated from the screening process. A detailed discussion of the screening assessment is located in Appendix J of the Installation Work Plan (LANL 1993, 1017). Subsection 4.2 of this document presents the screening assessment performed with the data from SWMUs 10-001(a-d).

3.2.1 Background Comparison Methodology

The first step in the screening assessment is a background comparison. The background comparison is carried out for all inorganic analytes and radionuclides that occur naturally in soils.

Inorganics: COPCs that occur naturally in soils, which includes most inorganics, are statistically compared with background concentrations in comparable uncontaminated soils. The statistical comparisons to background in this report follow the general guidance provided in the LANL Environmental Restoration Project policy paper, "Statistical Comparisons to Background, Part I" (Environmental Restoration Project Assessments Council 1995, 1218). The policy paper

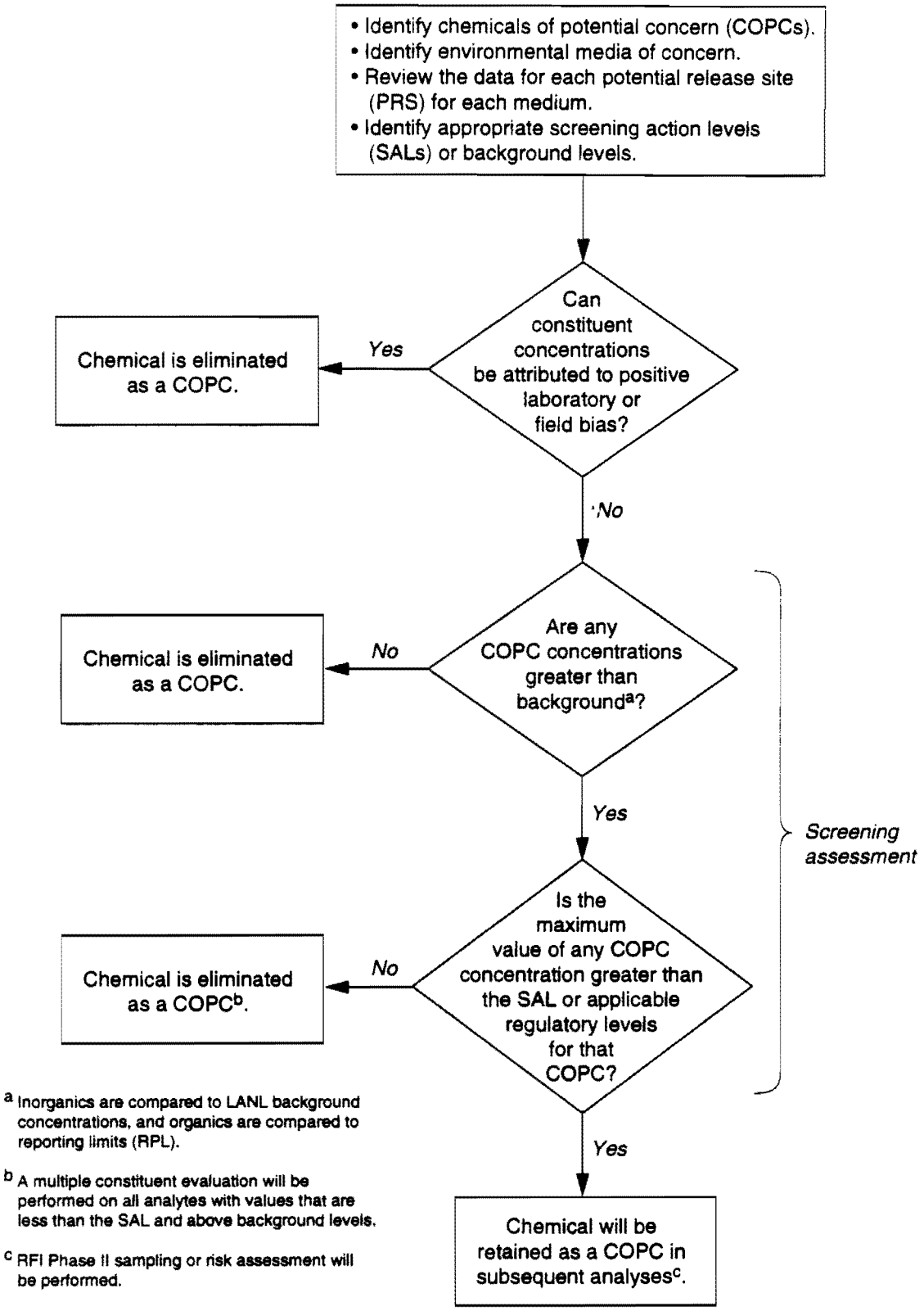

Fig. 3-1. Data analysis and screening assessment decision logic flow chart.

identifies statistical methods that can be used to compare site to background data and also discusses the importance of selecting appropriate background data for these comparisons. This policy paper uses methods described in the EPA guidance document, "Statistical Analysis of Ground-Water Monitoring Data" (EPA 1989, 1141).

The LANL background data for soil (Longmire et al. in preparation, 1142) are used as the applicable background data set. The soil data in the LANL background report were collected from sites around the perimeter of LANL that have not been impacted by LANL operations. Some TA-10 surface samples were sediments collected in the Bayo Canyon stream channel. Sediments typically have lower concentrations of most inorganics and, therefore, the TA-10 sediment data should be compared to appropriate sediment background data. Because there are no background sediment data available, sets of comparable data are graphically related by comparing the concentrations of the inorganics in the sediment samples to both TA-10 soil and background soil data. These graphical comparisons are presented in Appendix B.

The hot measurement test was used as the statistically based screening tool for background comparisons of TA-10 data. This test identifies the site data that exceed the highest background concentrations. It is based on the upper tolerance limits (UTLs) calculated for naturally occurring inorganics (Table 3-1). The UTL is the 95% upper confidence limit of the 99th percentile. The 99th percentile is a value, estimated from the data, that will be exceeded by only 1% of the data. For more information on UTLs, see the LANL Environmental Restoration Project policy paper (Environmental Restoration Project Assessments Council 1995, 1218). UTLs were not calculated for rarely detected inorganics (antimony, mercury, selenium, and thallium), and the background maximum was used as the screening value. Uranium is one of the inorganic chemicals analyzed in the TA-10 surface sampling, and because total uranium concentration was measured in these samples using methods that involve complete digestion, site data are compared to the total uranium background data [measured by delayed neutron activation analysis (DNAA)].

Inorganic chemicals with values less than their background UTLs are eliminated as COPCs. Inorganic chemicals with values greater than their background UTLs are advanced in the screening process to the comparison with screening action levels (SALs). Section 4.0 and Appendix B of this report summarize the statistical comparison of site data with inorganic background.

Radionuclides: Site radionuclide results are reported isotopically in units of specific activity (e.g., pCi/g). The LANL environmental surveillance reports (Purtymun et al. 1987, 0211; ESG 1988, 0408;

ESG 1989, 0308; Environmental Protection Group 1990, 0497; Environmental Protection Group 1992, 0740) present data for radionuclides associated with global fallout from seven localities in northern New Mexico. Environmental surveillance reports were used to estimate the activities of two radionuclides (cesium-137 and strontium-90) in regional background soils.

TABLE 3-1

LIST OF UPPER TOLERANCE LIMITS FOR LOS ALAMOS NATIONAL LABORATORY SOIL BACKGROUND DATA FOR INORGANIC ANALYTES[a,b]

ANALYTE	SAL[c]	MEAN[d]	STANDARD DEVIATION	UTL[e] 99%,0.95	NUMBER OF SAMPLES	NUMBER OF SAMPLES > LOD[f]
Aluminum	77 000	19 000	13 800	123 000	47	47
Antimony	31	2.45	0.36	2.5 [g]	46	2
Arsenic	0.32	4.4	2.5	11.6	46	46
Barium	5 600	161	129	1 140	47	47
Beryllium	0.14	1.15	0.75	3.31	47	47
Cadmium	38	0.39	0.54	2.7 [g]	47	5
Calcium	0.14	5 790	12 500	54 400	47	47
Chromium (total)	[h]	11.7	7.8	34.2	47	47
Cobalt	NA[i]	15.2	7.6	51.1	47	47
Copper	2 800	5.3	3.6	15.7	47	45
Iron	NA[i]	14 500	7 320	35 600	47	47
Lead	400	15.0	8.3	39.0	47	44
Magnesium	NA[i]	2 920	2 150	16 100	47	47
Manganese	380	343	238	1 030	47	47
Mercury	23	0.05	0.01	0.1 [g]	48	4
Nickel	1 500	9.7	5.9	26.7	47	45
Potassium	NA[i]	2 420	1 304	6 180	47	47
Selenium	380	0.43	0.41	1.7 [g]	46	23
Sodium	NA[i]	577	453	1 880	47	47
Thallium	6.1	0.27	0.24	0.9 [g]	45	21
Uranium[j]	230	3.41	0.80	5.71	50	50
Vanadium	540	25	14	66	47	47
Zinc	23 000	41	21	101	47	47

[a] Longmire et al. in preparation, 1142.
[b] All values are in units of mg/kg.
[c] SAL = Screening action level (EPA 1995, 06-0124).
[d] Concentration values less than the limit of detection (LOD) were replaced by one-half of the LOD
[e] UTL = Background upper tolerance limit.
[f] LOD = Limit of detection.
[g] The maximum value is used as the background screening value rather than the UTL.
[h] The SAL for chromium VI is 30 mg/kg; the SAL for chromium III is 210 mg/kg.
[i] NA = Not available.
[j] Uranium background represents the total elemental concentration measured by delayed neutron activation analysis (DNAA).

TABLE 3-2

LIST OF UPPER TOLERANCE LIMITS FOR RADIONUCLIDES IN LOS ALAMOS NATIONAL LABORATORY SOIL BACKGROUND DATA

ANALYTE	SAL[b]	MEAN[c]	STANDARD DEVIATION	UTL[d] 99%,0.95	NUMBER OF SAMPLES	NUMBER OF SAMPLES > LOD[e]
Cesium-137 [f]	4[g]	0.42	0.31	1.4[g]	79	79
Strontium-90 [f]	5.9	0.34	0.27	1[g]	29	29

[a] All values are in units of pCi/g.
[b] SAL = Screening action level (EPA 1995, 06-0124).
[c] Concentration values less than the limit of detection (LOD) were replaced by one half of the LOD.
[d] UTL = background upper tolerance limit.
[e] LOD = Limit of detection.
[f] Data are from the Environmental Surveillance Reports (Purtymun et al. 1987, 0211; ESG 1988, 0408; ESG 1989, 0308; Environmental Protection Group 1990, 0497; Environmental Protection Group 1992, 0740)
[g] The maximum value is used as the background screening value rather than the UTL.

These data were collected from 1974 to 1990 and represent a time series at these locations. Therefore, maximum observed concentration is used as the background screening value for cesium-137 and strontium-90 (Table 3-2). The results of the background comparison for radionuclides are in Section 4.0 and Appendix B of this report.

3.2.2 Human Health Screening Action Levels Comparison Methodology

The second step in performing the screening assessment is a comparison with SALs. SALs are protective risk-based levels, based primarily on formulas presented in EPA Region 9 Preliminary Remediation Goals (PRGs) First Half 1995 (EPA 1995, 06-0124), that are intended for use as a preliminary screening tool (EPA 1990, 0432). Appendix J of the Installation Work Plan explains how the SALs for radionuclides used in the screening assessment are derived (LANL 1993, 1017). All inorganic COPCs and radionuclides detected at concentrations greater than their background UTLs and all detected organic COPCs are compared with their respective SALs. Based on this comparison, each COPC is placed into one of three categories: greater than or equal to SAL, no SAL, or below SAL.

Greater than or equal to SAL indicates that at least one chemical value is greater than or equal to the SAL for that chemical. Any chemical that is greater than or equal to its SAL remains a COPC unless an applicable regulatory guideline takes precedence.

No SAL indicates that there is currently no SAL available for comparison and that at least one chemical value is greater than the reporting limit. Regulatory guidelines are checked to determine if there are any appropriate criteria for comparison to determine if these chemicals should be maintained as COPCs (Vocke 1993, 1073).

Below SAL indicates that the chemical values are all less than their respective SALs. Chemicals with concentrations below their respective SALs in all samples generally pose no risk. However, these chemicals are further evaluated to determine the potential for adverse health effects resulting from exposure to the COPC in combination with other chemicals. This is called the multiple chemical evaluation (MCE).

It is possible that chemicals in combination, while near but not exceeding their SALs, could prove harmful to human health. In evaluating the effects of multiple chemicals, a simplistic screening approach that assumes additive effects is used to normalize concentration data by comparing concentration data to SALs, as shown in following equation:

$$M=\sum C_i/SAL_i$$

where:

M = maximum sum of proportions,

C_i = maximum concentration of the ith chemical for a given site, and

SAL_i = chemical-specific SAL for the ith chemical.

If the sum of the proportions between each chemical that is below SAL (C_i) and its SAL (SAL_i) is less than one, then the chemicals are eliminated as COPCs. If the sum of the proportions is greater than one, then the effect of the multiple chemicals has the potential to be adverse. It should be noted that this evaluation is used for screening purposes only, and that the normalized sums or proportions do not indicate risk levels. The chemicals included in this evaluation are divided into three classes: noncarcinogens, carcinogens, and radionuclides. Additive effects are assumed within each class, but each class is evaluated separately. For more information regarding this method, refer to Appendix J of the Installation Work Plan (LANL 1993, 1017).

A human health risk evaluation was also conducted to determine if the shrapnel resulting from firing site activities at SWMUs 10-001(a-d) presents significant risk to recreational users of Bayo Canyon. The human health evaluation was conducted because some of the shrapnel was contaminated with strontium-90, and possibly natural or depleted uranium, and will be discussed in an addendum.

3.3 Ecotoxicological Screening Assessment Methodology

Screening methodology for ecological risk assessment has been developed (Ebinger et al, 1995, 1217) and currently is in the process of being revised (Myers and Ferenbaugh in preparation, 1250). Figure 3-2 shows a flow chart of the decision logic embodied in this

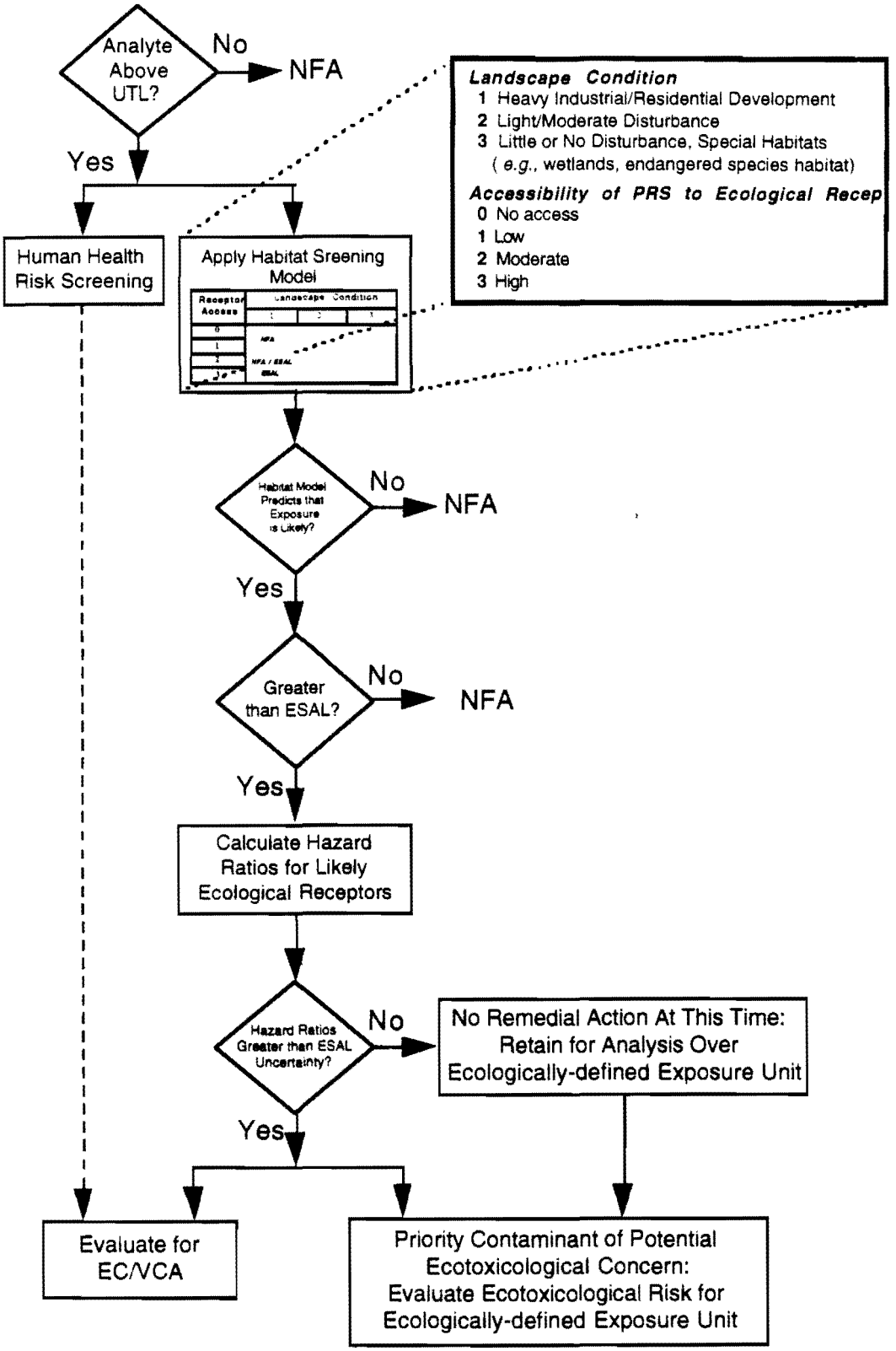

Fig. 3-2. Ecological screening decision flow chart.

process. The methodology is based on first determining whether a suitable habitat exists. If the habitat model predicts that exposure is likely, soil concentrations are then compared to ecological screening action levels (ESALs) for COPCs to determine if further consideration is necessary. A detailed explanation of the derivation of ESALs is given in Ebinger et al. (1994, 1216). A detailed description of the screening methodology is given in Myers and Ferenbaugh (in preparation, 1250).

The ecological screening is based on information collected during the initial biological evaluations of the area that survey biological resources and identify sensitive species or habitats (Biggs 1993, 06-0101). If sites cannot be eliminated from further consideration during the initial screening assessment, further investigation leading to an ecological risk assessment may be necessary. This may include size of home ranges, whether threatened or endangered species inhabit the area, and whether the site is a sensitive habitat. Impacts from proposed remedial alternatives also must be assessed.

3.4 Development of Conclusions and Recommendations

Conclusions are based on the initial screening assessment performed on the analytical results for each SWMU. Recommendations are based on the potential for human health or ecological risk, and on applicable regulations.

4.0 SITE-SPECIFIC INVESTIGATIONS, RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

4.1 SWMUs 10-001(a-d) Field Investigations

Presented here are descriptions of field investigations of Bayo Canyon impacted by operations at SWMUs 10-001(a-d).

4.1.1 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 explosives testing and continuing natural erosion and sedimentation processes, at the time of decommissioning a reasonable probability that potential radioactive contamination remained in the canyon was recognized. Surface debris was recovered during periodic searches and surveys until 1976.

The 1977 Atomic Energy Commission Formerly Utilized Sites Remedial Action Program (FUSRAP) survey sampled the area influenced by testing operations (Mayfield et al.1979, 0818). The samples indicated strontium-90 and uranium in surface soils of the canyon floor. Most of the contamination was located near or on the former firing pads, concentrated in surface soils to a depth of 0 to 6 in. (LANL 1992, 0783).

In 1965 and 1970 sediments were collected from two locations in the channel downstream of TA-10. Radiochemical analyses showed no indication of contamination. In 1973 eight samples were taken of channel bank soil across two locations (one upstream and one downstream of the firing sites). Stream channel sediments indicated no contamination above worldwide fallout levels. Data were not collected to assess metals contamination in the surface soils and sediments (LANL 1992, 0783).

4.1.2 Field Investigation

Surface sampling in Bayo Canyon took place during June 1994.

A geodetic survey was performed to establish the surface sample grid, stream sample transects, and former structures associated with former TA-10 operations. Surface soil sample locations were established in a 17 000 000 ft^2 grid with a 500-ft grid interval (Fig. 4-1). Sample locations corresponded to grid nodes. If a grid node fell on bedrock, it was relocated to the nearest soil outcrop and surveyed. The grid consisted of 68 surface sample locations plus 10 random samples. Of the 68 grid samples, the 10 samples that indicated the highest radioactivity during field screening were to have been analyzed for TAL metals, radionuclides, and HE. If all field screening measurements were low, then the 10 samples were to be selected from around the firing sites.

All samples were screened in the field for beta and gamma radiation with two-minute counts using a Ludlum Model 2221 with a shielded G-M probe. Because none of these samples showed significantly-elevated results, nine of the samples were collected from locations near the firing sites, and one sample was collected at a location (10-1001) that showed field-screening results slightly above background (but not above the daily-established contamination criteria).

Samples were collected from the finest-grained sediments from the surface to a depth of no more than six inches in order to maximize the potential for detecting residual contamination. Each sample was collected using disposable sampling equipment, plastic scoops, aluminum

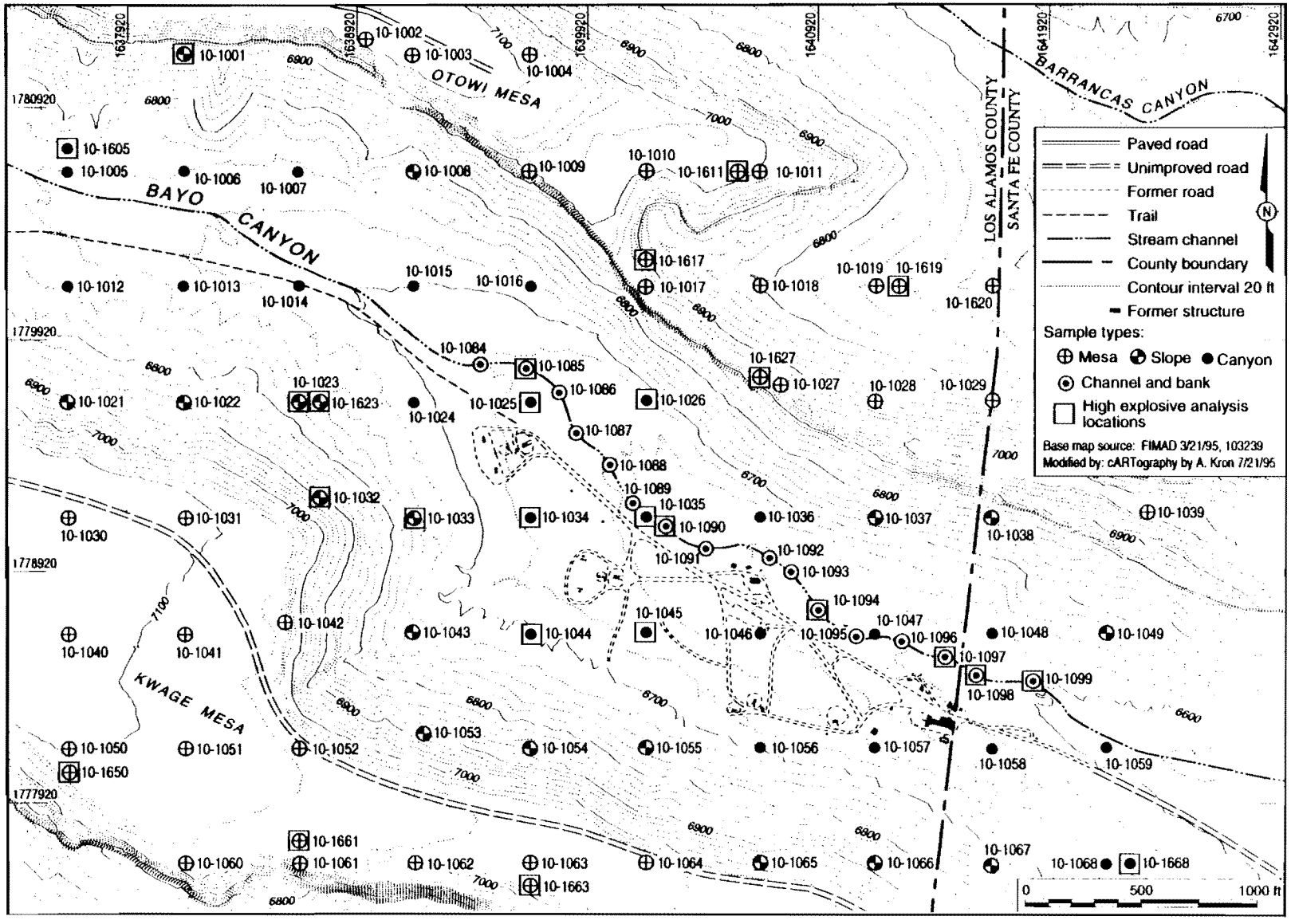

Fig. 4-1. TA-10 surface sampling locations by location group.

pans, sample containers, and personal protective equipment (PPE) consisting of nitrile gloves in accordance with LANL-ER-SOP-6.09, RO, Spade and Scoop Method for Collection of Soil Samples. Samples were collected and shipped to fixed laboratories to be analyzed for strontium-90, total uranium, beryllium, barium, and lead.

An additional 10 samples were collected 100 ft from randomly selected grid nodes in a randomly selected cardinal direction. Four grid nodes were chosen from those within the canyon bottom, and three each from the grid nodes on Otowi and Kwage Mesas. If one of these samples fell on an outcrop of bedrock, it was relocated to the nearest soil outcrop and surveyed. These random samples were analyzed for gross alpha, beta, and gamma radiation by the MRAL and for total uranium, strontium-90, beryllium, barium, lead, TAL metals, and HE at fixed laboratories.

Sixteen stream transects were established along the length of the Bayo Canyon drainage (Fig. 4-1). Two stream sediment samples were collected from each transect, one in the stream channel and one from the channel bank, resulting in 32 stream sediment samples.

Stream sediment samples were analyzed by the MRAL for gross alpha, beta, and gamma radiation. If elevated gross alpha, beta, and/or gamma radiation was detected by the MRAL, then that sample was analyzed by gamma spectroscopy. No sample had an elevated result, so gamma spectroscopy was not performed. Samples were also analyzed by fixed laboratories for total uranium, strontium-90, beryllium, barium, lead, and other TAL metals including cadmium, antimony, nickel, chromium, manganese, magnesium, cobalt, copper, and zinc. Additionally, six samples were analyzed for SVOCs.

A summary of all samples and analyses performed is presented in Appendix A, Table A-1. Analytical results for all analytes detected are presented in Appendix A, Table A-3.

4.2 Screening Assessment

This subsection describes the screening assessment performed on analytical results from samples associated with SWMUs 10-001(a-d). Appendix A presents the analytical results used in the screening assessment. It consists of a table showing summaries of samples collected and analyses performed (Table A-1), summaries of analyses for nondetected chemicals (Table A-3), and specific data for all detected chemicals (Table A-4 and Table A-5) at SWMUs 10-001(a-d).

TABLE 4-1

INORGANIC AND RADIOLOGICAL CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS NATIONAL LABORATORY BACKGROUND AT SWMUs 10-001(a-d)[a]

CHEMICAL	LOCATION ID	SAMPLE ID	SAMPLE VALUE (mg/kg)	BACKGROUND UTL[b] (mg/kg)	SAL[c] (mg/kg)	DEPTH (in.)
Copper	10-1034	AAB5457	50.8	15.7	2 800	2-6
	10-1056	AAB5476	33.9	15.7	2 800	0-4
	10-1045	AAB5463	22.9	15.7	2 800	0-4
	10-1611	AAB5601	17.7	15.7	2 800	0-3
Mercury	10-1022	AAB5485	0.52	0.1[d]	23	0-4
	10-1025	AAB5450R	0.12	0.1[d]	23	0-4
Nickel	10-1039	AAB5614	101	26.7	1 500	0-4
Thallium	10-1095	AAB5524	10	0.9[d]	5.4	0-4
Zinc	10-1039	AAB5614	668	101	23 000	0-4
Strontium-90	10-1066	AAB5583	6.26	1	5.9	0-6
	10-1012	AAB5491	1.67	1	5.9	0-4
	10-1017	AAB5502	1.11	1	5.9	0-4
	10-1004	AAB5597	1.09	1	5.9	0-4
Uranium	10-1015	AAB5451	8.1	5.71	95	0-5
	10-1038	AAB5483	7.8	5.71	95	0-6
	10-1028	AAB5606	6.4	5.71	95	0-4
	10-1004	AAB5597	6	5.71	95	0-4
	10-1086	AAB5497	5.92	5.71	95	0-4
	10-1034	AAB5457	5.8	5.71	95	2-6
	10-1039	AAB5607	5.8	5.71	95	0-4
	10-1048	AAB5479	5.8	5.71	95	0-4
	10-1013	AAB5469	5.74	5.71	95	0-4

[a] SWMUs 10-001(a-d) data were extracted from the Facility for Information Management, Analysis, and Display on July 3,1995.
[b] UTL = Upper tolerance limit.
[c] SAL = Screening action level (EPA 1995, 06-0124).
[d] There were insufficient samples to calculate the UTL for this analyte; therefore, the maximum value in the background range was used (Longmire et al. in preparation, 1142).

4.2.1 Background Comparison

Inorganics and radionuclides: All inorganic and radionuclide detections associated with SWMUs 10-001(a-d) were compared with their natural background UTLs. All inorganic and radionuclide COPCs except copper, mercury, nickel, thallium, zinc, strontium-90, and uranium were below their respective background UTLs and were eliminated as COPCs. These seven constituents were carried forward to the comparison to SALs. Results from soil samples with inorganic and radionuclide analytes exceeding background UTLs are presented in Table 4-1. Locations of samples exceeding background UTLs are shown on Fig. 4-2.

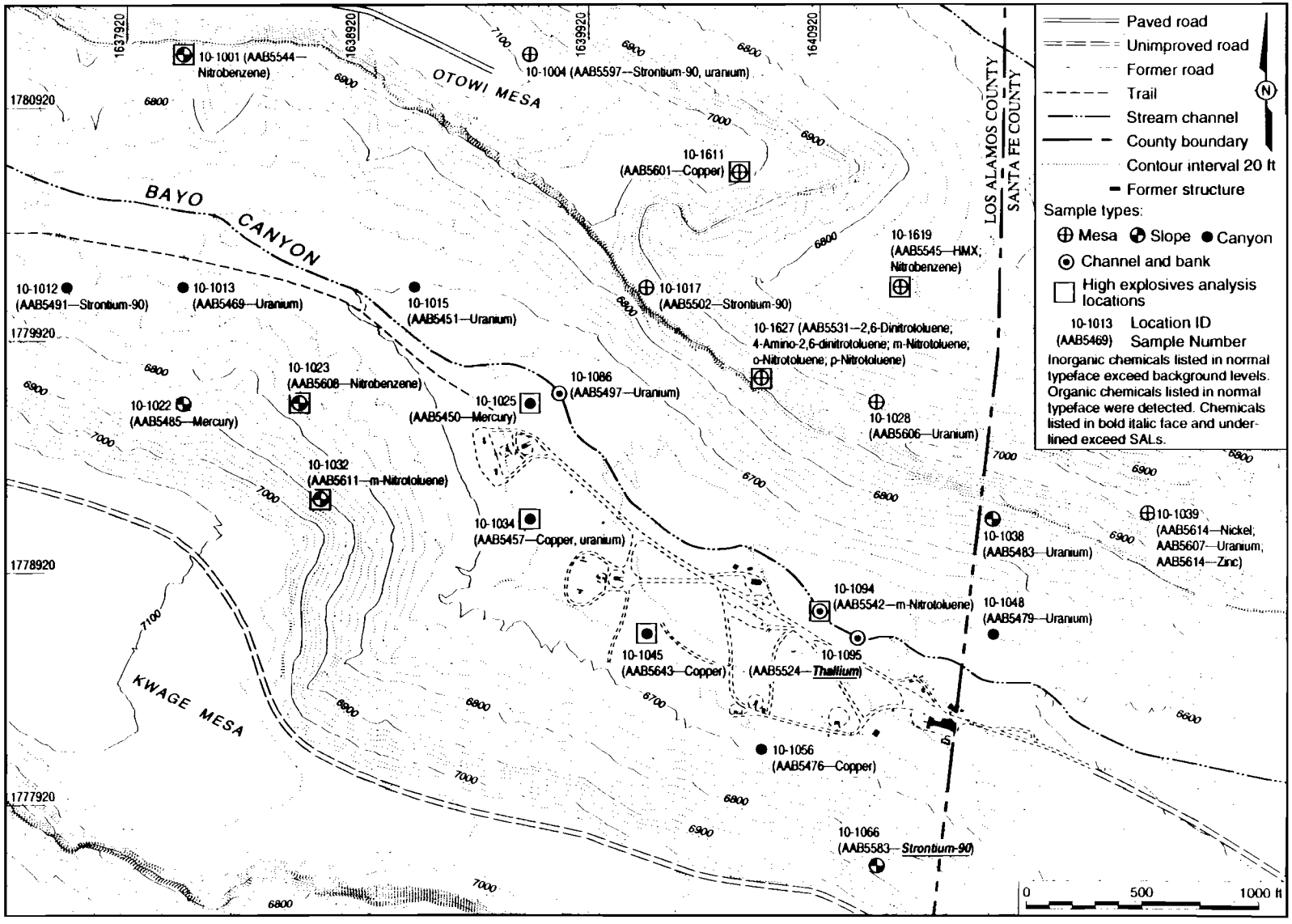

Fig. 4-2. Locations of detected organic chemicals, inorganic chemicals, and radionuclides that exceed background levels, and all chemicals that exceed SALs at SWMUs 10-001 (a-d).

TABLE 4-2

ORGANIC CHEMICALS WITH DETECTED CONCENTRATIONS AT SWMUs 10-0001(a-d)[a]

ANALYTE	SAMPLE ID	LOCATION ID	SAMPLE VALUE (mg/kg)	SAL[b]	CRQL[c]
Amino-2,6-dinitrotoluene [4-]	AAB5544	10-1001	<0.09	NA[d]	NA[d]
	AAB5608	10-1023	<0.092	NA[d]	NA[d]
	AAB5611	10-1032	<0.091	NA[d]	NA[d]
	AAB5543	10-1033	<0.091	NA[d]	NA[d]
	AAB5542	10-1094	<0.09	NA[d]	NA[d]
	AAB5545	10-1619	<0.092	NA[d]	NA[d]
	AAB5531	10-1627	0.157	NA[d]	NA[d]
Dinitrotoluene [2,6-]	AAB5544	10-1001	<0.092	65	0.33
	AAB5608	10-1023	<0.094	65	0.33
	AAB5611	10-1032	<0.092	65	0.33
	AAB5543	10-1033	<0.092	65	0.33
	AAB5542	10-1094	<0.092	65	0.33
	AAB5545	10-1619	<0.094	65	0.33
	AAB5531	10-1627	0.789	65	0.33
HMX	AAB5544	10-1001	<0.164	3 300	NA[d]
	AAB5608	10-1023	<0.168	3 300	NA[d]
	AAB5611	10-1032	<0.165	3 300	NA[d]
	AAB5543	10-1033	<0.165	3 300	NA[d]
	AAB5542	10-1094	<0.163	3 300	NA[d]
	AAB5545	10-1619	1.56	3 300	NA[d]
	AAB5531	10-1627	<0.165	3 300	NA[d]
Nitrobenzene	AAB5544	10-1001	0.104	33	0.33
	AAB5608	10-1023	0.098	33	0.33
	AAB5611	10-1032	<0.075	33	0.33
	AAB5543	10-1033	<0.075	33	0.33
	AAB5542	10-1094	<0.074	33	0.33
	AAB5545	10-1619	0.154	33	0.33
	AAB5531	10-1627	<0.074	33	0.33
Nitrotoluene [m-]	AAB5544	10-1001	<0.159	630	NA[d]
	AAB5608	10-1023	<0.163	630	NA[d]
	AAB5611	10-1032	0.213	630	NA[d]
	AAB5543	10-1033	<0.16	630	NA[d]
	AAB5542	10-1094	0.21	630	NA[d]
	AAB5545	10-1619	<0.162	630	NA[d]
	AAB5531	10-1627	0.435	630	NA[d]
Nitrotoluene [o-]	AAB5544	10-1001	<0.137	630	NA[d]
	AAB5608	10-1023	<0.141	630	NA[d]
	AAB5611	10-1032	<0.138	630	NA[d]
	AAB5543	10-1033	<0.138	630	NA[d]
	AAB5542	10-1094	<0.137	630	NA[d]
	AAB5545	10-1619	<0.14	630	NA[d]
	AAB5531	10-1627	0.21	630	NA[d]
Nitrotoluene [p-]	AAB5544	10-1001	<0.184	630	NA[d]
	AAB5608	10-1023	<0.189	630	NA[d]
	AAB5611	10-1032	<0.186	630	NA[d]
	AAB5543	10-1033	<0.186	630	NA[d]
	AAB5542	10-1094	<0.184	630	NA[d]
	AAB5545	10-1619	<0.188	630	NA[d]
	AAB5531	10-1627	0.469	630	NA[d]

[a]SWMUs 10-001(a-d) data were extracted from the Facility for Information Management, Analysis, and Display on July 3, 1995.
[b]SAL = Screening action level (EPA 1995, 06-0124).
[c]CRQL = Contract-required quantitation limit (RPL not reported for chemicals with detected value).
[d]NA = Value is not available.

TABLE 4-3

SWMUs 10-001(a-d) SOIL CONCENTRATIONS WITH VALUES GREATER THAN SALs[a]

CHEMICAL	LOCATION ID	SAMPLE ID	SAMPLE VALUE (mg/kg)	BACKGROUND UTL[b] (mg/kg)	SAL[c] (mg/kg)
Thallium	10-1095	AAB5524	10	0.9	5.4
Strontium-90	10-1066	AAB5583	6.26	1	5.9

[a] SWMUs 10-001(a-d) data were extracted from the Facility for Information Management, Analysis, and Display on July 3,1995.
[b] UTL = Upper tolerance limit.
[c] SAL = Screening action level (EPA 1995, 06-0124).

Organics: Seven organic chemicals associated with SWMUs 10-001(a-d) were detected: 4-amino-2,6-dinitrotoluene, 2,6-dinitrotoluene, the high explosive HMX, nitrobenzene, m-nitrotoluene, o-nitrotoluene, and p-nitrotoluene. All organic chemicals detected were retained as COPCs and were carried forward to the screening assessment. The soil concentrations for these chemicals are presented in Table 4-2. Locations of samples with detected concentrations of organic chemicals are shown on Fig. 4-2.

4.2.2 Screening Action Levels Comparison

This subsection discusses the comparison with SALs for all COPCs not eliminated by the background comparison.

Greater than or equal to SAL: Strontium-90 and thallium are the only COPCs that fall into the greater than or equal to SAL category. Analytical results that are greater than or equal to SALs for these COPCs are presented in Table 4-3; sample locations are shown on Fig. 4-1.

Strontium-90 was detected at 6.26 pCi/g, slightly above its SAL of 5.9 pCi/g at only one location, 10-1066, on the talus slope below Kwage Mesa. Most other strontium-90 detections were below the background UTL. At three locations, detection was slightly above the background UTL, but well below SAL. The distribution of shrapnel resulting from firing site operations make it very possible that the single detection of strontium-90 above SAL resulted from a piece of shrapnel contaminated with strontium-90 at the sampling location. Because the sampling area is large and there was only one detection above SAL, it is probable that there is no widespread strontium-90 contamination in the sampling area. In addition, because the single result above SAL was collected on a steep talus slope location (10-1066) and could not be included in a residential exposure area, a recreational land use cleanup level would be calculated for this

sampling location. Recreational cleanup levels would be well above the 6.26 pCi/g detected at location 10-1066. Therefore, strontium-90 is eliminated as a COPC.

Thallium was detected in only 2 of 126 analyses. At location 10-1001, thallium was below background UTLs. At location 10-1095, in the active stream channel, thallium was detected at a concentration of 10 mg/kg. This is inconsistent with the pattern seen in other inorganics at SWMUs 10-001(a-d), which are consistently at lower concentrations in the active channel sediments than in the surrounding soils. Thallium was not expected to be a COPC at SWMUs 10-001(a-d). There are no historical records of thallium use in the firing tests conducted at the site. Thus, the detection of thallium above background levels and the location of the detection appear to be anomalies. Because of the low frequency of detection and the anomalous nature of the detection location, the thallium detection does not appear to be related to site activities. Therefore, thallium was eliminated as a COPC.

No SAL: One COPC, 4-amino-2,6-dinitrotoluene (a-DNT), defected at SWMUs 10-001(a-d) fell into the no SAL category. The toxic mechanisms of a-DNT and 2,4,6-trinitotoluene (TNT) are similiar and the two compounds have approximately the same toxicity [Registry of Toxic Effects of Chemical Substances (RTECS), 1994; Agency for Toxic Substances and Disease Registry (ATSDR), 1993).] The oral lethal dose for 50% of the sample population (LD_{50}) of a-DNT is 959 mg/kg for rats, and 1 318 mg/kg for mice (RTECS, 1994); while TNT has a gavage-in-oil LD_{50} of 1 320 mg/kg for male rats , 795 mg/kg for female rats, and 660 mg/kg for mice (ATSDR, 1993 06-0123). If the SAL for TNT (40 mg/kg) were to be used as a proxy SAL for a-DNT, the normalized value for the highest detected concentration of a-DNT (0.157 mg/kg) would be 0.004 mg/kg (0.157 mg/kg / 40 = 0.004). This value would not impact the MCE, and a-DNT would be eliminated as a COPC at this point.

Below SAL: Eleven RCRA COPCs (copper, mercury, nickel, uranium, zinc, 2,6-dinitrotoluene, HMX, nitrobenzene, m-nitrotoluene, o-nitrotoluene, and p-nitrotoluene) were detected at concentrations below their respective SALs. One radionuclide, uranium, was also detected at a concentration below SAL. These eleven RCRA COPCs and one radionuclide are addressed in the multiple chemical evaluation, shown in Table 4-4.

To evaluate multiple chemical effects for this data set, COPCs below their respective SALs were divided into three classes: noncarcinogens, carcinogens, and radionuclides. SALs for all chemicals were normalized to one and summed as described in Subsection 3.2.2. The result of the analysis for all classes is less than one, 0.2 for noncarcinogens, 0.01 for carcinogens, and 0.09 for radionuclides, indicating that adverse health effects are unlikely. Therefore, all of the chemicals with concentrations below their respective SALs are eliminated as COPCs.

TABLE 4-4

MULTIPLE CHEMICAL EVALUATION FOR SWMU 10-001(a-d) DATA

CHEMICAL	MAXIMUM CONCENTRATION (mg/kg)	SOIL SAL[a] (mg/kg)	MAXIMUM CONCENTRATION / SAL (NORMALIZED VALUES)
RADIONUCLIDES			
Uranium	8.1	95	0.09
Sum of proportions			0.09
CARCINOGENS			
Dinitrotoluene [2,6-]	0.789	65	0.01
Sum of proportions			0.01
NONCARCINOGENS			
Copper	50.8	2 800	0.02
Mercury	0.52	23	0.02
Nickel	101	1 500	0.07
Uranium	8.1	230	0.04
Zinc	668	23 000	0.03
HMX	1.56	3 300	0.0005
Nitrobenzene	0.154	33	0.005
Nitrotoluene [m-]	0.435	650	0.0007
Nitrotoluene [o-]	0.21	650	0.0003
Nitrotoluene [p-]	0.469	650	0.0007
Sum of proportions			0.2

[a] SAL=Screening action level.

4.2.3 Ecological Screening Assessment

The background comparisons in Appendix B indicate that six inorganic analytes (copper, mercury, nickel, thallium, uranium, and zinc) and one radionuclide (strontium-90) exceeded their respective background UTLs. The inorganic analytes were compared to their respective ESALs, as tabulated in Ebinger et al. (1994, 0121). Radionuclides do not have ESALs, as human SALs are considered to be protective of most plants and animals (IAEA 1992, 0983).

4.2.3.1 ESALs Comparison for TA-10

Greater than ESALs: Mercury, nickel, uranium, zinc, and 2,6-dinitrotoluene all exceeded their ESALs. Although concentrations of mercury, nickel, uranium, and zinc exceeded the ESALs for these metals, no further ecological assessment is required. The distribution of the uranium concentrations has been shown to be statistically indistinguishable from background and the

locations at which the other metals exceeded their ESALs are isolated canyon or mesa locations far enough away from the stream channel to preclude significant transport (see Appendix B). Only one organic, 2,6-dinitrotoluene, was detected at a concentration above its ESAL. This particular ESAL is a carcinogenic ESAL rather than systemic. Although the ESAL indicates that the compound is potentially a potent carcinogen, the fact that it was detected in only 1 of 35 samples makes it unlikely that any significant ecological risk can be attributed to it. Thus all chemicals detected at concentrations greater than ESALs are eliminated as COPCs.

No ESALs: There are no ESALs for copper, thallium, 4-amino-2,6-dinitrotoluene, and nitrotoluene. However, copper and nitrotoluene were detected below their SALs and are not considered as COPCs. Thallium and 4-amino-2,6-dinitrotoluene are discussed in Subsection 4.2.2 and both have been eliminated as COPCs.

Below ESALs. Nitrobenzene and the high explosive HMX were detected at concentrations below their respective ESALs. A formal multiple component analysis was performed for these COPCs. The risk ratio summation is 0.82. Because this value is less than unity, these chemicals are eliminated as COPCs.

4.3 Conclusions, Actions, and Recommendations

No chemicals or radionuclides were retained as COPCs by the screening process at SWMUs 10-001(a-d). Therefore, SWMUs 10-001(a-d) and surrounding area impacted by the firing sites are recommended for no further action (NFA). Based on LANL's No Further Action Criteria Policy, criterion 4 (which states that the SWMU has been characterized in accordance with current applicable state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the projected future land use), a Class III permit modification will be requested to remove these SWMUs from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

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TABLE A-1

SUMMARY OF SAMPLES COLLECTED AT SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	SAMPLE TYPE	DEPTH (INCHES)	TAL[a] METALS	SVOC[b]	HE[c]	STRONTIUM-90, URANIUM	GAMMA ACTIVITY	MRAL SCREENING
10-1001	AAB5544	Soil	0-4			x			
10-1001	AAB5573	Soil	0-3	x			x		x
10-1002	AAB5598	Soil	0-2	x			x		x
10-1003	AAB5600	Soil	0-4	x			x		x
10-1004	AAB5597	Soil	0-4	x			x		x
10-1005	AAB5512	Soil	0-4	x			x		x
10-1006	AAB5513	Soil	0-4	x			x		x
10-1007	AAB5515	Soil	0-4	x			x		x
10-1008	AAB5460	Soil	0-4	x			x		x
10-1009	AAB5503	Soil	0-3	x			x		x
10-1010	AAB5504	Soil	0-6[d]	x			x		x
10-1011	AAB5599	Soil	0-2	x			x		x
10-1012	AAB5491	Soil	0-4	x			x		x
10-1013	AAB5469	Soil	0-4	x			x		x
10-1014	AAB5467	Soil	0-4	x			x		x
10-1015	AAB5451	Soil	0-5	x			x		x
10-1016	AAB5452	Soil	0-4	x			x		x
10-1017	AAB5502	Soil	0-4	x			x		x
10-1018	AAB5482	Soil	0-4	x			x		x
10-1019	AAB5486	Soil	0-4	x			x		x
10-1020	AAB5492	Soil	0-4	x			x		x
10-1021	AAB5517	Soil	0-4	x			x		x
10-1022	AAB5461	Soil	0-4	x			x		x
10-1022	AAB5485	Soil	0-4	x			x		x
10-1023	AAB5462	Soil	2-4	x			x		x
10-1023	AAB5608	Soil	0-4			x		x	
10-1025	AAB5450	Soil	0-4	x			x		x

TABLE A-1 (CONTINUED)

SUMMARY OF SAMPLES COLLECTED AT SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	SAMPLE TYPE	DEPTH (INCHES)	TAL[a] METALS	SVOC[b]	HE[c]	STRONTIUM-90, URANIUM	GAMMA ACTIVITY	MRAL SCREENING
10-1025	AAB5609	Soil	0-6[d]			x		x	
10-1026	AAB5453	Soil	0-4	x			x		x
10-1026	AAB5616	Soil	0-4			x		x	
10-1027	AAB5526	Soil	0-4	x			x		x
10-1028	AAB5606	Soil	0-4	x			x		x
10-1029	AAB5505	Soil	0-4	x			x		x
10-1030	AAB5588	Soil	0-4	x			x		x
10-1031	AAB5581	Soil	0-4	x			x		x
10-1032	AAB5520	Soil	0-4	x			x		x
10-1032	AAB5611	Soil	0-6[d]			x		x	
10-1033	AAB5455	Soil	0-4	x			x		x
10-1033	AAB5543	Soil	0-6[d]			x			
10-1034	AAB5457	Soil	2-6	x			x		x
10-1034	AAB5610	Soil	0-4			x		x	
10-1035	AAB5454	Soil	0-4	x			x		x
10-1035	AAB5615	Soil	0-4			x		x	
10-1036	AAB5458	Soil	0-4	x			x		x
10-1036	AAB5480	Soil	0-4	x			x		x
10-1037	AAB5481	Soil	0-4	x			x		x
10-1038	AAB5483	Soil	0-6[d]	x			x		x
10-1039	AAB5607	Soil	0-4	x			x		x
10-1039	AAB5614	Soil	0-4	x			x		x
10-1040	AAB5591	Soil	0-4	x			x		x
10-1041	AAB5587	Soil	0-4	x			x		x
10-1041	AAB5589	Soil	0-4	x			x		x
10-1042	AAB5584	Soil	0-4	x			x		x
10-1043	AAB5523	Soil	0-4	x			x		x
10-1044	AAB5459	Soil	0-4	x			x		x
10-1044	AAB5612	Soil	0-4			x		x	
10-1045	AAB5463	Soil	0-4	x			x		x

TABLE A-1 (CONTINUED)

SUMMARY OF SAMPLES COLLECTED AT SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	SAMPLE TYPE	DEPTH (INCHES)	TAL[a] METALS	SVOC[b]	HE[c]	STRONTIUM-90, URANIUM	GAMMA ACTIVITY	MRAL SCREENING
10-1045	AAB5613	Soil	0-4			x		x	
10-1046	AAB5468	Soil	0-4	x			x		x
10-1047	AAB5449	Soil	0-4	x			x		x
10-1048	AAB5479	Soil	0-4	x			x		x
10-1049	AAB5570	Soil	0-4	x			x		x
10-1050	AAB5593	Soil	0-4	x			x		x
10-1051	AAB5590	Soil	0-4	x			x		x
10-1052	AAB5596	Soil	0-4	x			x		x
10-1053	AAB5522	Soil	0-4	x			x		x
10-1054	AAB5518	Soil	0-4	x			x		x
10-1055	AAB5477	Soil	0-4	x			x		x
10-1056	AAB5476	Soil	0-4	x			x		x
10-1057	AAB5464	Soil	0-4	x			x		x
10-1058	AAB5478	Soil	0-4	x			x		x
10-1059	AAB5470	Soil	0-4	x			x		x
10-1059	AAB5471	Soil	0-4	x			x		x
10-1060	AAB5586	Soil	0-4	x			x		x
10-1061	AAB5580	Soil	0-4	x			x		x
10-1062	AAB5585	Soil	0-4	x			x		x
10-1063	AAB5572	Soil	0-4	x			x		x
10-1064	AAB5576	Soil	0-4	x			x		x
10-1065	AAB5595	Soil	0-4	x			x		x
10-1066	AAB5583	Soil	0-6[d]	x			x		x
10-1067	AAB5574	Soil	0-3	x			x		x
10-1067	AAB5579	Soil	0-3	x			x		x
10-1068	AAB5594	Soil	0-4	x			x		x
10-1084	AAB5472	Soil	0-3	x			x		x
10-1084	AAB5495	Sediment	0-3	x			x		x
10-1085	AAB5474	Sediment	0-4	x			x		x

TABLE A-1 (CONTINUED)

SUMMARY OF SAMPLES COLLECTED AT SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	SAMPLE TYPE	DEPTH (INCHES)	TAL[a] METALS	SVOC[b]	HE[c]	STRONTIUM-90, URANIUM	GAMMA ACTIVITY	MRAL SCREENING
10-1085	AAB5496	Sediment	0-3	x			x		x
10-1085	AAB5547	Sediment	0-4			x			
10-1086	AAB5487	Sediment	0-4	x			x		x
10-1086	AAB5507	Sediment	0-4	x			x		x
10-1087	AAB5487	Sediment	0-3	x			x		x
10-1087	AAB5510	Sediment	0-3	x			x		x
10-1088	AAB5511	Sediment	0-3	x			x		x
10-1088	AAB5516	Sediment	0-3	x			x		x
10-1089	AAB5508	Sediment	0-4	x			x		x
10-1089	AAB5525	Sediment	0-3	x			x		x
10-1090	AAB2818	Sediment	0-3			x			
10-1090	AAB5499	Sediment	0-3	x			x		x
10-1090	AAB5506	Sediment	0-3	x			x		x
10-1091	AAB5582	Sediment	0-3	x			x		x
10-1091	AAB5592	Sediment	0-3	x			x		x
10-1092	AAB5473	Sediment	0-3	x			x		x
10-1092	AAB5519	Sediment	0-3	x			x		x
10-1093	AAB5498	Sediment	0-4	x			x		x
10-1093	AAB5501	Sediment	0-4	x			x		x
10-1094	AAB5489	Sediment	0-4	x			x		x
10-1094	AAB5509	Sediment	0-4	x			x		x
10-1094	AAB5542	Sediment	0-4			x			
10-1095	AAB5488	Sediment	0-4	x			x		x
10-1095	AAB5500	Sediment	0-4				x		x
10-1095	AAB5524	Sediment	0-4	x					
10-1096	AAB5484	Sediment	0-5	x			x		x
10-1096	AAB5490	Sediment	0-4	x			x		x
10-1096	AAB5521	Sediment	0-5	x			x		x
10-1097	AAB2823	Sediment	0-4	x	x		x		x

TABLE A-[illegible] (CONTINUED)

SUMMARY OF SAMPLES COLLECTED AT SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	SAMPLE TYPE	DEPTH (INCHES)	TAL[a] METALS	SVOC[b]	HE[c]	STRONTIUM-90, URANIUM	GAMMA ACTIVITY	MRAL SCREENING
10-1097	AAB2824	Sediment	0-4	x	x		x		x
10-1097	AAB5536	Sediment	0-4			x			
10-1097	AAB5540	Sediment	0-4			x			
10-1098	AAB2821	Sediment	0-4	x	x		x		x
10-1098	AAB2822	Sediment	0-4	x	x		x		x
10-1098	AAB5537	Sediment	0-4			x			
10-1098	AAB5539	Sediment	0-4			x			
10-1099	AAB2819	Sediment	0-2	x	x		x		x
10-1099	AAB2820	Sediment	0-4	x	x		x		x
10-1099	AAB5535	Sediment	0-2			x			
10-1099	AAB5541	Sediment	0-4			x			
10-1605	AAB5493	Soil	0-4	x			x		x
10-1605	AAB5529	Soil	0-4			x			
10-1611	AAB5530	Soil	0-3			x			
10-1611	AAB5601	Soil	0-3	x			x		x
10-1617	AAB5494	Soil	0-4	x			x		x
10-1617	AAB5548	Soil	0-4			x			
10-1619	AAB5545	Soil	0-4			x			
10-1619	AAB5571	Soil	0-4	x			x		x
10-1623	AAB5465	Soil	0-4	x			x		x
10-1623	AAB5527	Soil	0-2			x			
10-1627	AAB5531	Soil	0-4			x			
10-1627	AAB5605	Soil	0-4	x			x		x
10-1650	AAB5528	Soil	0-4			x			
10-1650	AAB5578	Soil	0-4	x			x		x
10-1661	AAB5532	Soil	0-4			x			
10-1661	AAB5577	Soil	0-4	x			x		x
10-1663	AAB5575	Soil	0-4	x			x		x
10-1668	AAB5546	Soil	0-2			x			
10-1668	AAB5569	Soil	0-4	x			x		x

[a]TAL = Target analyte list.
[b]SVOC = Semivolatile organic compounds.
[c]HE = High explosives
[illegible] Sampled to a depth of at least [illegible] inches and at most [illegible] inches

TABLE A-2

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1033	AAB5543	Soil	Gamma [a]	19706	All QC[b] within parameters. All data are valid
10-1001	AAB5544	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1023	AAB5608	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1025	AAB5609	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1034	AAB5610	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1032	AAB5611	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1044	AAB5612	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1045	AAB5613	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1035	AAB5615	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1026	AAB5616	Soil	Gamma	19706	All QC within parameters. All data are valid
10-1099	AAB5535	Soil	HE[c]	17781	All QC (except holding time) within parameters. All data are valid
10-1099	AAB5541	Soil	HE	17781	All QC (except holding time) within parameters. All data are valid
10-1097	AAB5536	Soil	HE	17784	Tetryl(methyl-2,4,6-trinitrophenylnitramine) and o-nitrotoluene were not detected in the QC sample. Because of the false negative values in the QC sample, these analytes are qualified 'UJ' [d]
10-1098	AAB5537	Soil	HE	17784	Tetryl(methyl-2,4,6-trinitrophenylnitramine) and o-nitrotoluene were not detected in the QC sample. Because of the false negative values in the QC sample, these analytes are qualified 'UJ'
10-1098	AAB5539	Soil	HE	17784	Tetryl(methyl-2,4,6-trinitrophenylnitramine) and o-nitrotoluene were not detected in the QC sample. Because of the false negative values in the QC sample, these analytes are qualified 'UJ'
10-1097	AAB5540	Soil	HE	17784	Tetryl(methyl-2,4,6-trinitrophenylnitramine) and o-nitrotoluene were not detected in the QC sample. Because of the false negative values in the QC sample, these analytes are qualified 'UJ'
10-1617	AAB5548	Soil	HE	17911	O-nitrotoluene, m-nitrotoluene and tetryl(methyl-2,4,6-trinitrophenylnitramine) had % recoveries of less than 50%. These analytes are qualified 'J' [e] or 'UJ'.
10-1623	AAB5527	Soil	HE	17913	All QC (except holding time) within parameters. All data are valid
10-1663	AAB2817	Soil	HE	17915	All QC (except holding time) within parameters. All data are valid
10-1650	AAB5528	Soil	HE	17915	All QC (except holding time) within parameters. All data are valid
10-1661	AAB5532	Soil	HE	17915	All QC (except holding time) within parameters. All data are valid
10-1094	AAB5542	Soil	HE	17915	All QC (except holding time) within parameters. All data are valid
10-1668	AAB5546	Soil	HE	17915	All QC (except holding time) within parameters. All data are valid
10-1085	AAB5547	Soil	HE	17915	All QC (except holding time) within parameters. All data are valid
10-1033	AAB5543	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1001	AAB5544	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1023	AAB5608	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1025	AAB5609	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1034	AAB5610	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1032	AAB5611	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1044	AAB5612	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1045	AAB5613	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1035	AAB5615	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1026	AAB5616	Soil	HE	17916	All QC (except holding time) within parameters. All data are valid
10-1611	AAB5536	Soil	HE	17917	All QC (except holding time) within parameters. All data are valid
10-1090	AAB2818	Soil	HE	17919	All QC (except holding time) within parameters. All data are valid
10-1605	AAB5529	Soil	HE	17919	All QC (except holding time) within parameters. All data are valid
10-1619	AAB5545	Soil	HE	17919	All QC (except holding time) within parameters. All data are valid
10-1627	AAB5531	Soil	HE	17917	All QC (except holding time) within parameters. All data are valid

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1099	AAB2819	Soil	SVOC'	17772	Low recoveries in the QC sample for anthracene (10%), o-dichlorobenzene (42%), 2-methylphenol (24%) and trichlorophenol (45%). These 3 qualified 'UJ'.
10-1099	AAB2820	Soil	SVOC	17772	Low recoveries in the QC sample for anthracene (10%), o-dichlorobenzene (42%), 2-methylphenol (24%) and trichlorophenol (45%). These 3 qualified 'UJ'.
10-1098	AAB2821	Soil	SVOC	17793	Continuing calibration % D > 25% for 4-chloroaniline and pentachlorophenol. These two are qualified 'UJ'. Also, di-n-butylphthalate (1600 ug/kg) and bis-2-ethylhexlphthalate (13ug/kg), found in blank, not in sample. No qualification.
10-1098	AAB2822	Soil	SVOC	17793	Continuing calibration % D > 25% for 4-chloroaniline and pentachlorophenol. These two are qualified 'UJ'. Also, di-n-butylphthalate (1600 ug/kg) and bis-2-ethylhexlphthalate (13ug/kg), found in blank, not in sample. No qualification.
10-1097	AAB2823	Soil	SVOC	17793	Continuing calibration % D > 25% for 4-chloroaniline and pentachlorophenol. These two are qualified 'UJ'. Also, di-n-butylphthalate (1600 ug/kg) and bis-2-ethylhexlphthalate (13ug/kg), found in blank, not in sample. No qualification.
10-1097	AAB2824	Soil	SVOC	17793	Continuing calibration % D > 25% for 4-chloroaniline and pentachlorophenol. These two are qualified 'UJ'. Also, di-n-butylphthalate (1600 ug/kg) and bis-2-ethylhexlphthalate (13ug/kg), found in blank, not in sample. No qualification.
10-1019	AAB5486	Soil	TAL Metals[d]	19500	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. mercury (61%) and arsenic (587%) had recoveries outside allowed limits for QC sample. Both qualified 'J' or 'UJ'.
10-1099	AAB2819	Soil	TAL Metals	19499	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Aluminum (74%), arsenic (587%), chromium (68%), mercury (61%), vanadium (71%) and thallium (58%) recoveries for QC sample outside allowed limits. All are qualified 'J' or 'UJ'.
10-1099	AAB2820	Soil	TAL Metals	19499	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Aluminum (74%), arsenic (587%), chromium (68%), mercury (61%), vanadium (71%) and thallium (58%) recoveries for QC sample outside allowed limits. All are qualified 'J' or 'UJ'.
10-1054	AAB5518	Soil	TAL Metals	19499	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Aluminum (74%), arsenic (587%), chromium (68%), mercury (61%), vanadium (71%) and thallium (58%) recoveries for QC sample outside allowed limits. All are qualified 'J' or 'UJ'.
10-1018	AAB5482	Soil	TAL Metals	19500	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Mercury (61%) and arsenic (587%) had recoveries outside allowed limits for QC sample. Both qualified 'J' or 'UJ'.
10-1020	AAB5492	Soil	TAL Metals	19500	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Mercury (61%) and arsenic (587%) had recoveries outside allowed limits for QC sample. Both qualified 'J' or 'UJ'.
10-1617	AAB5494	Soil	TAL Metals	19500	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Mercury (61%) and arsenic (587%) had recoveries outside allowed limits for QC sample. Both qualified 'J' or 'UJ'.
10-1098	AAB2821	Soil	TAL Metals	19501	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'.
10-1098	AAB2822	Soil	TAL Metals	19501	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'.
10-1097	AAB2823	Soil	TAL Metals	19501	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'.
10-1097	AAB2824	Soil	TAL Metals	19501	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'.
10-1047	AAB5449	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1036	AAB5458	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1044	AAB5459	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1008	AAB5460	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1023	AAB5462	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1045	AAB5463	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1057	AAB5464	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1623	AAB5465	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1044	AAB5466	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1014	AAB5467	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1046	AAB5468	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1013	AAB5469	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1059	AAB5470	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1059	AAB5471	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1056	AAB5476	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1055	AAB5477	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1058	AAB5478	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1048	AAB5479	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1036	AAB5480	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1037	AAB5481	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1038	AAB5483	Soil	TAL Metals	19518	Mercury and cyanide holding times grossly exceeded, qualified 'J' or 'UJ'. Arsenic (70%, 67%) and chromium (66%, 63%) had low recoveries in 2 QC samples. Both are qualified 'J' or 'UJ'.
10-1095	AAB5524	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1668	AAB5569	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1049	AAB5570	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1063	AAB5572	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1001	AAB5573	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1067	AAB5574	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1663	AAB5575	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1064	AAB5576	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1661	AAB5577	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1650	AAB5578	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1067	AAB5579	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1061	AAB5580	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1031	AAB5581	Soil	TAL Metals	19662	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1066	AAB5583	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1042	AAB5584	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1062	AAB5585	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1060	AAB5586	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1041	AAB5587	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1030	AAB5588	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1041	AAB5589	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1051	AAB5590	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1040	AAB5591	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1050	AAB5593	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1068	AAB5594	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1065	AAB5595	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1052	AAB5596	Soil	TAL Metals	19682	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (68%) and chromium (66%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1022	AAB5461	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1084	AAB5472	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1085	AAB5474	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1084	AAB5475	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1096	AAB5484	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1022	AAB5485	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1095	AAB5488	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1094	AAB5489	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1096	AAB5490	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1084	AAB5495	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1085	AAB5496	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1086	AAB5507	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1094	AAB5509	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1096	AAB5514	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1032	AAB5520	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1096	AAB5521	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1053	AAB5522	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1043	AAB5523	Soil	TAL Metals	19759	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Lead (244%) and chromium (69%) had recoveries outside acceptable limits in the QC sample. Both are qualified 'J' or 'UJ'.
10-1029	AAB5505	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1027	AAB5526	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1004	AAB5597	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1002	AAB5598	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1011	AAB5599	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1003	AAB5600	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1611	AAB5601	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1627	AAB5605	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1028	AAB5606	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1039	AAB5607	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1039	AAB5614	Soil	TAL Metals	19779	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1092	AAB5473	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1087	AAB5487	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1012	AAB5491	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1605	AAB5493	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1086	AAB5497	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1093	AAB5498	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1090	AAB5499	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1093	AAB5501	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1017	AAB5502	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1009	AAB5503	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1010	AAB5504	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1090	AAB5506	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1087	AAB5510	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1088	AAB5511	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1005	AAB5512	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1006	AAB5513	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1007	AAB5515	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1088	AAB5516	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1021	AAB5517	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1092	AAB5519	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1089	AAB5525	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1619	AAB5571	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1091	AAB5582	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1091	AAB5592	Soil	TAL Metals	19785	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'.
10-1025	AAB5450	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.
10-1015	AAB5451	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.
10-1016	AAB5452	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.
10-1026	AAB5453	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.
10-1035	AAB5454	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.
10-1033	AAB5455	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.
10-1024	AAB5456	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.
10-1034	AAB5457	Soil	TAL Metals	19792	Mercury holding time grossly exceeded, qualified 'J' or 'UJ'. Aluminum (84% and 71%) and chromium (89% and 74%) outside allowed limits in one of two QC sample. Up to 20% uncertainty in QC value. Data are not qualified.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

10-1018	AAB5482	Soil	Total uranium, strontium-90[h]	19766	All QC within parameters. All data are valid
10-1019	AAB5486	Soil	Total uranium, strontium-90	19766	All QC within parameters. All data are valid
10-1020	AAB5492	Soil	Total uranium, strontium-90	19766	All QC within parameters. All data are valid
10-1617	AAB5494	Soil	Total uranium, strontium-90	19766	All QC within parameters. All data are valid
10-1029	AAB5505	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1027	AAB5526	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1004	AAB5597	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1002	AAB5598	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1011	AAB5599	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1003	AAB5600	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1611	AAB5601	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1627	AAB5605	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1028	AAB5606	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1039	AAB5607	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1039	AAB5614	Soil	Total uranium, strontium-90	18990	All QC within parameters. All data are valid
10-1668	AAB5569	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1049	AAB5570	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1063	AAB5572	Soil	Total uranium, strontium-90	19661	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1001	AAB5573	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1067	AAB5574	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1663	AAB5575	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1064	AAB5576	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1661	AAB5577	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1650	AAB5578	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1067	AAB5579	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1061	AAB5580	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1031	AAB5581	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1066	AAB5583	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1042	AAB5584	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1062	AAB5585	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1060	AAB5586	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1041	AAB5587	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1030	AAB5588	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1041	AAB5589	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1051	AAB5590	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1040	AAB5591	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1050	AAB5593	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1068	AAB5594	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1065	AAB5595	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1052	AAB5596	Soil	Total uranium, strontium-90	19681	Low recoveries of uranium in the QC sample (48% and 16%). All the uranium results are qualified 'J'.
10-1092	AAB5473	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1087	AAB5487	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1012	AAB5491	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1605	AAB5493	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1086	AAB5497	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1093	AAB5498	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1090	AAB5499	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1093	AAB5501	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1017	AAB5502	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1009	AAB5503	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1010	AAB5504	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1090	AAB5506	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 0-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1086	AAB5507	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1087	AAB5510	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1088	AAB5511	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1005	AAB5512	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1006	AAB5513	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1007	AAB5515	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1088	AAB5516	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1021	AAB5517	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1092	AAB5519	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1089	AAB5525	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1619	AAB5571	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1091	AAB5582	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1091	AAB5592	Soil	Total uranium, strontium-90	19705	High recoveries in the QC samples for strontium-90 (121%) and uranium (122% and 123%). All of the data are qualified 'J'.
10-1022	AAB5461	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1084	AAB5472	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1085	AAB5474	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1084	AAB5475	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1096	AAB5484	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1022	AAB5485	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1095	AAB5488	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1094	AAB5489	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1096	AAB5490	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1084	AAB5495	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1085	AAB5496	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1086	AAB5507	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1094	AAB5509	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1096	AAB5514	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1032	AAB5520	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1096	AAB5521	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1053	AAB5522	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1043	AAB5523	Soil	Total uranium, strontium-90	19762	Uranium recovery in the QC sample was 78%. Because of this low recovery, all uranium data are qualified 'J'.
10-1025	AAB5450	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1015	AAB5451	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1016	AAB5452	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1026	AAB5453	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1035	AAB5454	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1033	AAB5455	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1024	AAB5456	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1034	AAB5457	Soil	Total uranium, strontium-90	19765	All QC within parameters. All data are valid
10-1047	AAB5449	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1036	AAB5458	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1044	AAB5459	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1008	AAB5460	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1023	AAB5462	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1045	AAB5463	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1057	AAB5464	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1623	AAB5465	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1044	AAB5466	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1014	AAB5467	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1046	AAB5468	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1013	AAB5469	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1059	AAB5470	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1059	AAB5471	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.

TABLE A-2 (CONTINUED)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR SWMUs 10-001(a–d)

LOCATION ID	SAMPLE ID	MATRIX CODE	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
10-1056	AAB5476	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1055	AAB5477	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1058	AAB5478	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1048	AAB5479	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1036	AAB5480	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1037	AAB5481	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1038	AAB5483	Soil	Total uranium, strontium-90	19768	High recovery in the QC sample for uranium (130%). All of the uranium data are qualified 'J'.
10-1099	AAB2819	Soil	Total uranium, strontium-90	19769	All QC within parameters. All data are valid
10-1099	AAB2820	Soil	Total uranium, strontium-90	19769	All QC within parameters. All data are valid
10-1054	AAB5518	Soil	Total uranium, strontium-90	19769	All QC within parameters. All data are valid
10-1098	AAB2821	Soil	Total uranium, strontium-90	19772	All QC within parameters. All data are valid
10-1098	AAB2822	Soil	Total uranium, strontium-90	19772	All QC within parameters. All data are valid
10-1097	AAB2823	Soil	Total uranium, strontium-90	19772	All QC within parameters. All data are valid
10-1097	AAB2824	Soil	Total uranium, strontium-90	19772	All QC within parameters. All data are valid
10-1095	AAB5500	Soil	Total uranium, strontium-90	20452	All QC within parameters. All data are valid

[a]Gamma = Gamma spectroscopy activity.
[b]QC = Quality control
[c]HE = High explosives.
[d]UJ = Estimated undetected quantities.
[e]J = Estimated detected quantities.
[f]SVOCs = Semivolatile organic compounds.
[g]TAL Metals = Target analyte list metals.

TABLE A-3

SUMMARY OF NON-DETECTED ANALYTES AT SWMUs 10-001(a–d)

ANALYTE	NON-DETECTS COUNT	MIN	MAX
Acenaphthene	6	0.32	0.33
Acenaphthylene	6	0.32	0.33
Amino-4,6-dinitrotoluene [2-]	29	0.073	0.075
Anthracene	6	0.32	0.33
Antimony	129	0.36	5.1
Benzoic acid	6	0.8	0.84
Benzo[a]anthracene	6	0.32	0.33
Benzo[a]pyrene	6	0.32	0.33
Benzo[b]fluoranthene	6	0.32	0.33
Benzo[g,h,i]perylene	6	0.32	0.33
Benzo[k]fluoranthene	6	0.32	0.33
Benzyl alcohol	6	0.32	0.33
Bis(2-chloroethoxy)methane	6	0.32	0.33
Bis(2-chloroethyl)ether	6	0.32	0.33
Bis(2-chloroisopropyl)ether	6	0.32	0.33
Bis(2-ethylhexyl)phthalate	6	0.32	0.33
Bromophenylphenyl ether [4-]	6	0.32	0.33
Butyl benzyl phthalate	6	0.32	0.33
Chloro-3-methylphenol [4-]	6	0.32	0.33
Chloroaniline [4-]	6	0.32	0.33
Chloronaphthalene [2-]	6	0.32	0.33
Chlorophenol [o-]	6	0.32	0.33
Chlorophenylphenyl ether [4-]	6	0.32	0.33
Chrysene	6	0.32	0.33
Cyanide	35	0.38	0.46
Di-n-butyl phthalate	6	0.32	0.33
Di-n-octyl phthalate	6	0.32	0.33
Dibenzofuran	6	0.32	0.33
Dibenzo[a,h]anthracene	6	0.32	0.33
Dichlorobenzene (1,2) [o-]	6	0.32	0.33
Dichlorobenzene (1,3) [m-]	6	0.32	0.33
Dichlorobenzene (1,4) [p-]	6	0.32	0.33
Dichlorobenzidine [3,3'-]	6	0.32	0.33
Dichlorophenol [2,4-]	6	0.32	0.33
Diethyl phthalate	6	0.32	0.33

TABLE A-3 (CONTINUED)

SUMMARY OF NON-DETECTED ANALYTES AT SWMUs 10-001(a–d)

ANALYTE	NON-DETECTS COUNT	MIN	MAX
Dimethyl phthalate	6	0.32	0.33
Dimethylphenol [2,4-]	6	0.32	0.33
Dinitrobenzene [1,3-]	29	0.059	0.061
Dinitrophenol [2,4-]	6	0.8	0.84
Dinitrotoluene [2,4-]	35	0.061	0.33
Fluoranthene	6	0.32	0.33
Fluorene	6	0.32	0.33
Hexachlorobenzene	6	0.32	0.33
Hexachlorobutadiene	6	0.32	0.33
Hexachlorocyclopentadiene	6	0.32	0.33
Hexachloroethane	6	0.32	0.33
Indeno[1,2,3-cd]pyrene	6	0.32	0.33
Isophorone	6	0.32	0.33
Methyl-4,6-dinitrophenol [2-]	6	0.8	0.84
Methylnaphthalene [2-]	6	0.32	0.33
Methylphenol [2-]	6	0.32	0.33
Methylphenol [4-]	6	0.32	0.33
Naphthalene	6	0.32	0.33
Nitroaniline [2-]	6	0.8	0.84
Nitroaniline [3-]	6	0.8	0.84
Nitroaniline [4-]	6	0.8	0.84
Nitrophenol [2-]	6	0.32	0.33
Nitrophenol [4-]	6	0.8	0.84
Nitrosodi-n-propylamine [N-]	6	0.32	0.33
Nitrosodiphenylamine [N-]	6	0.32	0.33
Pentachlorophenol	6	0.8	0.84
Phenanthrene	6	0.32	0.33
Phenol	6	0.32	0.33
Pyrene	6	0.32	0.33
RDX	29	0.1678	0.172
Selenium	129	0.34	0.86
Silver	129	0.06	0.91
Tetryl(methyl-2,4,6-trinitrophenylnitramine)	29	0.09	0.093
Trichlorobenzene [1,2,4-]	6	0.32	0.33
Trichlorophenol [2,4,5-]	6	0.8	0.84

TABLE A-3 (CONTINUED)

SUMMARY OF NON-DETECTED ANALYTES AT SWMUs 10-001(a–d)

ANALYTE	NON-DETECTS COUNT	MIN	MAX
Trichlorophenol [2,4,6-]	6	0.32	0.33
Trinitrobenzene [1,3,5-]	29	0.089	0.094
Trinitrotoluene [2,4,6-]	29	0.084	0.086

TABLE A-4

TA-10 ANALYTICAL RESULTS FOR INORGANIC ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
	SAL[a]	77 000	0.32	5 000	0.14	38	0.14	d	NA[d]	2 000	NA	400	NA	300	23	1 500	NA	NA	6.1	230	540	23 000
	UTL[b]	123 000	11.6	1 140	3.31	2.7	54 400	34.2	51.1	15.7	35 600	30	16 100	1 030	0.1	26.7	0 100	3 320	0.0	5.71	66.2	101
	CRQL[c]	40	2	40	1	1	1 000	10	10	5	20	0.5	1 000	3	0.04	0	1 000	1 000	2	NA	10	4

LOCATION ID	SAMPLE ID	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
10-1001	AAB5573	1 464	<0.54	<17.3	<0.54	0.39	<883	<1.1	<0.7	1.9	4 347	6.4	384	201	0.03	<1.19	<403	82.1	0.36	3.21	1.6	36.5
10-1001	AAB5573R	1 580	<0.54	15.7	0.49	<0.34	1 189	<1.1	<0.7	<2.1	4 790	6.9	<373	213	<0.03	<1.3	382	<94.6	<0.52	3.21	<2.1	39.1
10-1002	AAB5598	8 450	2.6	70.1	1	<0.41	2 600	4	<2.6	7.1	10 300	28.3	1 410	271	<0.04	<4.7	1 170	<98	<0.57	5.3	<8.1	48.1
10-1003	AAB5600	6 310	3.4	96.7	<0.72	<0.46	5 730	4.1	<3	8.3	8 670	24.4	1 420	373	<0.06	<4.5	1 310	<134	<0.58	4.3	<8.4	54.9
10-1004	AAB5597	7 060	3.3	100	<0.69	<0.47	5 380	4.9	<3.2	6.6	9 380	24	1 670	386	<0.05	<4.9	1 400	<95	<0.57	6	<9.8	52.9
10-1005	AAB5512	2 810	<0.55	<25.4	<0.51	<0.41	<865	<1.1	<0.75	<2.3	3 700	5.9	<643	155	<0.03	<2.3	<568	<89.4	<0.27	4.56	<3	19.5
10-1006	AAB5513	3 510	<0.58	55.4	<0.6	<0.4	<933	<1.6	<0.83	<3	4 090	7.8	<612	213	<0.03	<1.8	<736	<61.5	<0.28	5.7	<3.5	25
10-1007	AAB5515	1 950	<0.55	<21.9	<0.53	<0.42	<887	<1.1	<0.7	<2.2	4 770	6.6	<368	236	<0.03	<1.2	<399	<64.2	<0.34	2.78	<2.3	32.3
10-1008	AAB5460	1 420	<0.54	<12.7	<0.33	<0.34	<632	<1.1	<0.7	<1.1	3 340	6.8	<240	279	<0.02	<1.2	<434	<193	<0.26	3.5	<1.4	25.6
10-1009	AAB5503	1 810	<0.7	<16.5	<0.47	<0.34	<431	<1.1	<0.72	<3.5	3 740	8.2	<332	127	<0.04	<1.5	<291	<62	<0.26	1.44	<3.4	21.4
10-1010	AAB5504	3 810	<1.1	<39.1	<0.78	<0.78	1 150	2.5	<1.4	<4.7	7 930	14.5	<673	284	<0.04	<3.2	<587	<67.9	<0.31	3.01	<5.3	42.7
10-1011	AAB5599	3 090	2.2	43.5	<0.7	<0.23	<907	<2	<1.6	<4.3	7 580	13.3	<670	297	<0.04	<2.3	<512	<83.2	<0.56	5.2	<5	42.5
10-1012	AAB5491	5 360	<1.6	65.4	<0.87	<0.82	4 160	3.3	<2.6	7.5	8 750	16	1 150	352	<0.06	<5	1 370	<58.9	<0.28	4.75	<8.2	42.1
10-1013	AAB5489	5 600	<1.3	61.2	<0.69	<0.36	2 290	3.2	<2.5	<4.4	5 980	20	<1 070	307	<0.02	<3.4	1 300	<113	<0.28	5.74	<7.7	30.6
10-1014	AAB5467	5 310	<1.4	62.1	<0.7	<0.42	1 800	4	<2.4	6	5 790	18.5	<1 010	281	<0.02	<4	1 240	<116	<0.32	4.24	<8.8	28.9
10-1015	AAB5451	2 420	<0.36	<21.2	<0.53	<0.04	<861	<0.93	<0.78	<0.96	2 720	5.7	<434	122	<0.05	<0.97	<489	<332	<0.61	6.1	<1.6	17
10-1016	AAB5452	2 700	<0.64	<24.5	<0.59	<0.1	1 130	<1.5	<1	<1.8	3 990	7.5	<529	169	<0.06	<1.6	<585	<76.1	<0.59	4.83	<2.7	20.1
10-1017	AAB5502	1 600	<1.3	<14.3	<0.65	<0.34	<265	<1.1	<0.7	<3.5	8 020	11.1	<219	289	<0.03	<1.2	<342	<175	<0.26	5.29	<2.4	75.8
10-1018	AAB5482	2 120	0.67	21	<0.44	<0.35	<655	<1.5	<0.77	<3.2	3 458	8.1	400	199	0.04	<1.2	550	<129	<0.26	3.87	<2.6	23
10-1018	AAB5482R	2 018	<0.55	<23	0.41	<0.35	652	2	0.96	2.6	3 090	10.4	<369	186	<0.03	<1.2	<582	104	<0.26	3.09	3.1	21
10-1019	AAB5486	1 410	<0.58	<10.6	<0.26	<0.34	<278	<1.5	<0.78	<1.2	2 250	4.3	<211	95.2	<0.03	<1.2	<353	<113	<0.26	2.16	<2	13.9
10-1020	AAB5492	8 250	<1.5	66.9	<0.74	<0.36	1 840	3.6	<2.6	<4.4	6 550	11.8	1 130	362	<0.06	<2.2	1 290	<97.6	<0.27	3.63	<8.4	31.8
10-1021	AAB5517	4 140	<1.2	47.3	<0.59	<0.35	1 540	2.7	<2	<4	6 330	7.6	<776	303	<0.04	<3.2	<847	<60.4	<0.27	2.81	<7.1	31
10-1022	AAB5461	4 560	<1.6	53.7	<0.64	<0.64	2 110	3.7	<2.3	5.2	8 640	4.5	1 070	234	<0.05	<3.2	1 100	<48.1	<0.55	4.39	<7.7	29.5
10-1022	AAB5485	5 220	<1.6	54.8	<0.72	1.1	2 080	4.6	<2.7	5.7	7 080	26.7	1 190	239	0.52	<4.4	1 190	<51.3	<0.57	3.31	<8.5	33.9
10-1023	AAB5462	6 890	<1	62.4	<0.68	<0.37	2 380	4.2	<2.2	<4	5 850	13.8	1 210	260	<0.02	<3.2	1 490	<101	<0.28	4.81	<6.6	22.6
10-1024	AAB5456	8 040	2.6	107	<0.98	<0.49	2 410	6.9	<5.1	6.4	11 600	13.1	1 810	321	<0.06	<7.2	1 540	<103	<0.57	3.11	16.8	29.9
10-1025	AAB5450	2 223	<0.68	26.9	0.45	<0.4	843	1.6	1.6	8.8	4 957	9.9	390	230	0.06	<1.6	<435	47.5	<0.57	3.71	3.7	28.5
10-1025	AAB5450R	2 150	1.1	<28	<0.46	0.37	<582	<1.6	<1.3	9.6	5 120	9.6	<392	191	0.12	1.6	440	<47.1	<0.57	3.69	<3.7	29.3

TABLE A-4 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR INORGANIC ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
	BAL[a]	77 000	8.32	5 000	0.16	30	0.14	4	NA[d]	2 000	NA	400	NA	300	23	1 500	NA	NA	6.1	230	540	23 000
	UTL[b]	123 000	11.8	1 140	3.31	2.7	54 400	34.2	51.1	16.7	26 000	30	16 100	1 030	0.1	26.7	6 100	3 320	0.9	5.71	66.2	101
	CRQL[c]	40	2	40	1	1	1 000	10	10	5	20	0.5	1 000	3	0.04	8	1 000	1 000	2	NA	10	4

LOCATION ID	SAMPLE ID	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
10-1026	AAB5453	1 510	<0.39	<15.8	<0.45	<0.09	<532	<0.86	<0.72	<1.3	3 900	6.4	<346	179	<0.05	<0.74	<318	<70.5	<0.57	4	<1.8	28.5
10-1027	AAB5526	1 690	<1.7	<9	<0.77	<0.08	<666	<0.63	<0.48	<1.0	3 540	3.8	<341	139	<0.04	<0.86	<237	<96	<0.56	4.7	<2.2	19.5
10-1028	AAB5606	2 040	<1.9	<22	<0.44	<0.17	<798	<1.2	<1	<2.7	5 780	10.4	<458	333	<0.04	<1.4	<477	<108	<0.56	8.4	<3.1	46.5
10-1029	AAB5505	2 590	<1.6	<33.7	<0.48	<0.19	2 390	<1.6	<1.2	<3.8	4 680	12.8	<648	270	<0.04	<1.8	<539	<108	<0.57	5.6	<3.6	42.1
10-1030	AAB5588	6 590	<1.4	91.8	<0.69	<0.62	1 220	6.4	<6.5	5.9	9 370	20.7	1 310	495	<0.05	<5.8	1 400	<55.2	<0.34	3.16	17.5	26.1
10-1030	AAB5588R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.32	-	-
10-1031	AAB5581	8 130	<0.91	71.5	<0.65	<0.8	1 180	5.3	<4.8	<4.5	8 190	15.3	1 160	379	<0.04	<4.8	1 320	<43.4	<0.4	2.25	14.9	23.2
10-1032	AAB5520	3 750	<0.81	<36.3	<0.73	<0.69	1 540	2	<1.6	<3	5 350	3.8	<650	177	<0.04	<2.7	<644	<119	<0.69	4.32	<6.2	30.7
10-1033	AAB5455	3 120	<1.3	43.8	<0.78	<0.18	1 980	<2	<1.5	<4.4	5 810	14.7	<775	234	<0.06	<2.4	<878	<74	<0.58	4.9	<4	35.3
10-1034	AAB5457	8 150	<1.9	96.4	1.1	<0.91	1 800	4.2	<3.6	50.8	8 700	22.2	1 210	354	<0.06	<4.9	1 450	<87.8	<0.59	5.8	<10.2	63.8
10-1035	AAB5454	1 500	<0.75	<19.5	<0.43	<0.04	<483	<1	<1.4	<0.6	4 130	6.3	<306	208	<0.05	<1.2	<310	<75.9	<0.61	4.98	<2.7	24.2
10-1036	AAB5458	2 020	<0.54	<18.7	<0.39	<0.34	<853	<1.1	<0.77	<2.3	2 050	8.6	<408	145	<0.02	<1.2	<712	<125	<0.26	3.34	<1.9	17.2
10-1036	AAB5480	2 150	<0.54	<20.2	<0.41	<0.34	<914	<1.1	<1.2	<2.8	2 110	8.7	<442	147	<0.02	<1.8	<736	<133	<0.26	3.42	<1.9	18
10-1037	AAB5481	2 141	0.54	<13.4	<0.47	<0.34	570	<1.1	<0.7	8.7	2 400	10.1	311	160	<0.02	<1.2	<918	728	<0.26	4.84	<1.9	20
10-1037	AAB5481R	2 310	<0.82	9.63	0.45	<0.34	<882	<1.1	<0.7	<1.1	2 414	8.76	<544	149	<0.02	<1.2	908	<663	<0.26	-	1.62	20.9
10-1038	AAB5463	1 400	<0.56	<14.3	<0.33	<0.35	1 080	<1.1	<0.72	<1.1	1 320	4.2	<206	94.2	<0.02	<1.2	<448	<581	<0.27	7.8	<1.3	9.9
10-1039	AAB5607	3 820	2.1	68.3	<0.48	<0.46	13 800	2.8	<1.7	7.2	4 670	18	1 270	183	<0.04	<4.4	<727	<121	<0.56	5.8	<5.8	28.6
10-1039	AAB5614	3 780	2.1	84.4	<0.48	<0.42	11 400	2.5	<1.7	7	4 810	17.5	1 210	179	<0.04	101	<708	<121	<0.57	5.4	<5.6	668
10-1040	AAB5591	9 230	<1.5	123	<0.98	<0.92	2 160	7	<6.5	8.5	11 600	17.4	1 850	520	<0.05	8.4	1 780	<52.6	<0.27	3.72	19.7	33.6
10-1041	AAB5587	8 220	<1.8	96	<0.9	<0.94	1 950	7.2	<6	7.3	10 900	24.5	1 700	481	<0.05	<6.9	1 690	<134	<0.86	3.11	19.7	34.6
10-1041	AAB5589	7 780	<1.7	98.9	<0.89	<0.94	1 970	7	<8.3	7.3	10 700	27.1	1 690	493	<0.06	<7.5	1 670	<141	<0.3	3.17	19.5	35.2
10-1042	AAB5584	6 970	<1.4	72.7	<0.59	<0.85	1 740	5	<3.5	5.8	8 370	19.6	1 230	283	<0.05	<4.2	1 130	<57.2	<0.48	2.83	12.9	31.2
10-1043	AAB5523	4 930	<1.3	60.8	<0.62	<0.6	1 940	3.4	<2.8	<5.1	6 510	10.3	<1 000	274	<0.04	<3.5	1 140	<96.7	<0.47	2.73	<7.6	28.3
10-1044	AAB5459	5 140	<0.87	60.2	<0.86	<0.35	1 530	2.9	<2.6	7.1	5 040	10.6	<983	227	<0.02	<3.4	1 170	<86.5	<0.27	1.56	<6.9	24.8
10-1044	AAB5466	4 910	<1	48.5	<0.85	<0.36	1 240	3.3	<2.5	6	5 220	10.5	<921	205	<0.02	<3.1	1 140	<81.8	<0.27	3.4	<7.2	23.6
10-1045	AAB5463	4 240	<0.55	55.6	<0.52	<0.75	1 250	2.7	<2.8	22.9	4 150	12	<786	234	<0.02	<2.4	1 100	<70.4	<0.27	3.29	<6.4	21.7
10-1046	AAB5468	3 897	<0.55	<38.1	<0.51	0.67	986	2	1.4	2.8	3 340	17.9	605	178	<0.02	<2	1 017	117	<0.26	3.4	4	26.9
10-1046	AAB5468R	3 760	<0.55	37.7	0.52	<0.44	1 060	2.5	<1.7	<3.5	3 453	18.7	<616	181	<0.02	1.8	<968	<105	<0.26	2.87	<4.3	25.5

TABLE A-4 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR INORGANIC ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
	SAL[a]	77 000	0.32	5 000	0.14	38	0.14	d	NA[d]	2 000	NA	400	NA	380	23	1 500	NA	NA	6.1	230	540	23 000
	UTL[b]	123 000	11.6	1 140	3.31	2.7	54 000	34.2	51.1	15.7	35 000	39	16 100	1 030	0.1	26.7	6 100	3 320	9.9	5.71	56.2	101
	CRQL[c]	45	2	40	1	1	1 000	10	10	5	20	0.5	1 000	3	0.04	8	1 000	1 000	2	NA	10	4

LOCATION ID	SAMPLE ID	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
10-1047	AAB5449	1 810	<0.58	<18.2	<0.3	<0.36	<521	<1.3	<1.4	<1.3	2 610	4.9	<319	137	<0.02	<1.7	<450	<60.5	<0.27	1.98	<3.4	14
10-1048	AAB5479	2 640	<0.55	<21.9	<0.36	<0.35	<909	<1.1	<0.72	<1.3	1 710	6.4	<547	115	<0.02	<1.2	<691	<157	<0.26	5.8	<2.1	11.1
10-1049	AAB5570	2 740	<0.83	<26.1	<0.49	<0.63	<898	<1.7	<0.7	<3.7	4 290	20.3	<852	195	<0.05	<2.1	<614	<61.1	<0.26	3.3	<3.9	35.7
10-1050	AAB5593	6 790	<1.2	78.7	<0.79	<0.65	1 440	5.3	<4	<4.5	6 490	15.2	1 130	384	<0.04	<3.6	1 140	<54.7	<0.3	2.52	12.2	31.8
10-1051	AAB5590	7 580	<1.1	106	<0.89	<0.78	1 600	8.2	<6	5.4	9 950	16.3	1 480	461	<0.04	<5.9	1 490	<48.8	<0.26	3.17	17.3	28.9
10-1052	AAB5596	5 860	<0.61	56.3	<0.65	<0.77	1 100	5.1	<3.2	<4.2	6 940	12.5	<968	239	<0.04	<3.4	<959	<42.5	<0.26	2.27	11.2	30.5
10-1053	AAB5522	2 680	<1.2	<32.8	<0.39	<0.88	1 360	2.4	<1.1	<4.3	6 530	10.4	<570	326	<0.04	<1.9	<570	<86.8	<0.47	4.07	<4.9	52.2
10-1054	AAB5516	3 420	<0.88	<31.6	<0.46	<0.35	1 300	3.1	<1.4	<3.5	4 410	6.9	<680	213	<0.04	<1.2	<766	<121	<0.27	3.37	<5.1	29.2
10-1055	AAB5477	5 650	<0.76	54.1	<0.55	<0.36	4 350	3	<2.2	6.2	4 690	19.6	<1 140	121	<0.02	<3.4	1 220	<115	<0.28	4.6	<6.4	23.3
10-1055	AAB5477R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.95	-	-
10-1056	AAB5476	7 250	<1.4	71.5	<0.8	<0.53	3 860	3.9	<3.3	33.9	6 720	16.9	<1 740	213	<0.02	<3.7	2 180	<97.9	<0.28	3.2	<9.6	31.5
10-1057	AAB5464		<0.79	51.2	<0.63	<0.36	1 230	2.3	<2.2	<2.5	4 420	10.1	<804	269	<0.02	<3.4	<962	<95.3	<0.28	3.4	<5.5	22.1
10-1058	AAB5478	3 560	<0.56	<40.1	<0.46	<0.35	<1 000	<2	<1.9	<2.3	3 610	10.9	<635	254	<0.02	<2.1	<856	<93.7	<0.27	2.98	<4.2	20
10-1059	AAB5470	1 560	<0.55	<18.2	<0.31	<0.34	<388	<1.1	<0.71	<1.1	2 970	3.7	<285	151	<0.02	<1.2	<342	<76.2	<0.26	1.53	<3.1	13
10-1059	AAB5470R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-1059	AAB5471	1 280	<0.55	<11.5	<0.26	<0.34	<314	<1.2	<0.79	<1.1	2 120	3.3	<225	91.6	<0.02	<1.2	<276	<62.8	<0.26	3.59	<2	11.5
10-1060	AAB5586	6 580	<1.3	94	<0.83	<0.7	33 900	3.2	<2.5	6.1	6 500	17	1 510	240	<0.06	<6.1	1 100	<76.3	<0.41	2.85	<7	32.7
10-1061	AAB5580	6 760	2.1	85.8	<0.67	<0.92	2 310	4.6	<2.7	6.5	7 290	24.2	1 250	285	<0.07	<4.3	1 470	<72	<0.26	3.21	<8.5	35.1
10-1062	AAB5585	5 900	<1	72.4	<0.59	<0.75	2 380	4.8	<2.6	5.3	6 540	23.6	1 110	300	<0.05	<4.2	1 120	<48.2	<0.38	4.02	<8.3	37.7
10-1063	AAB5572	6 530	<1	82.5	<0.96	<0.74	1 740	4.8	<3.6	<4.5	7 820	12.9	1 070	280	<0.04	<5.3	1 120	<66	<0.27	2.54	10.4	26.1
10-1064	AAB5576	7 940	<1.8	110	<1.1	<0.66	7 420	6.8	<3.9	7.4	8 800	21.5	1 780	332	<0.08	<5.6	1 620	<44.9	<0.28	2.86	11.9	36.6
10-1065	AAB5595	3 420	<0.82	<32.9	<0.5	<0.34	1 530	2	<1.3	<2.6	3 990	11.7	<665	127	<0.04	<2.6	<620	<45.7	<0.26	1.95	<4.9	17.9
10-1065	AAB5595R	-	-	-	<0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.57	-	-
10-1066	AAB5583	2 700	<0.74	<25.7	<0.36	<0.67	1 470	<1.9	<1.1	<2.6	5 320	14.3	<550	255	<0.04	<1.6	<558	<75.5	<0.35	3.91	<4.3	37.3
10-1067	AAB5574	3 360	<0.54	<26.5	<0.61	<0.34	<976	2.7	<1.4	<2	5 870	9.3	<676	176	<0.04	<2.9	<681	<48.1	<0.26	2.42	<5.5	29.8

TABLE A-4 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR INORGANIC ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
	SAL[a]	77 000	0.22	5 600	0.14	38	6.14	d	NA[d]	2 800	NA	400	NA	380	23	1 500	NA	NA	6.1	230	540	23 000
	UTL[b]	123 000	11.6	1 140	3.31	2.7	54 400	34.2	51.1	15.7	35 000	30	16 100	1 030	0.1	26.7	6 100	3 320	0.9	5.71	66.2	101
	CRQL[c]	40	2	40	1	1	1 000	10	10	5	20	0.5	1 000	3	0.04	8	1 000	1 000	2	NA	10	4

LOCATION ID	SAMPLE ID	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
10-1067	AAB5579	3 920	<0.54	<27.8	<0.57	<0.34	<988	<1.6	<1	<2	5 540	9	<662	163	<0.04	<2.4	<670	<48.7	<0.26	2.38	<5.2	26.5
10-1068	AAB5594	3 130	<0.55	26.2	<0.47	<0.34	<778	<1.8	<1.1	<2.4	4 760	9.6	<651	247	0.05	<2.6	<736	50.9	<0.26	3.09	<4.1	32.3
10-1068	AAB5594R	3 075	0.87	<26.2	0.47	<0.6	713	1.3	0.9	2	4 440	9.2	622	241	<0.04	2.1	706	<50.8	<0.26	-	3.7	28.3
10-1084	AAB5472	2 340	<0.86	<25.1	<0.39	<0.46	<561	<1.7	<1	<3	4 580	13.6	<397	199	<0.04	<1.7	<473	<56.6	<0.46	1.99	<3.9	23
10-1084	AAB5475	1 290	<0.42	<12.8	<0.26	<0.41	<297	<1.5	<0.66	<1.5	3 520	6.7	<242	124	<0.04	<1.7	<256	<50.1	<0.46	1.52	<2.6	23.7
10-1084	AAB5495	2 140	<0.42	<24.7	<0.44	<0.58	<674	<1.3	<0.85	<2.8	4 990	9.9	<384	227	<0.04	<1.7	<459	<55.5	<0.46	2.06	<3.9	26.5
10-1085	AAB5474	3 010	<1.3	<33.2	<0.44	<0.78	1 240	2.1	<1.4	6.2	5 080	3.5	<590	219	<0.05	<1.7	<831	<55.9	<0.48	4.04	<5.1	27.6
10-1085	AAB5496	628	<0.42	<7.3	<0.15	<0.38	<141	<1.2	<0.66	<0.73	1 320	2.6	<109	71.7	<0.04	<1.7	<144	<33.5	<0.46	1.79	<1.3	8.2
10-1086	AAB5497	2 570	<0.54	<23.6	<0.56	<0.37	<832	<1.6	<0.75	<2.4	4 670	6.7	<474	191	<0.03	<1.6	<635	<106	<0.26	5.92	<4.1	26.7
10-1088	AAB5507	1 020	0.56	<24.6	<0.58	<0.38	<936	<1.4	<0.82	<2.6	4 940	4.3	<477	151	<0.03	<2.1	<584	29.4	<0.46	2.61	<2.5	17.2
10-1088	AAB5507R	774	<0.63	7.6	<0.16	<0.34	196	<1.1	<0.74	<1.4	3 105	3.1	150	193	<0.04	<1.7	158	<109	<0.46	2.64	2	18.7
10-1086	AAB5507R1	2 560	<0.54	<9.5	0.15	<0.38	<351	<1.2	<0.66	1.3	3 440	6.6	<213	157	<0.04	<1.7	<221	<46.7	<0.26	5.32	<4	28.2
10-1087	AAB5487	1 210	<0.54	<11.4	<0.32	<0.43	<323	<1.1	<0.7	<1.7	4 250	5.4	<225	168	<0.02	<1.3	<266	<52.3	<0.26	1.65	<2.7	23.3
10-1087	AAB5510	2 180	<0.62	<36.4	<0.46	<0.34	<406	<1.1	<2.4	<1.8	4 340	4.9	<336	376	<0.03	<1.9	<435	<62.2	<0.26	2.34	<4.4	21.8
10-1087	AAB5510R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.37	-	-
10-1088	AAB5511	2 140	<0.54	<21	<0.48	<0.34	<749	<1.1	<1.1	<2.4	4 170	5.9	<402	173	<0.03	<1.7	<488	<76.9	<0.35	2.59	<3.3	22.8
10-1088	AAB5516	841	<0.54	<7.3	<0.28	<0.34	<206	<1.1	<0.7	<1.1	2 280	1.4	<154	83.5	<0.02	<1.6	<166	<33.9	<0.26	1.28	<1.9	25.6
10-1069	AAB5525	2 100	<0.54	18.1	0.46	<0.34	506	<1.1	<0.77	<2.3	4 360	4.4	<378	166	<0.02	<2	<442	84.2	<0.28	2.58	<3.5	27.6
10-1069	AAB5525R	1 980	<0.54	<20	<0.46	<0.34	<589	<1.1	<0.7	2.2	3 737	5.8	345	147	0.03	1.8	417	<93.8	<0.26	2.77	3.2	29.2
10-1090	AAB5499	2 660	<0.54	<24.5	<0.48	<0.34	<662	<2	<1.1	<2.4	4 810	3.8	<472	189	<0.02	<1.2	<500	<70.5	-	2.06	<4.4	24.8
10-1090	AAB5506	3 240	<0.54	<30.4	<0.55	<0.36	<765	2.5	<1.4	<3.4	5 290	5.9	<578	199	<0.03	<2.6	<631	<84.1	<0.26	4.41	<5.6	26.1
10-1091	AAB5502	1 330	<0.54	<15.9	<0.31	<0.34	<329	<1.1	<0.7	<1.1	5 120	3.3	<252	219	<0.02	<1.9	<261	<33.4	<0.26	1.49	<3	26.5
10-1091	AAB5592	2 710	<0.63	<30.5	<0.53	<0.34	<550	<1.4	<1.3	<3.4	6 000	7.2	<509	234	<0.03	<2.3	<497	<43.3	<0.28	2.54	<6.6	30.7
10-1092	AAB5473	2 630	0.68	<23	0.44	<0.49	<595	<1.1	0.6	<2.7	4 380	4.5	<442	156	<0.01	<1.9	479	<67.7	<0.23	2.88	<4.5	21.1

TABLE A-4 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR INORGANIC ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
	SAL[a]	77 000	0.32	5 000	0.14	38	0.14	d	NA[d]	2 000	NA	400	NA	300	23	1 500	NA	NA	0.1	230	540	23 000
	UTL[b]	123 000	11.6	1 140	3.31	2.7	54 400	34.2	51.1	16.7	35 000	30	10 100	1 830	0.1	26.7	6 100	3 320	0.9	5.71	66.2	101
	CRQL[c]	40	2	40	1	1	1 000	10	10	5	20	0.6	1 000	3	0.04	8	1 000	1 000	2	NA	10	4

LOCATION ID	SAMPLE ID	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodium	Thallium	Uranium	Vanadium	Zinc
10-1092	AAB5473R	2 630	<0.54	22.7	<0.49	<0.34	588	<1.1	<0.7	2.2	4 299	4.7	444	158	<0.02	1.2	<460	71.4	<0.26	3.25	4.4	22.8
10-1092	AAB5519	2 640	<0.56	<28.7	<0.46	<0.37	<734	<1.5	<1.1	<4.6	5 630	4.9	<589	253	<0.03	<2	<567	<71.8	<0.35	2.29	<5.6	27.6
10-1093	AAB5498	1 150	<1.4	<11.3	<0.34	<0.34	<382	<1.1	<0.7	<1.9	6 220	3.6	<257	414	<0.03	<1.2	<227	<37.6	<0.26	1.09	<3.2	43.8
10-1093	AAB5501	3 320	<0.6	<31.3	<0.55	<0.42	<836	<1.9	<1	<2.8	5 490	5.5	<602	204	<0.03	<2.5	<618	<73.5	<0.26	3.36	<5.4	26.6
10-1094	AAB5489	2 070	<0.42	<24.3	<0.35	<0.43	<624	<1.6	<1.3	<2.2	4 580	10.2	<385	196	<0.04	<1.7	<432	<47.4	<0.46	2.09	<4.6	23.5
10-1094	AAB5509	1 120	<0.42	<12.9	<0.26	<0.38	<237	<1.9	<0.66	<1.4	2 830	7.2	<185	131	<0.04	<1.7	<213	<26.2	<0.46	1.3	<2.6	14.2
10-1094	AAB5509R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.32	-	-
10-1095	AAB5488	4 110	<0.44	<39.6	<0.6	<0.79	1 130	3	<1.4	<4.1	6 170	17.2	<782	242	<0.04	<2	<934	<91	<0.48	5.14	<6.7	31.2
10-1095	AAB5500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.27	-	-
10-1095	AAB5524	2 240	<0.54	<24.2	<0.4	<0.36	<589	2.4	<0.69	<1.3	4 610	4.3	<410	243	<0.03	<1.2	<412	<55.6	10	-	<4.3	23
10-1096	AAB5484	2 250	<1.4	<23.9	<0.37	<0.54	<507	2.3	<1.1	<2.4	4 590	11.8	<416	162	<0.04	<1.7	<466	<50.2	<0.47	2.6	<4.6	22.5
10-1096	AAB5490	1 400	<0.42	<13.3	<0.26	<0.4	<307	<1.2	<0.66	<1.5	2 880	3.9	<271	109	<0.04	<1.7	<272	<45	<0.46	1.6	<2.7	14.4
10-1096	AAB5514	1 210	<0.52	<13.2	<0.21	<0.49	<325	<1.5	<0.66	<1.7	2 620	6.4	<219	97.9	<0.04	<1.7	<248	<37.3	<0.46	1.64	<2.8	13.4
10-1096	AAB5521	2 240	<0.75	<24.6	<0.37	<0.5	<855	<1.6	<1.6	<2.4	4 530	10	<400	196	<0.04	<1.7	<456	<51	<0.47	2.52	<5.3	20.6
10-1097	AAB2823	4 150	<0.92	<36	<0.62	<0.34	<910	2.6	<1.9	<2.4	5 340	8.8	<670	238	<0.04	<1.2	<811	<86.4	<0.26	4	<6	25.6
10-1097	AAB2824	3 370	<0.76	<30.6	<0.5	<0.35	<742	3.1	<1.6	<2.1	4 420	6.3	<602	177	<0.04	<1.8	<894	<115	<0.27	2.83	<5	20.6
10-1097	AAB2824R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-1098	AAB2821	1 940	<0.54	<17.2	<0.32	<0.34	<366	<1.4	<0.7	<1.9	2 740	7.8	<304	114	<0.04	<1.2	<476	<64.8	<0.26	1.98	<3.2	16.5
10-1098	AAB2821R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.25	-	-
10-1098	AAB2822	2 500	<0.55	<21.8	<0.35	<0.34	<580	2.6	<1.6	<1.8	6 640	6.2	<462	328	<0.04	<1.2	<462	<73.9	<0.26	2.03	<5	32.1
10-1099	AAB2819	3 160	<0.73	<26.9	<0.46	<0.36	<715	2.9	<1.5	<2.5	6 660	5.1	<549	225	<0.04	<1.2	<540	<73.4	<0.26	3.17	<6.2	33.2
10-1099	AAB2819R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.02	-	-
10-1099	AAB2820	1 890	<0.66	<15.9	<0.32	<0.34	<302	<1.9	<1.1	<2	3 120	3.3	<305	124	<0.03	<1.2	<395	<79.5	<0.26	1.2	<4	15.8
10-1605	AAB5493	2 650	<0.55	<24.5	<0.49	<0.35	1 360	<1.7	<0.72	<2.1	4 010	4.6	<611	143	<0.02	<1.7	<562	<96.4	<0.27	3.43	<3.3	19.1
10-1611	AAB5601	1 480	<1.7	<16.9	<0.44	<0.09	<501	<0.75	<0.6	17.7	4 970	6.3	<304	166	<0.04	<0.95	<268	<124	<0.56	4.2	<2.5	34.1
10-1617	AAB5494	2 180	<0.76	<12.5	<0.73	<0.34	<630	<1.5	<0.7	<1.4	5 090	13.2	<196	241	<0.04	<1.2	<517	<361	<0.26	5.02	<1.7	38.4
10-1619	AAB5571	2 170	<0.56	<19.6	<0.47	<0.35	1 060	2.2	<0.92	<3.2	4 270	10	<472	243	<0.04	<3.4	<636	<66.7	<0.27	4.1	<3	34.1
10-1623	AAB5465	5 330	2.6	49.3	<0.69	<0.35	1 470	3.4	<2	<4.2	4 720	11.4	<922	179	<0.02	<4	1 190	<101	<0.27	5.27	<5.9	20.8
10-1627	AAB5605	1 170	<1.3	<13.7	<0.37	<0.06	<369	<0.38	<0.57	<1.8	3 670	5	<179	169	<0.04	<0.47	<212	<125	<0.56	4.3	<1.6	29.1
10-1650	AAB5578	6 080	<1.3	71.9	<0.66	<0.69	1 410	5	<3.6	<4.9	7 440	16.6	1 050	387	<0.04	<5.1	1 260	<58.5	<0.34	3.32	<9.9	31.5
10-1661	AAB5577	5 040	<1.1	66.8	<0.64	<0.68	3 470	4.4	<2.8	<4	5 940	19.2	1 030	256	<0.04	<3	1 080	<40.5	<0.27	3.2	<7.7	30.4
10-1663	AAB5575	7 170	<1.7	78.6	<0.86	<0.91	2 310	4.9	<3.6	8.7	8 410	25.5	1 350	381	<0.06	<5.3	1 300	<69.9	<0.3	2.97	<10.7	41.3
10-1668	AAB5569	3 550	<0.54	<37.3	<0.6	<0.35	1 190	2.7	<1.6	<3.3	5 060	13.5	<754	214	<0.04	<1.9	<832	<55.3	<0.26	3.03	<5.1	35.2

[a]SAL = Screening action level. (EPA 1994, 1222)
[b]UTL = Upper tolerance limit.
[c]CRQL = Contract-required quantitation limit.
[d]NA = Not available

TABLE A-5

TA-10 ANALYTICAL RESULTS FOR RADIONUCLIDE ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
	SAL[a]	17	NA	64	4	0.9	NA	NA	14	1.3	5.9
	UTL[b]	NA[d]	NA	NA	1.4	NA	NA	NA	NA	NA	1
	CRQL[c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOCATION ID	SAMPLE ID	Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
10-1001	AAB5544	0.144	27.6	-0.164	0.335	0.017	0.125	0.009	0.3	0.017	-
10-1001	AAB5573	-	-	-	-	-	-	-	-	-	-0.7
10-1002	AAB5598	-	-	-	-	-	-	-	-	-	0.1
10-1003	AAB5600	-	-	-	-	-	-	-	-	-	0.53
10-1004	AAB5597	-	-	-	-	-	-	-	-	-	1.09
10-1005	AAB5512	-	-	-	-	-	-	-	-	-	-0.56
10-1006	AAB5513	-	-	-	-	-	-	-	-	-	0.62
10-1007	AAB5515	-	-	-	-	-	-	-	-	-	-0.01
10-1008	AAB5460	-	-	-	-	-	-	-	-	-	-0.16
10-1009	AAB5503	-	-	-	-	-	-	-	-	-	-0.17
10-1009	AAB5503R	-	-	-	-	-	-	-	-	-	0.33
10-1010	AAB5504	-	-	-	-	-	-	-	-	-	0.5
10-1011	AAB5599	-	-	-	-	-	-	-	-	-	-0.01
10-1012	AAB5491	-	-	-	-	-	-	-	-	-	1.67
10-1013	AAB5469	-	-	-	-	-	-	-	-	-	0.61
10-1014	AAB5467	-	-	-	-	-	-	-	-	-	-0.13
10-1015	AAB5451	-	-	-	-	-	-	-	-	-	0.28
10-1016	AAB5452	-	-	-	-	-	-	-	-	-	-0.12
10-1017	AAB5502	-	-	-	-	-	-	-	-	-	1.11
10-1018	AAB5482	-	-	-	-	-	-	-	-	-	0.03
10-1019	AAB5486	-	-	-	-	-	-	-	-	-	-0.71

TABLE A-5 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR RADIONUCLIDE ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
	SAL[a]	17	NA	64	4	0.9	NA	NA	14	1.3	5.9
	UTL[b]	NA[d]	NA	NA	1.4	NA	NA	NA	NA	NA	1
	CRQL[c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOCATION ID	SAMPLE ID	Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
10-1020	AAB5492	-	-	-	-	-	-	-	-	-	0.31
10-1021	AAB5517	-	-	-	-	-	-	-	-	-	-0.38
10-1022	AAB5461	-	-	-	-	-	-	-	-	-	0.43
10-1022	AAB5485	-	-	-	-	-	-	-	-	-	0.47
10-1023	AAB5462	-	-	-	-	-	-	-	-	-	-0.03
10-1023	AAB5462R	-	-	-	-	-	-	-	-	-	-0.2
10-1023	AAB5608	0.025	-77.3	-0.134	0.619	-0.027	0.096	-0.029	-0.162	-0.007	-
10-1024	AAB5456	-	-	-	-	-	-	-	-	-	0.35
10-1025	AAB5450	-	-	-	-	-	-	-	-	-	-0.33
10-1025	AAB5450R	-	-	-	-	-	-	-	-	-	-0.58
10-1025	AAB5609	0.013	-14.6	0.08	0.225	-0.002	0.166	-0.023	0.248	-0.003	-
10-1025	AAB5609R	-0.02	34.3	-0.052	0.3	-0.002	0.166	-0.038	0.149	-0.001	-
10-1026	AAB5453	-	-	-	-	-	-	-	-	-	-0.06
10-1026	AAB5453	-	-	-	-	-	-	-	-	-	-0.06
10-1026	AAB5616	-0.029	15.9	-0.201	0.285	-0.019	0.086	-0.011	-0.119	-0.009	-
10-1027	AAB5526	-	-	-	-	-	-	-	-	-	-0.21
10-1028	AAB5606	-	-	-	-	-	-	-	-	-	0.19
10-1029	AAB5505	-	-	-	-	-	-	-	-	-	0.16
10-1030	AAB5588	-	-	-	-	-	-	-	-	-	0.65
10-1031	AAB5581	-	-	-	-	-	-	-	-	-	0.14
10-1032	AAB5520	-	-	-	-	-	-	-	-	-	-0.12
10-1032	AAB5611	0.031	7.21	0.07	0.041	-0.024	0.15	-0.016	-0.23	-0.004	-
10-1033	AAB5455	-	-	-	-	-	-	-	-	-	0.13
10-1033	AAB5543	0.002	50.5	0.014	0.216	0.038	0.351	-0.014	-0.037	-0.027	-

TABLE A-5 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR RADIONUCLIDE ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
	SAL[a]	17	NA	64	4	0.9	NA	NA	14	1.3	5.9
	UTL[b]	NA[d]	NA	NA	1.4	NA	NA	NA	NA	NA	1
	CRQL[c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOCATION ID	SAMPLE ID	Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
10-1034	AAB5457	-	-	-	-	-	-	-	-	-	0.62
10-1038	AAB5483	-	-	-	-	-	-	-	-	-	-0.03
10-1039	AAB5607	-	-	-	-	-	-	-	-	-	0.29
10-1039	AAB5614	-	-	-	-	-	-	-	-	-	0.58
10-1040	AAB5591	-	-	-	-	-	-	-	-	-	-0.53
10-1040	AAB5591R	-	-	-	-	-	-	-	-	-	0.31
10-1041	AAB5587	-	-	-	-	-	-	-	-	-	-0.21
10-1041	AAB5587R	-	-	-	-	-	-	-	-	-	-0.36
10-1041	AAB5589	-	-	-	-	-	-	-	-	-	0.15
10-1042	AAB5584	-	-	-	-	-	-	-	-	-	0.23
10-1043	AAB5523	-	-	-	-	-	-	-	-	-	0.43
10-1044	AAB5459	-	-	-	-	-	-	-	-	-	0.04
10-1044	AAB5466	-	-	-	-	-	-	-	-	-	-0.19
10-1044	AAB5612	-0.006	16.2	0.118	0.22	0.004	0.15	-0.024	-0.122	0.001	-
10-1045	AAB5463	-	-	-	-	-	-	-	-	-	0.01
10-1045	AAB5463R	-	-	-	-	-	-	-	-	-	-0.13
10-1045	AAB5613	0.023	-47.3	0.117	0.282	0.016	0.109	-0.004	-0.391	0.001	-
10-1046	AAB5468	-	-	-	-	-	-	-	-	-	-
10-1047	AAB5449	-	-	-	-	-	-	-	-	-	-0.05
10-1048	AAB5479	-	-	-	-	-	-	-	-	-	-0.15
10-1048	AAB5479R	-	-	-	-	-	-	-	-	-	-0.14
10-1049	AAB5570	-	-	-	-	-	-	-	-	-	0.82
10-1050	AAB5593	-	-	-	-	-	-	-	-	-	0.04
10-1051	AAB5590	-	-	-	-	-	-	-	-	-	-

TABLE A-5 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR RADIONUCLIDE ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
	SAL[a]	17	NA	64	4	0.9	NA	NA	14	1.3	5.9
	UTL[b]	NA[d]	NA	NA	1.4	NA	NA	NA	NA	NA	1
	CRQL[c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOCATION ID	SAMPLE ID	Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
10-1052	AAB5596	-	-	-	-	-	-	-	-	-	0.28
10-1053	AAB5522	-	-	-	-	-	-	-	-	-	0.33
10-1054	AAB5518	-	-	-	-	-	-	-	-	-	-0.04
10-1055	AAB5477	-	-	-	-	-	-	-	-	-	-0.12
10-1056	AAB5476	-	-	-	-	-	-	-	-	-	0.46
10-1057	AAB5464	-	-	-	-	-	-	-	-	-	-0.71
10-1058	AAB5478	-	-	-	-	-	-	-	-	-	0.25
10-1059	AAB5470	-	-	-	-	-	-	-	-	-	-1.13
10-1059	AAB5471	-	-	-	-	-	-	-	-	-	-0.38
10-1060	AAB5586	-	-	-	-	-	-	-	-	-	0.42
10-1061	AAB5580	-	-	-	-	-	-	-	-	-	0.14
10-1062	AAB5585	-	-	-	-	-	-	-	-	-	0.27
10-1063	AAB5572	-	-	-	-	-	-	-	-	-	-0.84
10-1064	AAB5576	-	-	-	-	-	-	-	-	-	0.64
10-1065	AAB5595	-	-	-	-	-	-	-	-	-	-0.01
10-1066	AAB5583	-	-	-	-	-	-	-	-	-	6.26
10-1067	AAB5574	-	-	-	-	-	-	-	-	-	-0.06
10-1067	AAB5579	-	-	-	-	-	-	-	-	-	-0.39
10-1068	AAB5594	-	-	-	-	-	-	-	-	-	0.27
10-1068	AAB5594R	-	-	-	-	-	-	-	-	-	0.49
10-1084	AAB5472	-	-	-	-	-	-	-	-	-	0.17
10-1084	AAB5475	-	-	-	-	-	-	-	-	-	0.24
10-1084	AAB5495	-	-	-	-	-	-	-	-	-	0.06

TABLE A-5 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR RADIONUCLIDE ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
	SAL[a]	17	NA	64	4	0.9	NA	NA	14	1.3	5.9
	UTL[b]	NA[d]	NA	NA	1.4	NA	NA	NA	NA	NA	1
	CRQL[c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOCATION ID	SAMPLE ID	Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
10-1085	AAB5474	-	-	-	-	-	-	-	-	-	-0.15
10-1085	AAB5474R	-	-	-	-	-	-	-	-	-	0.72
10-1085	AAB5496	-	-	-	-	-	-	-	-	-	0.16
10-1086	AAB5497	-	-	-	-	-	-	-	-	-	0.17
10-1086	AAB5507	-	-	-	-	-	-	-	-	-	-0.34
10-1086	AAB5507R	-	-	-	-	-	-	-	-	-	-0.16
10-1086	AAB5507R1	-	-	-	-	-	-	-	-	-	0.39
10-1086	AAB5507R2	-	-	-	-	-	-	-	-	-	-0.55
10-1087	AAB5487	-	-	-	-	-	-	-	-	-	0.71
10-1087	AAB5510	-	-	-	-	-	-	-	-	-	0.19
10-1088	AAB5511	-	-	-	-	-	-	-	-	-	-0.27
10-1088	AAB5516	-	-	-	-	-	-	-	-	-	-0.21
10-1089	AAB5525	-	-	-	-	-	-	-	-	-	0.41
10-1090	AAB5499	-	-	-	-	-	-	-	-	-	-0.37
10-1090	AAB5506	-	-	-	-	-	-	-	-	-	-0.51
10-1091	AAB5582	-	-	-	-	-	-	-	-	-	0.32
10-1091	AAB5592	-	-	-	-	-	-	-	-	-	-0.17
10-1092	AAB5473	-	-	-	-	-	-	-	-	-	0.18
10-1092	AAB5519	-	-	-	-	-	-	-	-	-	-0.54
10-1092	AAB5519R	-	-	-	-	-	-	-	-	-	0.33
10-1093	AAB5498	-	-	-	-	-	-	-	-	-	-0.42
10-1093	AAB5501	-	-	-	-	-	-	-	-	-	0.26
10-1094	AAB5489	-	-	-	-	-	-	-	-	-	0.19

TABLE A-5 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR RADIONUCLIDE ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
	SAL[a]	17	NA	64	4	0.9	NA	NA	14	1.3	5.9
	UTL[b]	NA[d]	NA	NA	1.4	NA	NA	NA	NA	NA	1
	CRQL[c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOCATION ID	SAMPLE ID	Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
10-1094	AAB5509	-	-	-	-	-	-	-	-	-	0.06
10-1095	AAB5488	-	-	-	-	-	-	-	-	-	0.26
10-1095	AAB5500	-	-	-	-	-	-	-	-	-	-0.15
10-1096	AAB5484	-	-	-	-	-	-	-	-	-	-0.14
10-1096	AAB5490	-	-	-	-	-	-	-	-	-	-0.04
10-1096	AAB5514	-	-	-	-	-	-	-	-	-	-0.16
10-1096	AAB5521	-	-	-	-	-	-	-	-	-	0.06
10-1097	AAB2823	-	-	-	-	-	-	-	-	-	-0.18
10-1097	AAB2824	-	-	-	-	-	-	-	-	-	0.53
10-1098	AAB2821	-	-	-	-	-	-	-	-	-	-0.2
10-1098	AAB2821R	-	-	-	-	-	-	-	-	-	-0.23
10-1098	AAB2822	-	-	-	-	-	-	-	-	-	-0.13
10-1099	AAB2819	-	-	-	-	-	-	-	-	-	0.08
10-1099	AAB2820	-	-	-	-	-	-	-	-	-	-0.8
10-1605	AAB5493	-	-	-	-	-	-	-	-	-	-0.07
10-1611	AAB5601	-	-	-	-	-	-	-	-	-	0.06
10-1617	AAB5494	-	-	-	-	-	-	-	-	-	0.53
10-1619	AAB5571	-	-	-	-	-	-	-	-	-	0.05
10-1623	AAB5465	-	-	-	-	-	-	-	-	-	-0.36
10-1627	AAB5605	-	-	-	-	-	-	-	-	-	0.25
10-1650	AAB5578	-	-	-	-	-	-	-	-	-	0.5
10-1661	AAB5577	-	-	-	-	-	-	-	-	-	0.36

TABLE A-5 (CONTINUED)

TA-10 ANALYTICAL RESULTS FOR RADIONUCLIDE ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
	SAL[a]	17	NA	64	4	0.9	NA	NA	14	1.3	5.9
	UTL[b]	NA[d]	NA	NA	1.4	NA	NA	NA	NA	NA	1
	CRQL[c]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LOCATION ID	SAMPLE ID	Americium-241	Barium-140	Cerium-144	Cesium-137	Cobalt-60	Europium-152	Neptunium-237	Ruthenium-106	Sodium-22	Strontium-90
10-1663	AAB5575	-	-	-	-	-	-	-	-	-	0.48
10-1668	AAB5569	-	-	-	-	-	-	-	-	-	0.03

[a]SAL = Screening action level.(EPA 1994, 1222)
[b]UTL = Upper tolerance limit.
[c]CRQL = Contract-required quantitation limit.
[d]NA = Not available.

TABLE A-6

TA-10 ANALYTICAL RESULTS FOR ORGANIC ANALYTES DETECTED AT SWMUs 10-001(a-d)

COMPARISON LEVELS FOR SOIL SAMPLES (mg/kg)		Amino-2,6-dinitrotoluene [4-]	Dinitrotoluene [2,6-]	HMX	Nitrobenzene	Nitrotoluene [m-]	Nitrotoluene [o-]	Nitrotoluene [p-]
	SAL[a]	NA[c]	1	4 000	5.3	800	800	800
	CRQL[b]	NA	0.33	NA	0.33	NA	NA	NA
LOCATION ID	SAMPLE ID	Amino-2,6-dinitrotoluene [4-]	Dinitrotoluene [2,6-]	HMX	Nitrobenzene	Nitrotoluene [m-]	Nitrotoluene [o-]	Nitrotoluene [p-]
10-1001	AAB5544	<0.09	<0.092	<0.164	0.104	<0.159	<0.137	<0.184
10-1023	AAB5608	<0.092	<0.094	<0.168	0.098	<0.163	<0.141	<0.189
10-1025	AAB5609	<0.09	<0.092	<0.164	<0.074	<0.159	<0.137	<0.185
10-1026	AAB5616	<0.09	<0.092	<0.164	<0.074	<0.159	<0.137	<0.184
10-1032	AAB5611	<0.091	<0.092	<0.165	<0.075	0.213	<0.138	<0.186
10-1033	AAB5543	<0.091	<0.092	<0.165	<0.075	<0.16	<0.138	<0.186
10-1034	AAB5610	<0.091	<0.093	<0.166	<0.075	<0.161	<0.139	<0.187
10-1035	AAB5615	<0.09	<0.092	<0.163	<0.074	<0.159	<0.137	<0.184
10-1044	AAB5612	<0.091	<0.092	<0.165	<0.075	<0.16	<0.138	<0.186
10-1045	AAB5613	<0.09	<0.092	<0.164	<0.075	<0.16	<0.138	<0.185
10-1085	AAB5547	<0.09	<0.092	<0.163	<0.074	<0.159	<0.137	<0.184
10-1090	AAB2818	<0.09	<0.092	<0.163	<0.074	<0.159	<0.137	<0.184
10-1094	AAB5542	<0.09	<0.092	<0.163	<0.074	0.21	<0.137	<0.184
10-1097	AAB2823	-	<0.33	-	<0.33	-	-	-
10-1097	AAB2824	-	<0.32	-	<0.32	-	-	-
10-1097	AAB5536	<0.09	<0.092	<0.164	<0.074	<0.159	<0.138	<0.185
10-1097	AAB5540	<0.09	<0.092	<0.164	<0.074	<0.159	<0.137	<0.185
10-1098	AAB2821	-	<0.33	-	<0.33	-	-	-
10-1098	AAB2822	-	<0.33	-	<0.33	-	-	-
10-1098	AAB5537	<0.09	<0.092	<0.164	<0.074	<0.159	<0.137	<0.185
10-1098	AAB5539	<0.09	<0.092	<0.164	<0.074	<0.159	<0.137	<0.184
10-1099	AAB2819	-	<0.32	-	<0.32	-	-	-
10-1099	AAB2820	-	<0.33	-	<0.33	-	-	-
10-1099	AAB5535	<0.09	<0.092	<0.164	<0.074	<0.159	<0.137	<0.184
10-1099	AAB5541	<0.09	<0.092	<0.163	<0.074	<0.159	<0.137	<0.184
10-1605	AAB5529	<0.09	<0.092	<0.164	<0.074	<0.159	<0.138	<0.185
10-1611	AAB5530	<0.09	<0.092	<0.163	<0.074	<0.159	<0.137	<0.184
10-1617	AAB5548	<0.09	<0.092	<0.164	<0.075	<0.159	<0.138	<0.185
10-1619	AAB5545	<0.092	<0.094	1.56	0.154	<0.162	<0.14	<0.188
10-1623	AAB5527	<0.09	<0.092	<0.164	<0.075	<0.16	<0.138	<0.185
10-1627	AAB5531	0.157	0.789	<0.165	<0.074	0.435	0.21	0.469
10-1650	AAB5528	<0.091	<0.092	<0.165	<0.075	<0.16	<0.138	<0.186
10-1661	AAB5532	<0.092	<0.094	<0.167	<0.076	<0.162	<0.14	<0.189
10-1663	AAB2817	<0.091	<0.092	<0.164	<0.075	<0.16	<0.138	<0.185
10-1668	AAB5546	<0.091	<0.092	<0.164	<0.074	<0.159	<0.137	<0.185

[a]SAL – Screening action level (EPA 1994, 1222)
[b]CRQL – Contract required quantitation limit
[c]NA – Not available

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APPENDIX B STATISTICAL COMPARISON OF TA-10 SURFACE SAMPLING RESULTS FOR INORGANIC AND RADIONUCLIDE CHEMICALS

Inorganics and Radionuclides that Exceed the Background Screening Values

Five inorganics (copper, nickel, mercury, thallium, and zinc) and two radionuclides (strontium-90 and uranium) had concentrations greater than the upper tolerance level (UTL) or the maximum observed concentration in the LANL background soil data. The concentration of one of the inorganics (thallium) and one radionuclide (strontium-90) also exceeded the screening action level (SAL).

The data are presented for four groups, and these groups represent sampling locations that are different distances from the firing pads. The "canyon" samples were collected from the bottom of Bayo Canyon and represent the closest locations to the firing pads. The "slope" samples are located further from the firing pads on the talus slopes on the northern and southern portion of Bayo Canyon. The "mesa" locations, which are most distant from the firing pads, include sites on Otowi or Kwage Mesas, or sampling locations in Barrancas Canyon. The "channel" locations are in the active stream channel in Bayo Canyon, and are considered as a separate group because they represent sediment rather than soil samples. The channel data are presented as a separate group so that the reader can visually compare the sediment concentration to the soil samples, and determine if there is any evidence for migration of chemicals offsite through the stream channel.

The background comparison is graphically displayed with "box plots" (see discussion for specific inorganic and radionuclide analytes below). The box plots show the actual values (as filled circles) at each potential release site (PRS) where the background screening value was exceeded. The ends of the box represent the "Inter-quartile" range of the data distribution. The inter-quartile range is specified by the 25th percentile and 75th percentile of the data distribution. The line within the box plot is the median (50th percentile) of the data distribution. Thus, the box indicates concentration values for the central half of the data, and concentration shifts can be readily assessed by comparing the boxes. If the majority of the data is represented by a single concentration value (usually the detection limit), the box is reduced to a single line.

Copper soil concentrations were observed above the UTL in three canyon samples and one mesa sample (Fig. B-1). The three copper results are significantly greater than the maximum of the background data. The mesa data are not significantly different from the LANL background data (Fig. B-1), and the slope and stream channel copper concentrations are mostly less than 25th percentile of the background data. All of the copper concentrations that exceeded background are significantly less than the copper SAL of 2 800 mg/kg.

Mercury was measured above the background screening value in one sample in each of the canyon and slope location groups (Fig. B-2). There is no significant difference in mercury concentration between the location groups (Fig. B-2). The two mercury concentrations that exceeded background are significantly less than the mercury SAL of 23 mg/kg.

Only one nickel result exceeds the background UTL. This value significantly exceeds the background range (Fig. B-3). Most of the remaining nickel concentrations are less than the 25th percentile of the background data (Fig. B-3). The slope and the stream channel nickel concentrations are less than those observed in the canyon or mesa location groups. The one nickel concentration that exceed background is significantly less than the nickel SAL of 1 600 mg/kg.

There is one thallium result that exceeded both background and the thallium SAL. A concentration of 10 mg/kg was measured at one location in the stream channel (Fig. B-4). This one value represents an exception to the trend for the sediment data less than the lower quartile of the background data. However, all of the remaining thallium data is within the lower half of the background data.

The uranium UTL was exceeded in nine samples, in the following numbers per location group: four canyon samples, one slope sample, three mesa samples, and one stream channel sample (Fig. B-5). It is important to note that only two (one canyon and one slope) concentration values exceed the maximum observed value in the background data. All of the soil sample groups (canyon, slope, and mesa) exhibit a modest distribution shift relative to the background data (Fig. B-5). There is no statistically significant difference between the LANL background data and the TA-10 location groups (Table B-1). Statistical significance was measured by using the Wilcoxon rank sum test to determine if these site results are greater than background data. The Wilcoxon rank sum test is one of the statistical methods suggested in the LANL Environmental Restoration Project policy paper "Statistical Comparisons to Background, Part 1" (Environmental Restoration Project Assessments Council 1995, 1218). However, neither the concentrations greater than the background maximum nor this non-statistically significant distribution shift are important relative to the natural uranium SAL of 95 mg/kg.

The concentration pattern for zinc is similar to nickel (Fig. B-6). In fact, the only zinc result that exceeded the zinc background UTL was measured in sample AAB5614 at location 10-1039, the identical sample where nickel was measured above its UTL.

The strontium-90 background screening value was exceeded in three samples, which included one sample in each of the canyon, slope and mesa location groups (Fig. B-7). One strontium-90 result in the slope location group also exceeds strontium-90 SAL of 5.9 pCi/g. There is no

TABLE B-1

SUMMARY OF STATISTICAL COMPARISONS OF LANL BACKGROUND TO TA-10 URANIUM RESULTS

LOCATION GROUP	NUMBER OF SAMPLES	MEAN CONCENTRATION[a]	STANDARD DEVIATION	WRS[b] RESULT (Z-VALUE)	PROBABILITY[c]
Background	50	3.41	0.80	NA[d]	NA[d]
Canyon	30	3.87	1.40	1.53	0.063
Slope	25	3.85	1.24	1.60	0.055
Mesa	37	3.73	1.25	0.79	0.215
Stream channel	42	2.59	1.12	-4.63	1.00

[a] All values are in units of mg/kg.
[b] WRS = Wilcoxon rank sum test result, which is described in the LANL background policy paper (Environmental Restoration Project Assessments Council 1995, 1218). The result is presented as a Z-value, which measures the amount of difference between background and each group.
[c] Probabilities greater than 0.05 are not statistically significant.
[d] NA = Not applicable.

significant difference between the majority of the strontium-90 concentration data, and the median strontium-90 concentration is close to zero for all four location groups (Fig. B-7).

BACKGROUND ANALYSIS OF BERYLLIUM

Beryllium was not measured above the background screening value in any sample. However, the LANL Environmental Restoration Project policy paper "Statistical Comparisons to Background, Part 1" (Environmental Restoration Project Assessments Council 1995, 1218) suggests that additional background analyses should be considered if either arsenic or beryllium is a chemical of potencial concern (COPC) from historical knowledge of the site. The RFI Work Plan for OU 1079 identified beryllium as a COPC from historical activities at the firing pads (LANL 1992, 0783). The additional background analysis of beryllium was to compare the correlation between iron observed in the site data to the LANL background. Longmire and others (Longmire et al. in preparation, 1142) showed that there is a significant correlation between the concentration of iron and beryllium in LANL soil. A release would be identified by detecting a sample where the concentration of beryllium significantly exceeds the usual range in beryllium for the measured iron concentration. For example, if a site sample is measured to have 10 000 mg/kg iron, concentrations of background beryllium are expected to range between 0.5 and 1.2 mg/kg (Fig. B-8). A measured beryllium value of 1.5 mg/kg or larger for soil that measured 10 000 mg/kg iron would be evidence of an isolated beryllium release. If the site beryllium data fall consistently above the data scatter for the background observations on the beryllium-iron plot, this would be evidence for a systematic beryllium release at the site. As is clearly shown in Fig. B-8, the

TA-10 surface data exhibit the same linear relationship between beryllium and iron as do the LANL background data. Thus, this additional background analysis for beryllium confirms the initial conclusion based on comparing site beryllium data to the beryllium UTL.

SUMMARY

The vast majority of the TA-10 surface data are within background for naturally occurring inorganic chemicals or regional background associated with fallout for cesium-137 and strontium-90. Summing the results of all metals and radionuclides, there were nine samples above background in the canyon samples, three samples above background in the slope samples, seven samples above background in the mesa samples, and two samples above background in the stream channel samples. In addition, the pattern of observing some modestly elevated (greater than UTL) results in each region is consistent with the shrapnel reports, which showed that the shrapnel was present up to 1 400 to 2 700 ft from the former firing sites. These widely dispersed and modestly elevated inorganic results also indicate that the 500 ft grid spacing was adequate to characterize potential releases from the firing sites. Another important result is that the channel samples generally had the lowest concentrations, which is consistent with the expected background sediment concentrations, and also shows that there is no substantial migration of these chemicals offsite.

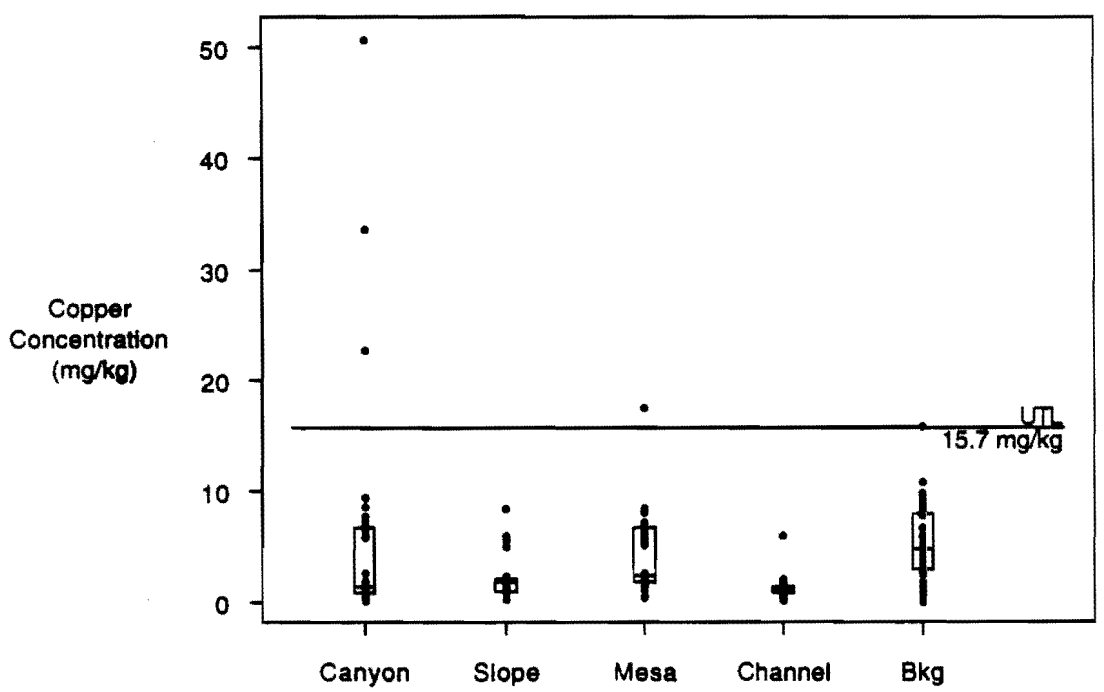

Fig. B-1. Box plot summary of copper for TA-10 data location groups. The UTL is calculated from LANL Background Soil Data.

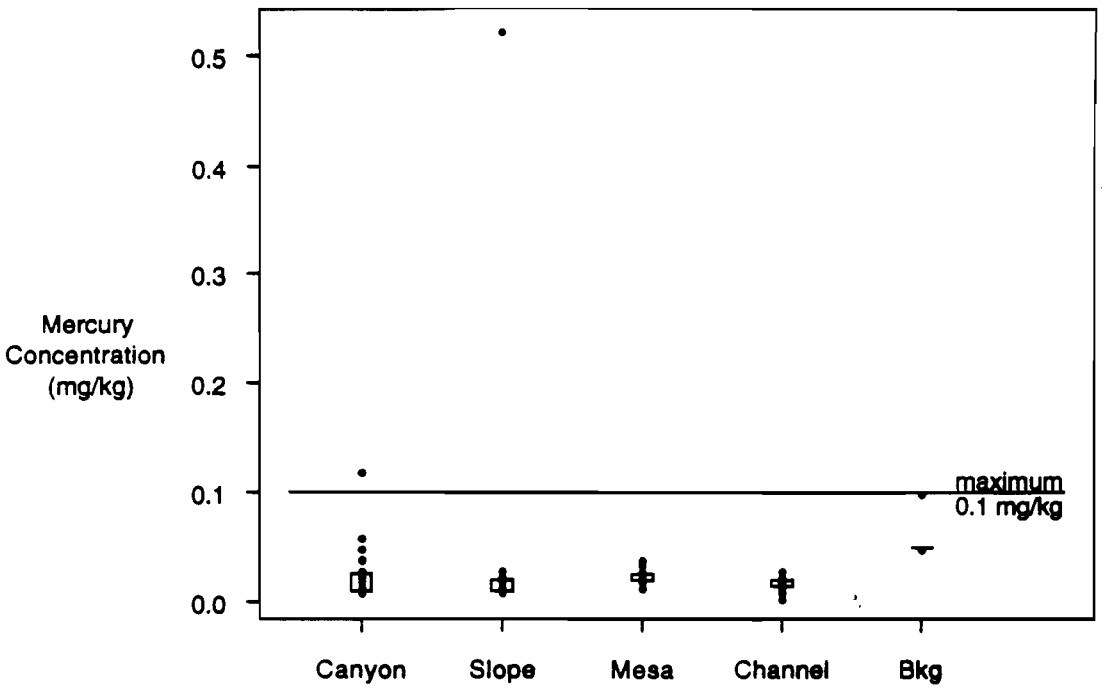

Fig. B-2. Box plot summary of mercury for TA-10 data location groups. The maximum is derived from LANL Background Soil Data.

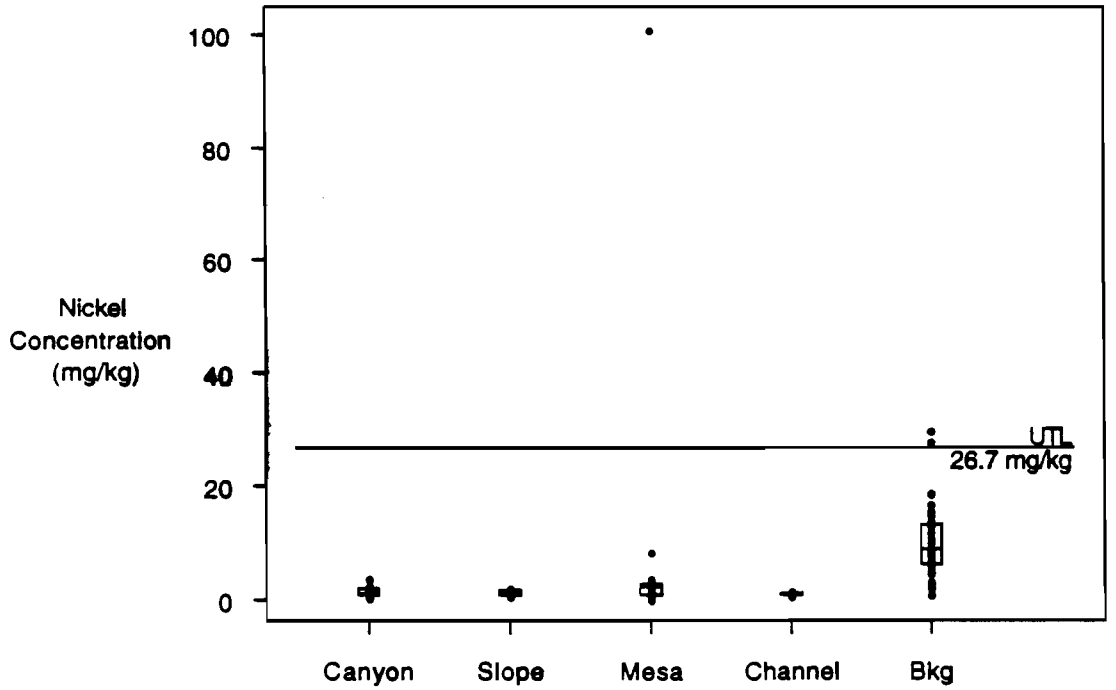

Fig. B-3. Box plot summary of nickel for TA-10 data location groups. The UTL is calculated from LANL Background Soil Data.

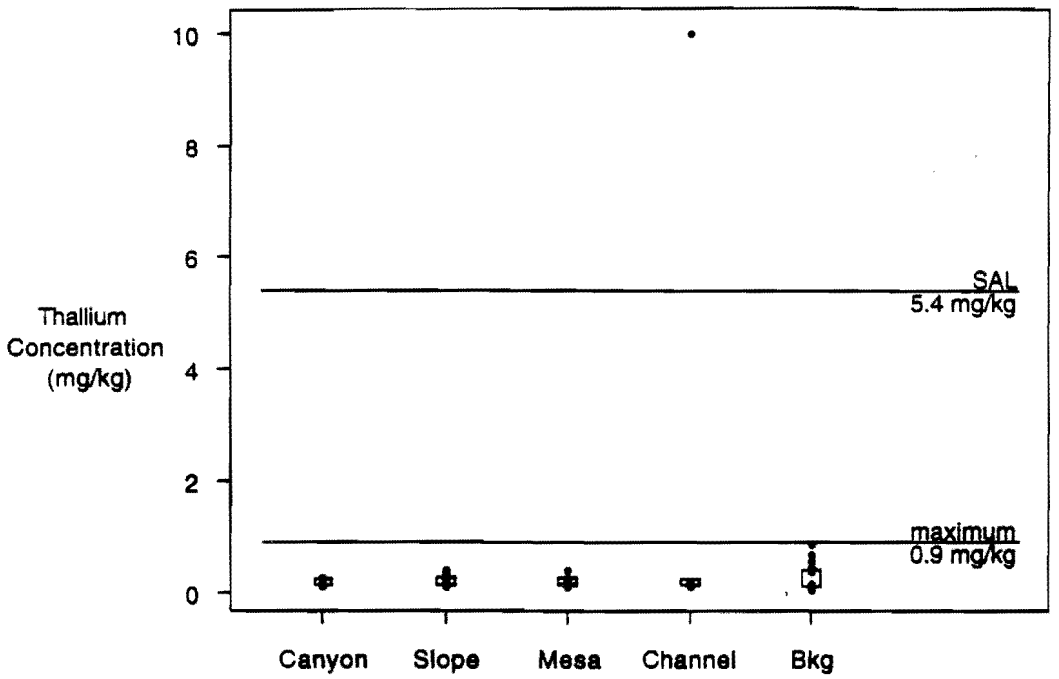

Fig. B-4. Box plot summary of thallium for TA-10 data location groups. The maximum is derived from LANL Background Soil Data).

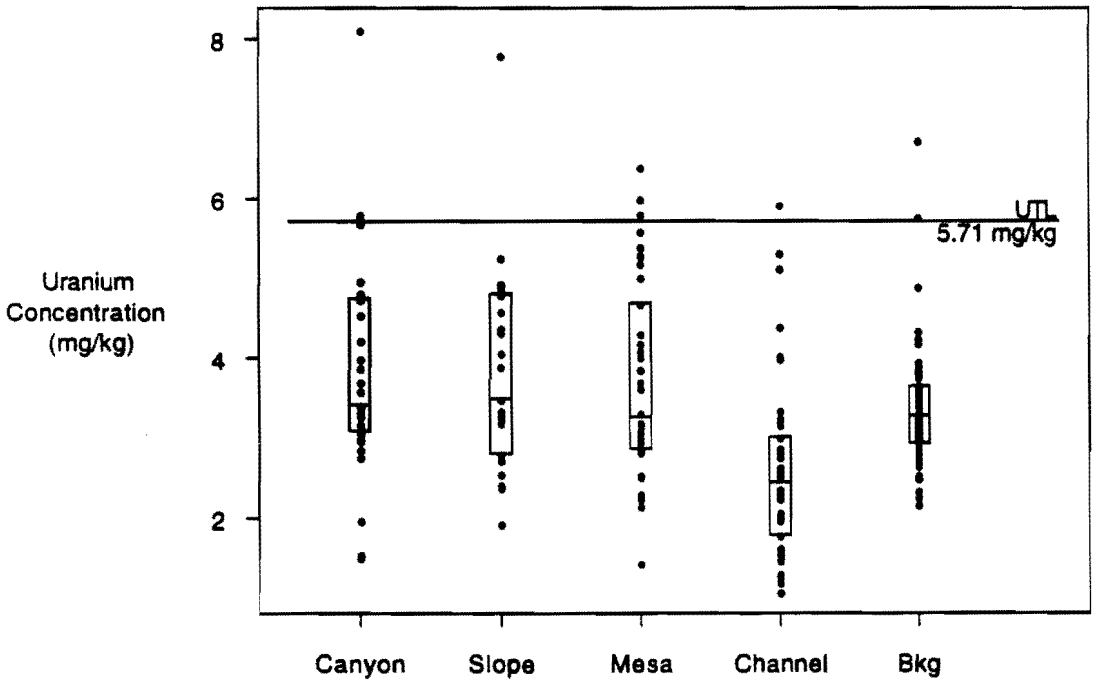

Fig. B-5. Box plot summary of uranium for TA-10 data location groups. The UTL is calculated from LANL Background Soil Data.

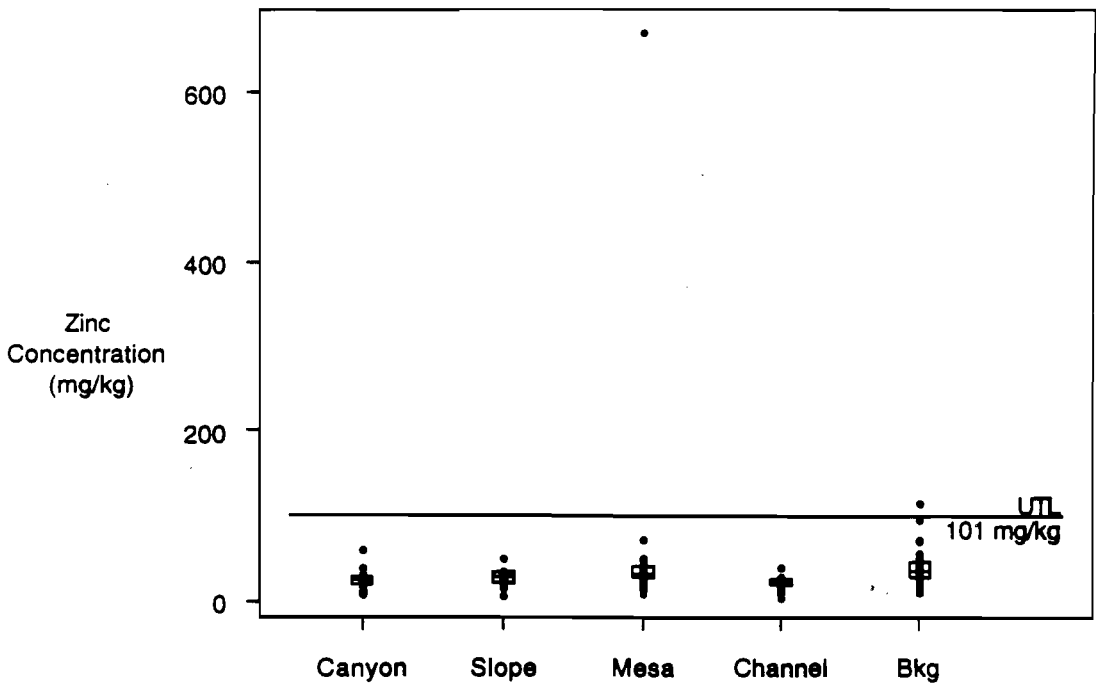

Fig. B-6. Box plot summary of zinc for TA-10 data location groups. The UTL is calculated from LANL Background Soil Data.

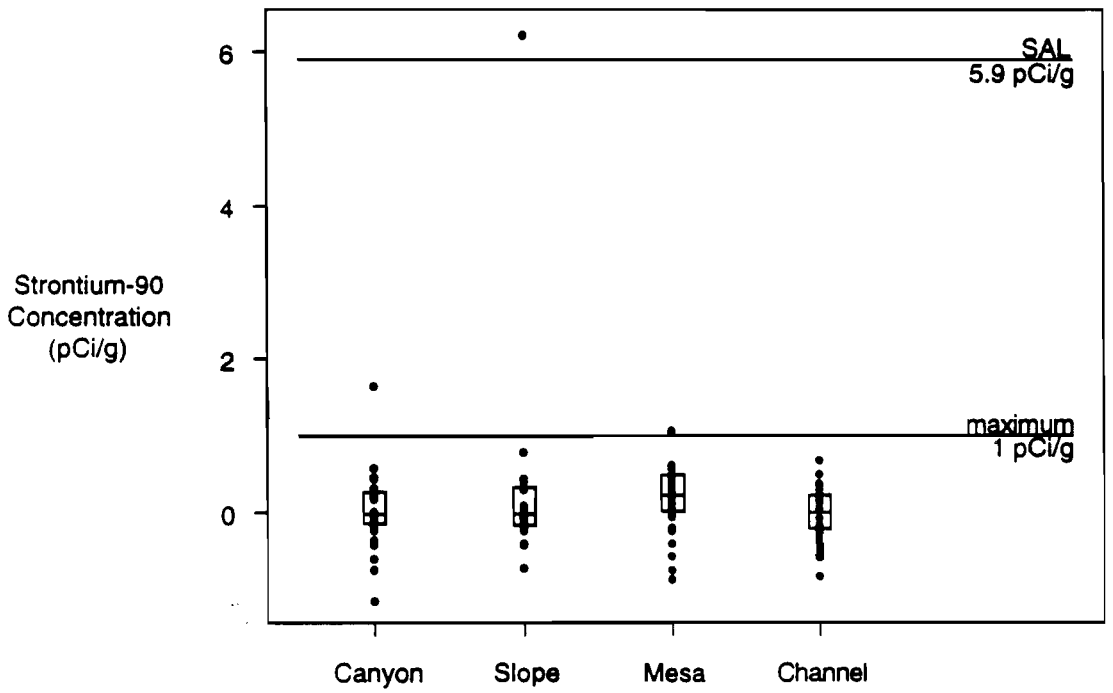

Fig. B-7. Box plot summary of strontium-90 for TA-10 data location groups. The maximum is calculated from the LANL Environmental Surveillance reports.

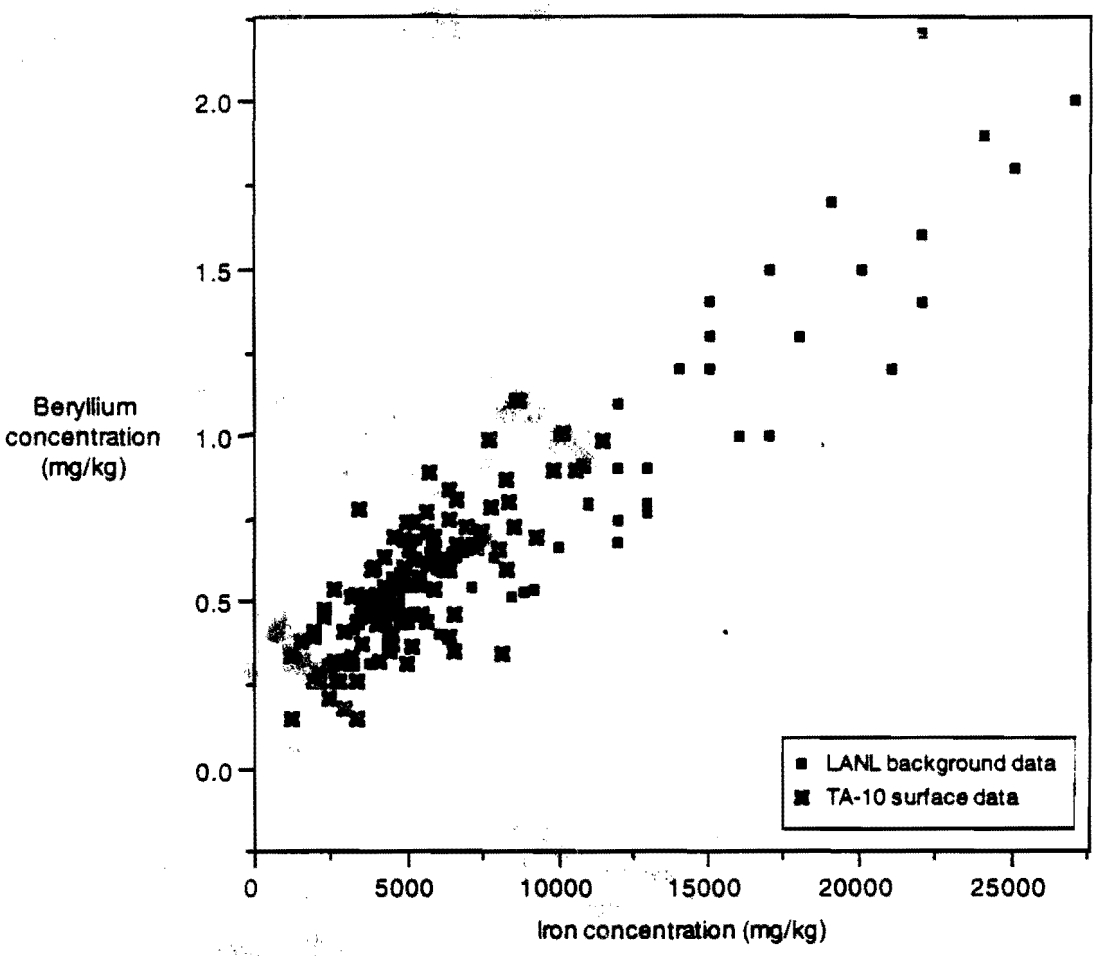

Fig. B-8. Comparison of the correlation between beryllium and iron for the LANL background data and the TA-10 surface data. [Note - TA-10 beryllium results reported as < LOD (limit of detection) were replaced by the LOD for this plot.]