1-1-2000

Statement of Basis Approval of No Further Action Volume 30 of 30, January 2000, Solid Waste Management Unit 275, Operable Unit 1306, Round 11

Sandia National Laboratories/NM

Sandia National Laboratories

Statement of Basis
Approval of No Further Action
Volume 30 of 30

January 2000

Solid Waste Management Unit 275
Operable Unit 1306
Round 11

(RCRA Permit No. NM5890110518)

NFA Originally Submitted September 15, 1998 (Chapter 2)
RSI Originally Submitted September 1999

Environmental
Restoration
Project

United States Department of Energy
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2.0 SOLID WASTE MANAGEMENT UNIT 275, TA-V SEEPAGE PITS

2.1 Summary

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a risk-based no further action (NFA) decision for Solid Waste Management Unit (SWMU) 275, Technical Area (TA) V Seepage Pits, Operable Unit (OU) 1306. SWMU 275 is comprised of two inactive septic tanks and six seepage pits. Review and analysis of all relevant data for SWMU 275 indicate that concentrations of constituents of concern (COC) at this site are less than applicable risk assessment action levels. An assessment of potential groundwater issues associated with SWMU 275 is being conducted under the TA-V groundwater investigation. Thus, SWMU 275 is proposed for an NFA decision based upon confirmatory sampling data demonstrating that COCs that may have been released from this SWMU into the environment pose an acceptable level of risk under current and projected future land use, as set forth by Criterion 5, which states, "The SWMU/AOC [area of concern] has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use" (NMED March 1998).

2.2 Description and Operational History

Section 2.2 describes the site and provides the operational history of SWMU 275.

2.2.1 Site Description

SWMU 275 is located within TA-V. TA-V is in the southern part of Kirtland Air Force Base (KAFB) immediately east of the TA-III gate and is approximately 1 mile southwest of Lovelace Road. It is reached by traveling southeast on Lovelace Road and then turning southwest on the paved TA-III/V access road (Figure 2.2.1-1). SWMU 275 encompasses approximately 0.26 acre of industrially developed, flat-lying land at an average elevation of 5,433 feet above mean sea level (amsl).

SWMU 275 consists of two septic tanks and six seepage pits that are located immediately south of Building 6588 near the center of TA-V (Figure 2.2.1-2). A security fence splits the site diagonally; the northern half is gravel-covered and contains three seepage pits. The southern half of the site contains the two septic tanks and three additional seepage pits (Figure 2.2.1-3). Figure 2.2.1-4a is a photograph of the southern portion of the site. Figures 2.2.1-4b and 2.2.1-4c are photographs of the northern portion of the site.

The surficial sediments at SWMU 275 consist of a thin veneer of recent (Holocene) alluvial fan deposits (see Plate I in SNL/NM December 1995). Subsurface sediments encountered in a borehole (TAV-BH-01) that was drilled in the center of the seepage pits area from the surface to the saturated zone in February 1995 consisted of interbedded gravelly sands, sands, silts, and clays. A thin (less than 5-foot) saturated zone was penetrated in the borehole at 380 feet below ground surface (bgs), but no water was produced. The regional aquifer was encountered at a depth of 491 feet bgs, and the borehole was drilled an additional 29 feet to a total depth of

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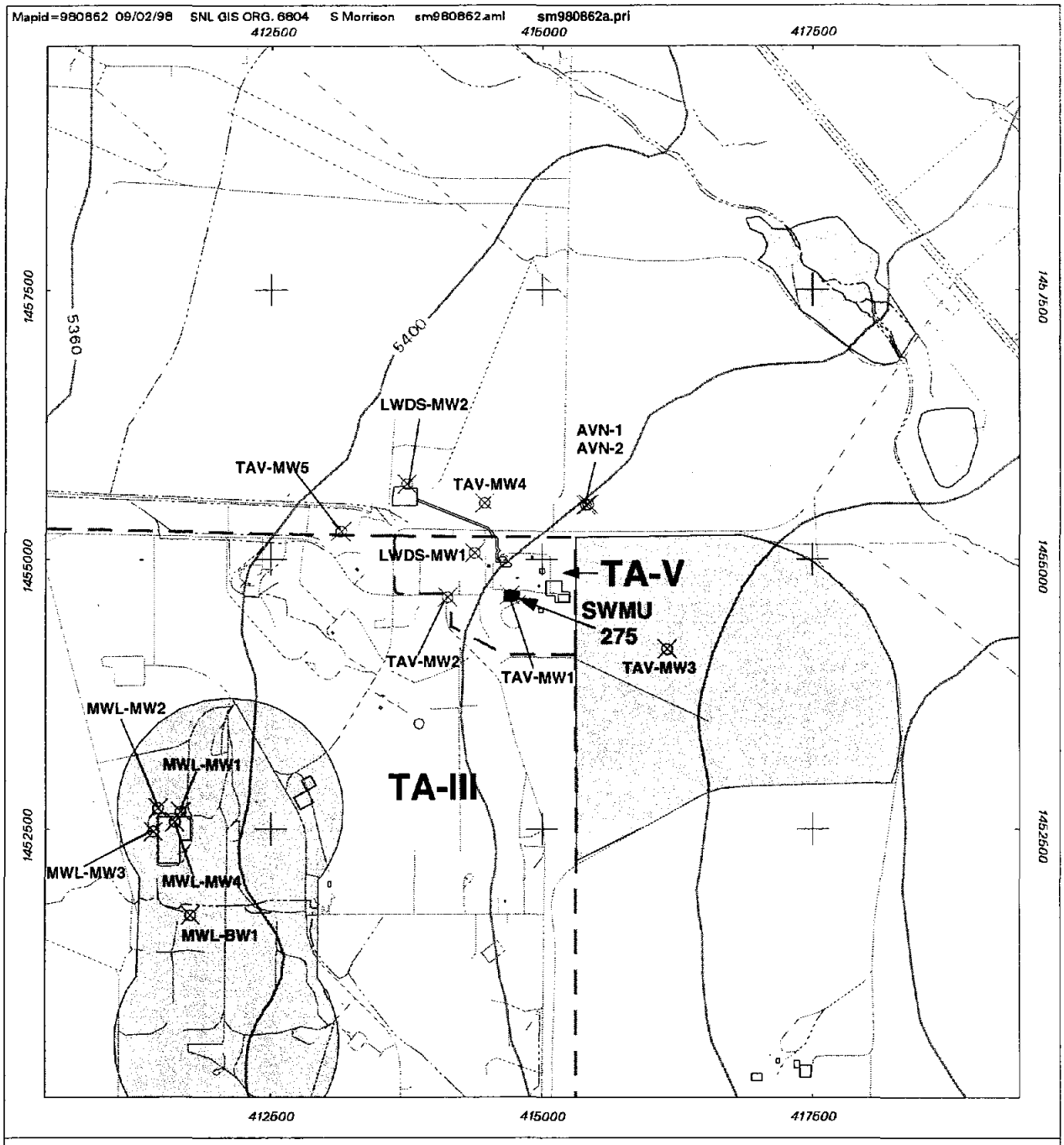


Legend

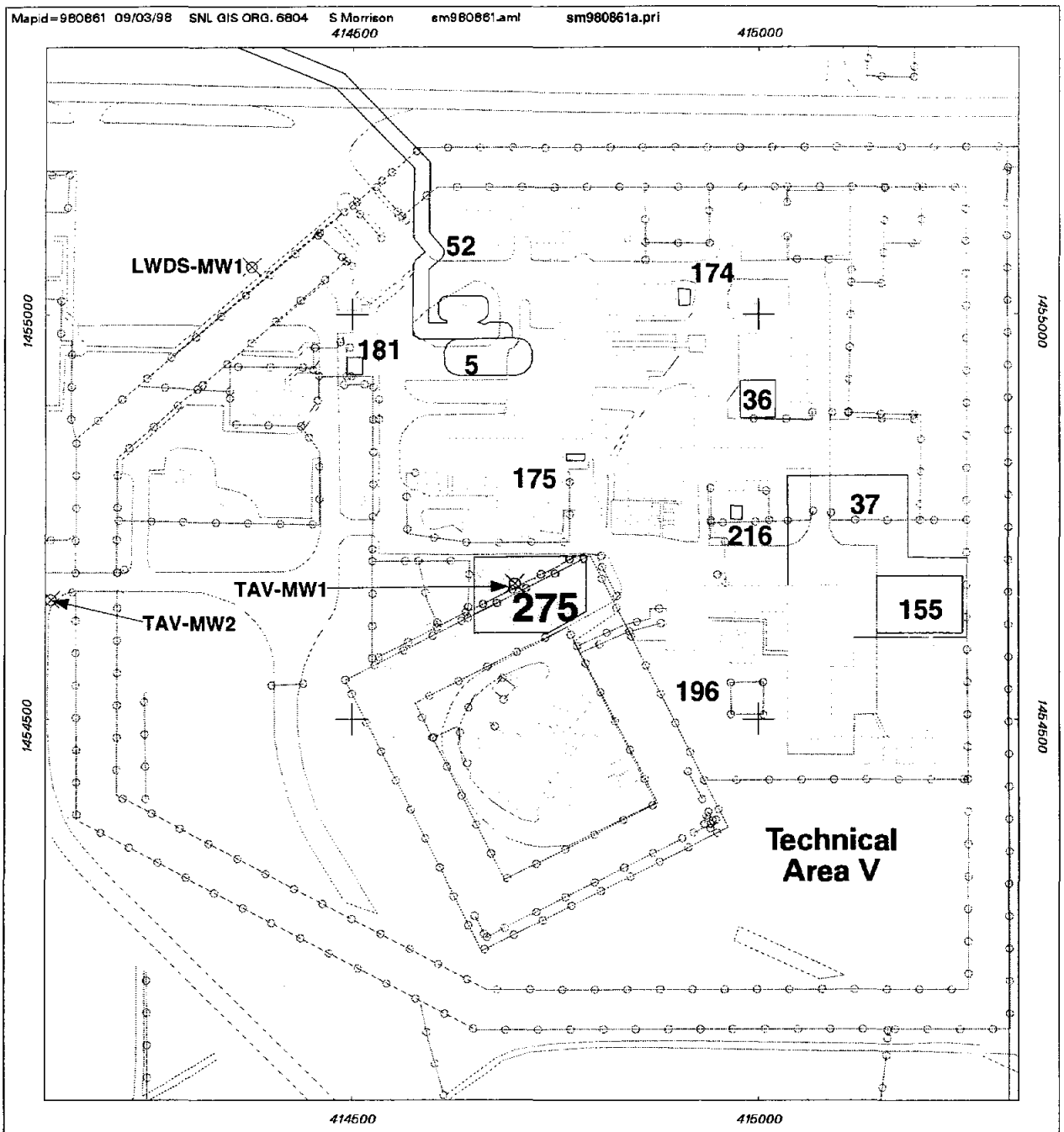
- Monitoring Well
- Road
- Surface Drainage
- 40 Ft Contour
- Technical Area
- SWMU 275
- Other SWMUs

Figure 2.2.1-1
Location of SWMU 275
TA-V Seepage Pits

0 750 1500
Scale in Feet

0 180 360
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System



Legend

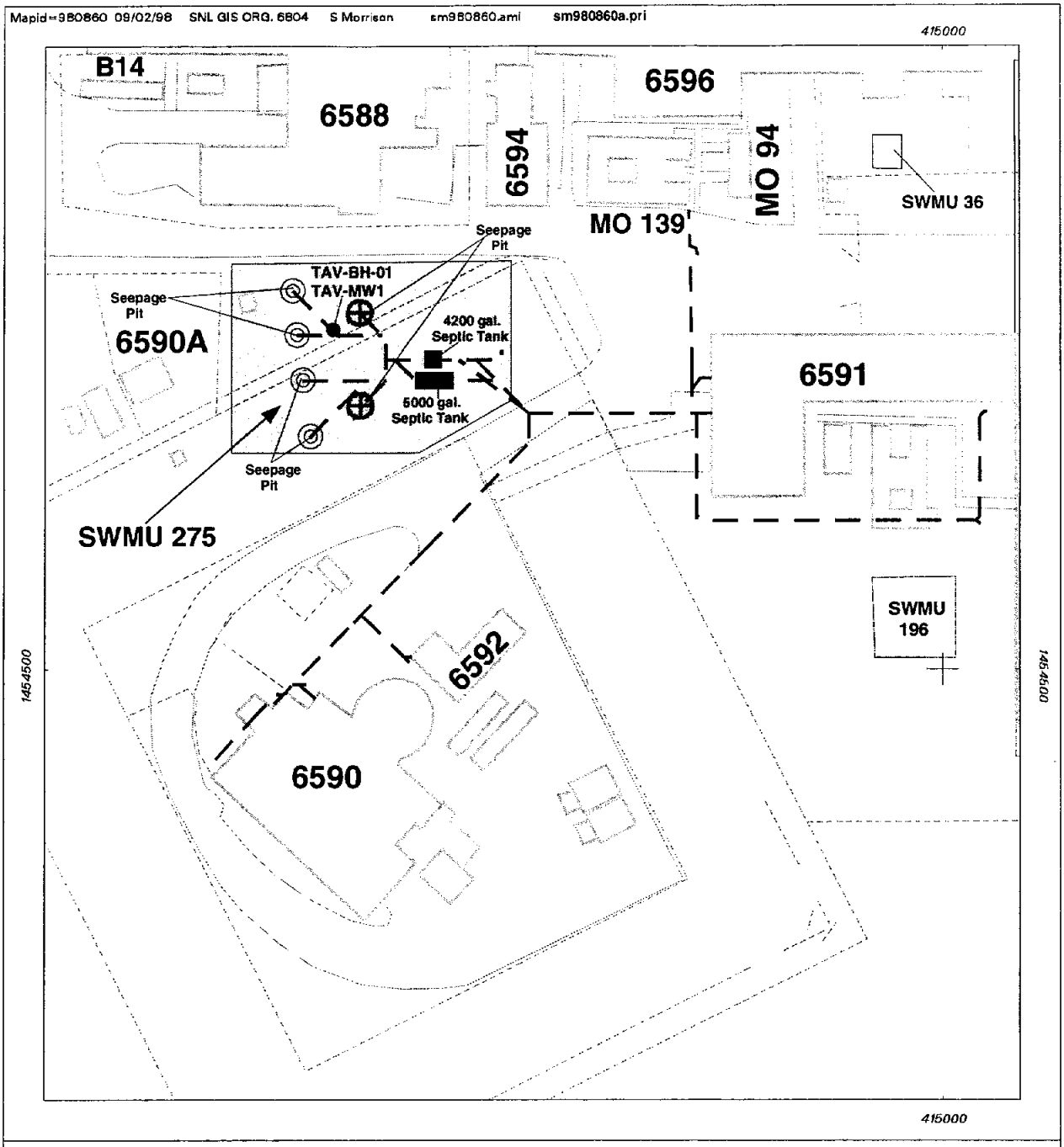
- Monitoring Well
- Technical Area Boundary
- Road
- Fence
- Building
- SWMU 275
- Other SWMUs

Figure 2.2.1-2
Location of SWMU 275
TA-V Seepage Pits

0 100 200
Scale in Feet

0 24 48
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System



Legend

- Seepage Pit with Manhole
- Seepage Pit
- Well/Borehole
- Fence
- Road
- Sewer Line
- SWMU 275
- Other SWMUs
- Building
- Septic Tank

Figure 2.2.1-3
Site Map for SWMU 275
Sandia National Laboratories,
New Mexico

0 40 80
Scale in Feet

0 9.6 19.2
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

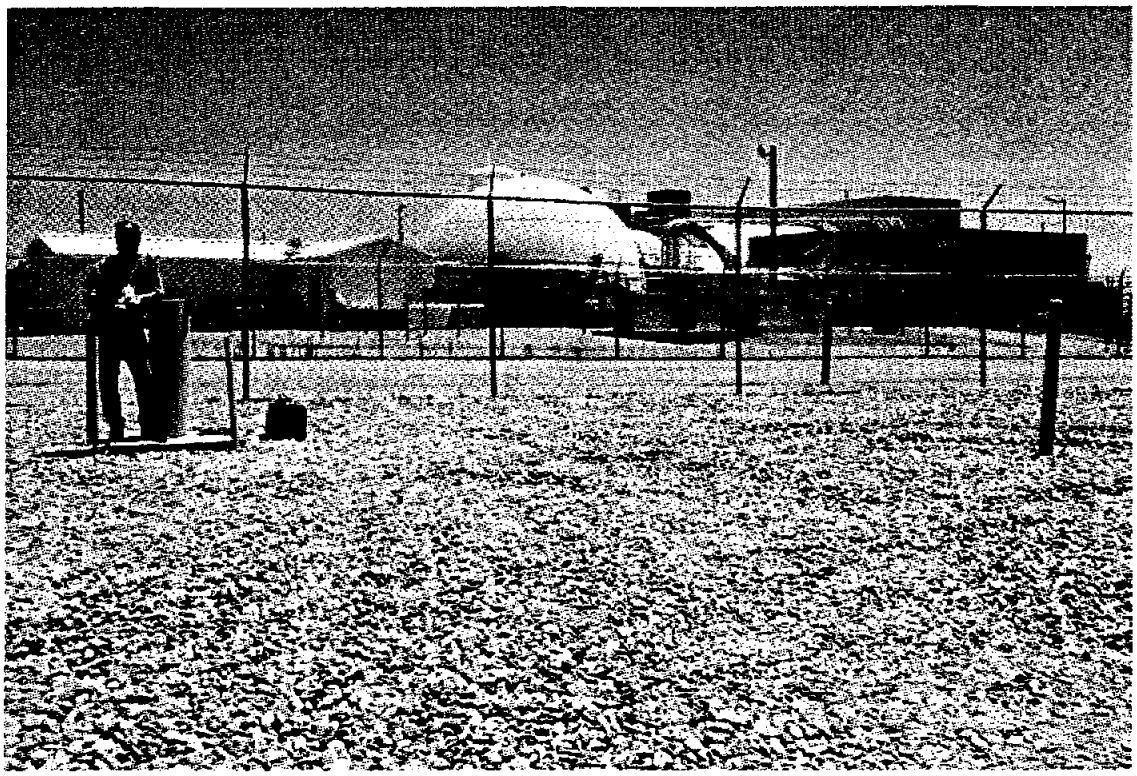


Figure 2.2.1-4a SWMU 275, TA-V, Seepage pits and monitor well TAV-MW1. View looking west toward Building 6590.

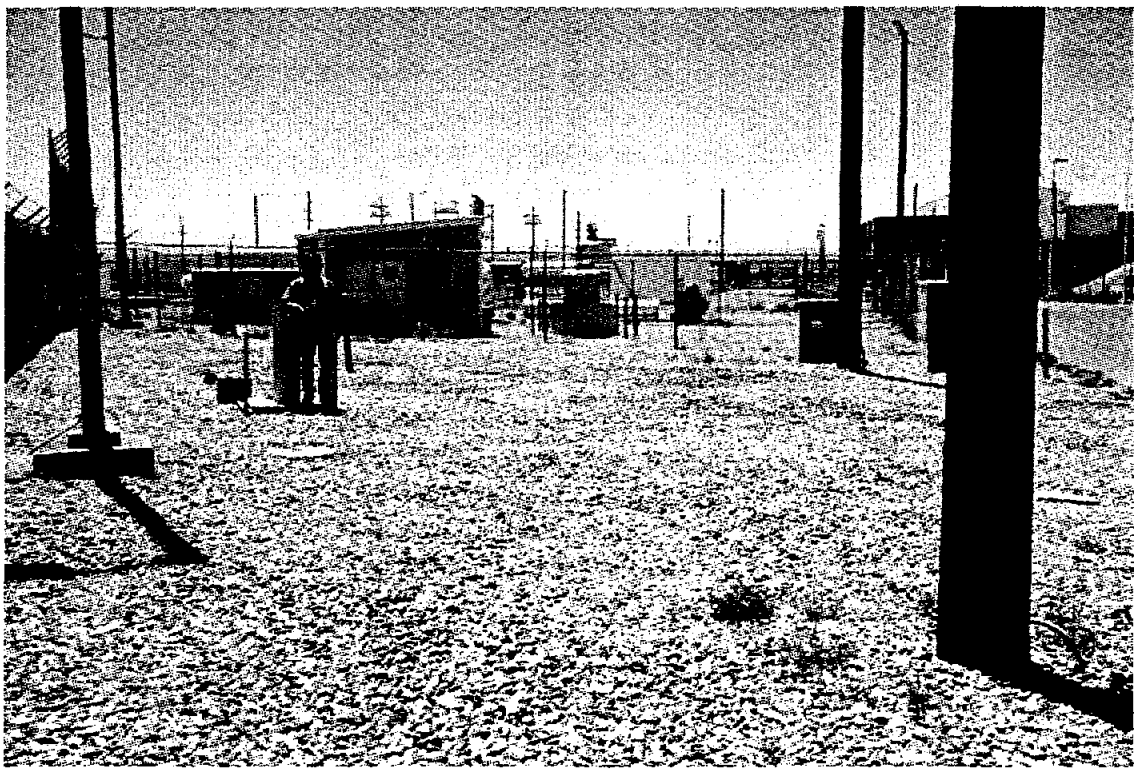


Figure 2.2.1-4b SWMU 275, TA-V, Seepage pits and monitor well TAV-MW1. View looking West.

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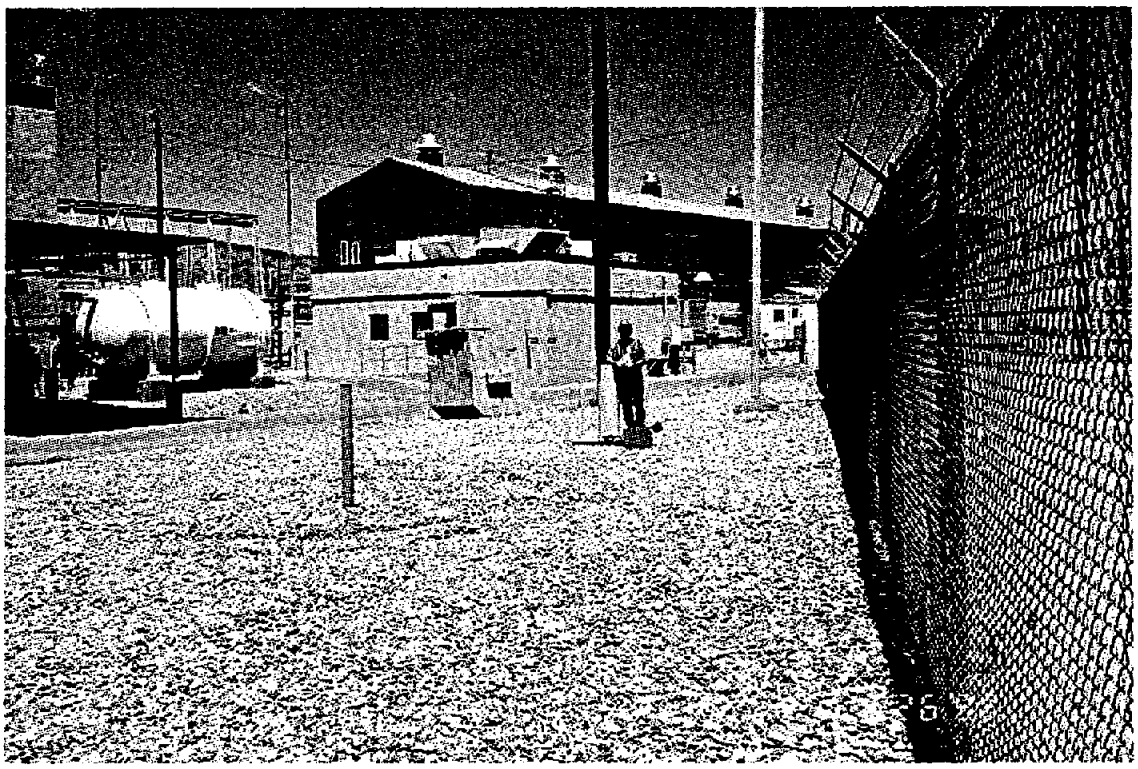

Figure 2.2.1-4c SWMU 275, TA-V, Seepage pits and monitor well TAV-MW1. View looking northeast toward Building 6596.

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520 feet. The boring was converted to monitoring well TAV-MW1 (Figures 2.2.1-4a, 2.2.1-4b, and 2.2.1-4c) at the conclusion of drilling. As part of the ongoing TA-V groundwater investigation, samples are routinely collected from this well.

The water table elevation in TAV-MW1 was approximately 4,930 feet amsl (approximately 503 feet bgs) in July 1998 (SNL/NM July 1998). Groundwater flow in the vicinity of TA-III and TA-V is in a westerly direction (SNL/NM March 1997). The nearest production wells are northwest of SWMU 275 and include KAFB-1, KAFB-2, KAFB-4, KAFB-7, and KAFB-11. They range from approximately 2.9 to 4.0 miles away from the site (SNL/NM August 1996).

2.2.2 Operational History

In 1993 trichloroethylene (TCE) was detected in the groundwater monitoring well LWDS-MW1, which was installed in May 1993 and is located on the northwestern edge of TA-V (Figure 2.2.1-1). This contamination was problematic in that no TCE had been detected in the adjacent SWMU 5 (Liquid Waste Disposal System [LWDS] Drainfield). The discovery of groundwater contamination led to a focused investigation to determine the contamination source. Following a background review (Section 2.4.3.1.1), a new site (the TA-V Seepage Pits) was identified as the most likely contamination source and was subsequently added to SNL/NM's list of SWMUs as SWMU 275.

The SWMU 275 seepage pit system is comprised of two septic tanks connected by distribution boxes to six seepage pits. The seepage pit system was connected by sewer lines to at least Buildings 6590, 6591, 6592, 6593, and 6596 and to an unnumbered building located immediately between Buildings 6594 and MO94 (Figures 2.2.1-3 and 2.2.2-1). The two septic tanks have capacities of 5,000 and 4,200 gallons and are constructed approximately 8 feet bgs (Figure 2.2.2-2). The seepage pits are concrete/cinder block construction and form open-bottomed cylinders approximately 20 feet tall with a diameter of 6.5 feet (Figure 2.2.2-2). The bottoms of the seepage pits are approximately 20 feet bgs and are filled with (approximately) a 3-foot-thick layer of 1- to 1.5-inch-diameter gravel.

Most process water at TA-V was disposed of into these seepage pits from the early 1960s until 1992. It is estimated that between 3,000 and 5,000 gallons of water were disposed of into these pits on a daily basis (SNL/NM January 1997). The seepage pits were abandoned when the City of Albuquerque sanitary sewer system was extended into the TA-III/TA-V area in 1992.

2.3 Land Use

Section 2.3 discusses the current and future land-use scenarios for SWMU 275.

2.3.1 Current Land Use

SWMU 275 is located in TA-V within the boundaries of KAFB. Current land use for TA-V and the site is industrial (Figure 2.3.1-1).

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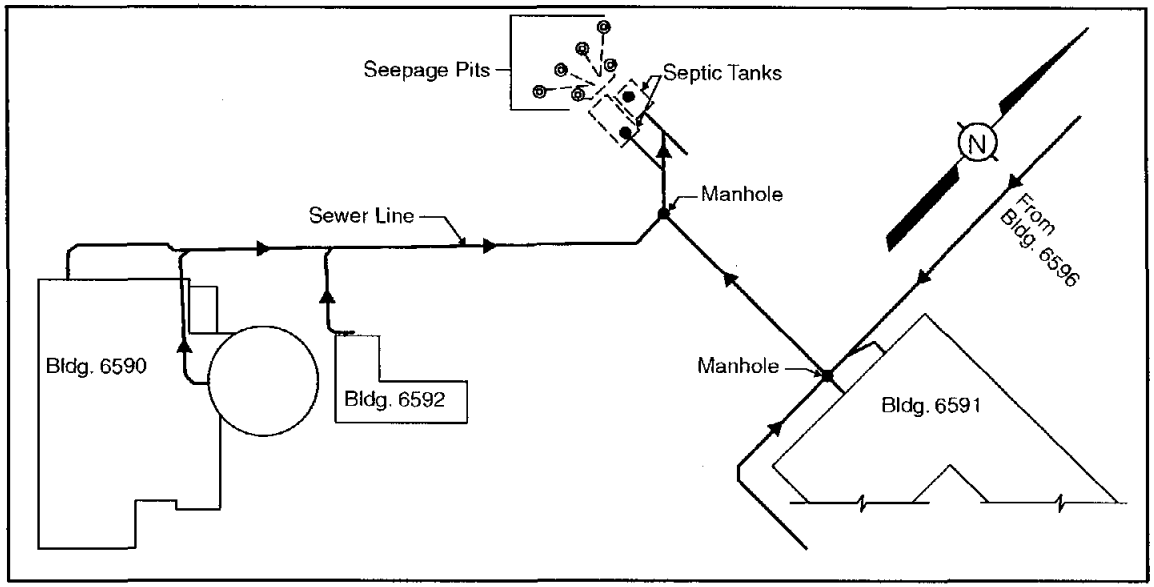

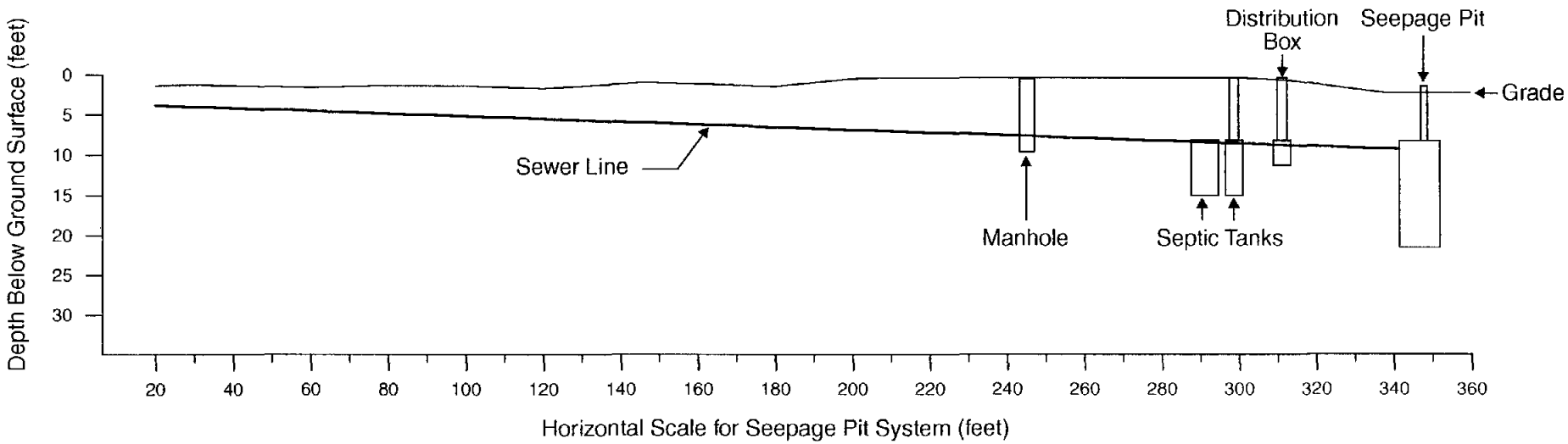

Figure 2.2.2-1

Plan view schematic and cross-section showing septic tanks, distribution box, and seepage pits, SWMU 275, TA-V

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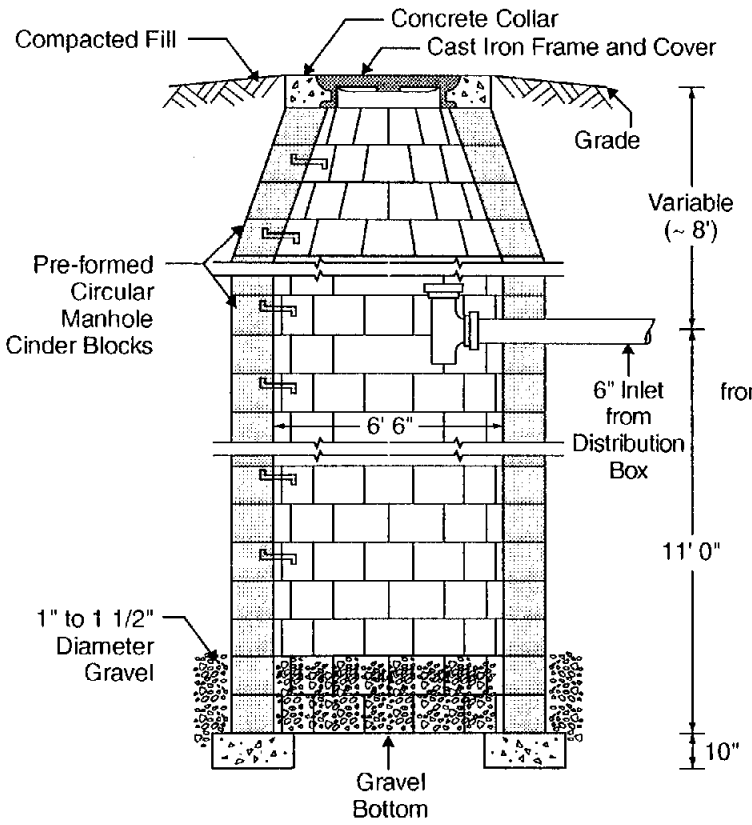
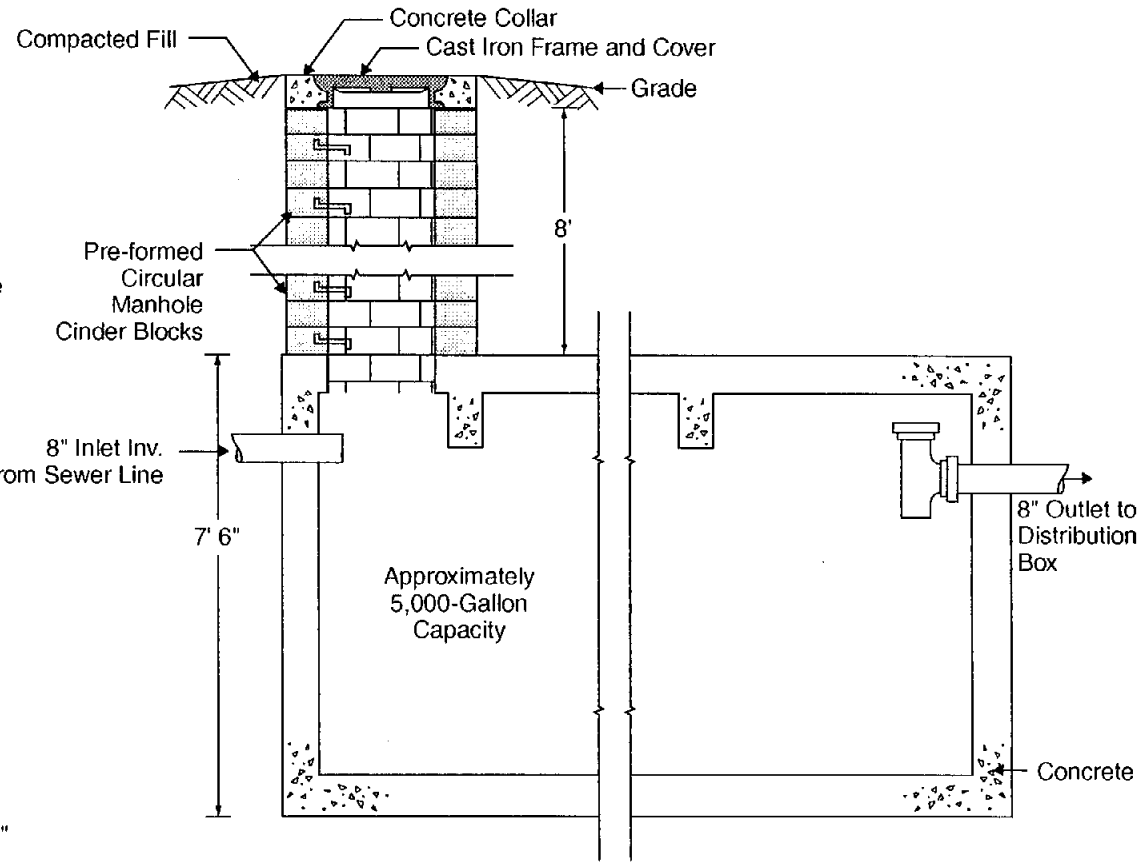


Seepage Pit Schematic



Septic Tank Schematic

Figure 2.2.2-2

Engineering schematic of SWMU 275, TA-V seepage pits and septic tanks.

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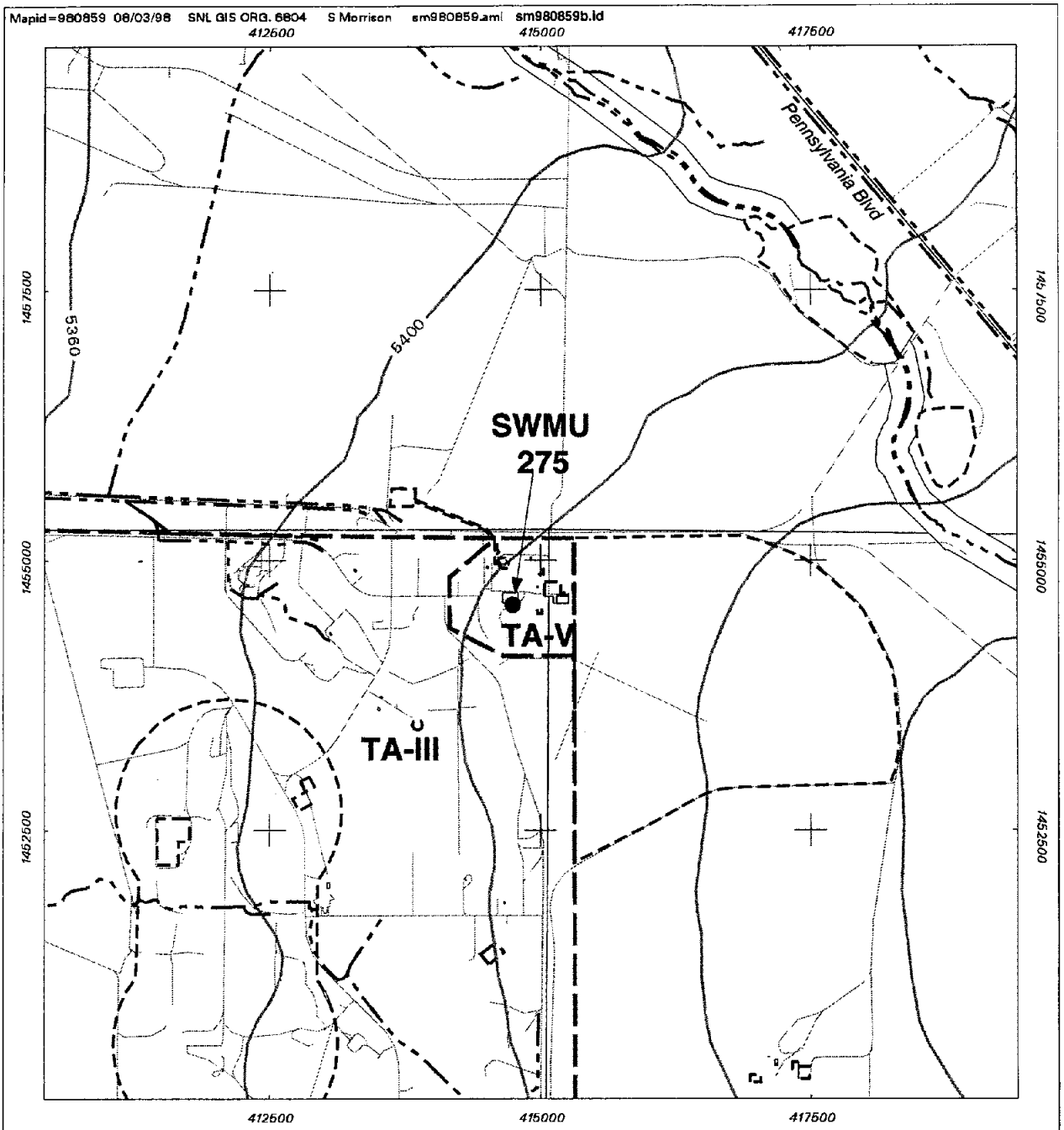

Legend

- Road
- Surface Drainage
- 40 Ft Contour
- Technical Area
- SWMU 275
- Other SWMUs
- Recreational Land Use
- Industrial Land Use

Figure 2.3.1-1
Land Use Map Relevant to
SWMU 275 TA-V Seepage Pits

0 750 1500
Scale in Feet

0 180 360
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

2.3.2 Future/Proposed Land Use

The projected land use for SWMU 275 is industrial (DOE et al. September 1995).

2.4 Investigatory Activities

SWMU 275 has been characterized in a series of three investigations as described in this section.

2.4.1 Summary

Numerous SNL/NM septic systems (not including SWMU 275) were identified as part of the U.S. Department of Energy Comprehensive Environmental Assessment and Response Program (CEARP) in the mid-1980s (Investigation #1). In 1994 preliminary investigations (including a subsurface active soil-gas survey that used direct-push borings and a surface passive soil-gas survey) were begun (Investigation #2). Following discovery of the SWMU 275 seepage pits in 1994, in 1995 a borehole (TAV-BH-01) was drilled near the center of the seepage pit system to the groundwater and was completed as a groundwater monitoring well (TAV-MW1) (Investigation #3).

2.4.2 Investigation #1—Comprehensive Environmental Assessment and Response Program

2.4.2.1 Nonsampling Data Collection

Numerous septic tanks and drainfields at SNL/NM were identified during the investigation conducted under the CEARP (DOE September 1987). The CEARP Phase I report documented that many of the septic systems received industrial effluent as well as sanitary wastes. The septic tanks and seepage pits associated with SWMU 275 had not been discovered when the report was written and were not identified until mid-1994 (Dawson December 1994).

2.4.2.2 Sampling Data Collection

No sampling activities were conducted at SWMU 275 as part of the CEARP.

2.4.2.3 Data Gaps

At the time of the CEARP, none of the septic systems had been evaluated under the New Mexico regulations for sanitary waste. The CEARP Phase I report recommended an evaluation of the septic systems for discharge plans under the New Mexico Environment Department (NMED) Water Quality Control Commission (WQCC) Regulations (DOE September 1987). SWMU 275 was not identified during the RCRA Facility Assessment (EPA April 1987).

2.4.2.4 Results and Conclusions

The CEARP Phase I report concluded that the septic tanks and drainfields at TA-V should be evaluated pursuant to the NMED WQCC Regulations, and therefore, no additional CEARP investigations were performed and no Hazard Ranking System scores were calculated for the sites.

2.4.3 Investigation #2—SNL/NM ER Preliminary Investigations

2.4.3.1 Nonsampling Data Collection

This section presents the nonsampling data collected at SWMU 275.

2.4.3.1.1 Background Review

A background review was conducted in order to collect available and relevant information regarding SWMU 275. Background information sources included interviews with SNL/NM staff and contractors who were familiar with site operational history and existing historical site records and reports. The study was documented and has provided traceable references that sustain the integrity of the NFA proposal. The following information sources were used to assist in evaluating SWMU 275:

- SNL/NM Facilities Engineering building drawings No. 90206 M-1 and No. 90206 M-12.1 (SNL/NM June 1967), and No. 82378 M-18 (SNL/NM June 1987)
- An interview with Mr. Joe Jones, SNL/NM Waste Management and Regulatory Projects Department (SNL/NM January 1997)

2.4.3.1.2 UXO/HE Survey

An unexploded ordnance (UXO)/high explosives (HE) survey was not performed at SWMU 275. The UXO/HE surveys were focused on testing areas outside TA-I through V (Young September 1994).

2.4.3.1.3 Radiological Survey(s)

Because of the nature of the liquid release from the seepage pits into the ground, no surface radiological surveys were performed at SWMU 275.

2.4.3.1.4 Cultural-Resources Survey

No cultural resources were identified at TA-V (Hoagland and Dello-Russo February 1995, Lord November 1990).

2.4.3.1.5 Sensitive-Species Survey

SWMU 275 is located in an active industrial area of TA-V. No sensitive-species surveys were performed at the site because the SWMU contains no unaltered habitat suitable for supporting sensitive species (IT February 1995).

2.4.3.1.6 Geophysical Survey(s)

No surface geophysical surveys were performed at SWMU 275.

2.4.3.2 Sampling Data Collection

One active subsurface soil-vapor survey (SVS) and two passive surface (less than 1.5 feet bgs) SVSs that included the vicinity of the SWMU 275 Seepage Pits were performed at TA-V.

2.4.3.2.1 Subsurface Active Soil-Vapor Survey

On July 15, 1994, an active SVS investigation was conducted in the vicinity of the tanks and seepage pits in order to identify potential contaminant sources. The soil-vapor samples were collected from three boreholes drilled with a geoprobe. Soil-vapor samples were collected at the 15-foot depth interval—until refusal. One borehole was drilled to 30 feet bgs, the second borehole was drilled to 44 feet bgs, and the third borehole was drilled to 45 feet bgs. All soil-vapor samples were analyzed on site with a gas chromatograph (GC)/mass spectrometer (MS). The on-site laboratory identified trace concentrations of benzene (up to 19 parts per billion by volume [ppbv]), TCE (up to 25 ppbv), toluene (up to 22 ppbv), and tetrachloroethene (PCE) (up to 5 ppbv). Except for TCE detected in soil vapor at concentrations of 25 ppbv at 44 feet bgs in the deep borehole, all on-site detections were identified below the quantitation limit (i.e., J values).

In addition to the on-site analyses, ENCOTEC laboratory analyzed soil-vapor samples collected from the 30-foot depth in each borehole. In the deep borehole, ENCOTEC detected 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113) in soil vapor at 0.1 parts per million (ppm) by volume at 30 feet bgs.

Annex 2-A includes the locations of the boreholes and the results of all active soil-vapor sampling.

2.4.3.2.2 Surface Passive SVSs

This section summarizes two phases of passive SVS investigations conducted in TA-V during 1994. The results of the passive SVSs are recorded in total ion counts (TIC) as measured on a mass spectrometer. The primary purpose of these passive SVSs was to help identify potential source areas for TCE and other constituents detected in groundwater in monitoring well LWDS-MW1 (Figure 2.2.1-2). Annex 2-B provides details of these two SVSs.

Phase I Passive SVSs

The first SVS was conducted between August 1 and 30, 1994. The survey consisted of 49 passive SVS collectors installed at or near the seepage pits and in the area between the seepage pits and monitoring well LWDS-MW1. In addition, the survey included two quality assurance (QA)/quality control (QC) samples and five duplicate samples. Time-series collectors also were installed to determine the length of the exposure time, which was approximately 28 days. Northeast Research Institute (NERI) in Lakewood, Colorado, analyzed the samples. The locations of the passive collectors were recorded using a Global Positioning System (GPS) and are shown on the Phase I passive SVS map in Annex 2-B.

Regarding interpretation of passive soil-gas collector ion count values, NERI states

> Please keep in mind that levels below 100,000 ion counts for a given compound such as PCE and TCE, under normal site conditions generally do not represent detectable levels by standard quantitative methods for soils and/or groundwater. Normal site conditions are considered to be sites in which the depth to groundwater is less than 100 feet below the surface, groundwater flow rates are undisturbed, and normal precipitation occurs during sampler exposure. Corresponding levels for a class of compounds such as BTEX and TPH, in which several masses are summed and reported, are equivalent to 200,000 ion counts. Areas of subsurface contamination are generally illustrated by a number of spatially contiguous samples exhibiting elevated response rather than isolated occurrences. (NERI December 1994)

Low levels of TCE (a maximum of 3,791 TICs) were identified in the vicinity of the TA-V seepage pits. These levels, however, were not sufficiently high to identify the seepage pits conclusively as a potential source area for TCE in groundwater 500 feet beneath TA-V. PCE (at up to 5,932 TICs) and benzene, toluene, ethylbenzene, and xylene (BTEX) (at a maximum of 169,011 TICs in the duplicate sample at location #7) were also identified in the vicinity of TA-V seepage pits during the passive SVS (NERI September 1994). Annex 2-B provides a summary of all Phase I passive soil-vapor sample locations and related data.

Phase II Passive SVS

The second phase of passive SVS investigations was conducted between October 13 and November 12, 1994. The second passive SVS covered a larger portion of TA-V. Seventy-three passive soil-vapor sample collectors were installed throughout the northern part of TA-V; the survey also included two QA/QC samples and six duplicate samples, which also were analyzed by NERI. The soil-vapor sample collectors were installed in all TA-V SWMUs as well as at surface disturbances, areas containing visible stains, and dry wells. The locations of the soil-vapor samples were determined using a GPS and are shown on the map of the Phase II passive SVSs in Annex 2-B.

Detectable levels of BTEX (up to 2,849,939 TICs), total petroleum hydrocarbon (TPH) (up to 19,959,176 TICs), TCE (up to 400,989 TICs), and PCE (a maximum of 2,487,530 TICs) were identified in samples from locations 200 to 300 feet away from the seepage pits and are likely not associated with the seepage pits themselves. These detectable concentrations may suggest leaks in other TA-V drain lines. Annex 2-B provides a summary of all Phase II passive soil-vapor sample locations and related data. The NERI table (Table 1) in Annex 2-B that summarizes analytical results for the Phase II samplers lists results for five samplers (numbers

29, 34, 41, 42, and 67) that are not shown on the corresponding Phase II sample location map. In-house GPS computer files generated when the survey was performed in late 1994 were researched in an attempt to determine locations for these five samples but was unsuccessful. These points were evidently missed when the GPS survey was performed. The original location markers for these samples have long since disappeared from the site, so the location of these five sample points is unknown.

2.4.3.3 Data Gaps

No data gaps are associated with the objectives of the passive SVS.

2.4.3.4 Results and Conclusions

Significant levels of contaminants were not detected in any of the Phase I passive collectors, based upon NERIs 100,000 and 200,000 TIC criteria for individual and compound groups respectively (NERI December 1994). In Phase II passive collectors, BTEX was identified throughout TA-V, but the majority of the highest concentrations were detected in areas of known oil releases (including HERMES [SWMU 36] and PROTO [SWMU 37]). In addition, areas of high BTEX concentrations were usually accompanied by high concentrations of TPH, which are likely indicative of vehicle fluid leakage. TCE was not detected in soil vapor in the vicinity of the seepage pits that conclusively identify a TCE source near these units. As stated earlier, VOCs in soil vapor that measure below about 100,000 TICs for single compounds like TCE and PCE or 200,000 TICs for multiple constituents like BTEX and TPH generally do not represent detectable levels by standard quantitative methods for soils and/or groundwater (NERI December 1994).

2.4.4 Investigation #3—SNL/NM ER Project TA-V Borehole Drilling and Well Installation

This section presents detailed descriptions of drilling activities conducted in January and February 1995 at the TA-V seepage pits. These activities included

- Drilling a borehole in the approximate center of the seepage pit area from the surface to groundwater
- Collecting soil and active soil-vapor samples from the borehole at selected depth intervals
- Conducting geophysical logging in the borehole
- Completing the seepage pit borehole as a groundwater monitoring well and collecting groundwater samples.

2.4.4.1 Nonsampling Data Collection

No nonsampling data collection activities were related to the borehole drilling and SVS activities.

2.4.4.2 Sampling Data Collection

This section discusses soil-sampling and soil-vapor sampling activities during the borehole drilling and installation of well TAV-MW1. This borehole sampling and well installation work was requested by EPA Region 6 (Dawson January 1995).

2.4.4.2.1 Borehole Drilling and Geophysical Logging

Borehole TAV-BH-01 was drilled and sampled as part of the seepage pit investigation at TA-V and was completed as monitoring well TAV-MW1. TAV-BH-01 was located in the approximate center of the SWMU 275 seepage pit group (Figure 2.2.1-3). To drill Borehole TAV-BH-01, Stewart Brothers of Grants, New Mexico, used a Chicago Pneumatic 650 (CP-650) drill rig, which included an air rotary casing hammer with 11.75- and 10.5-inch outer-diameter (O.D.) steel casing. The borehole was logged from drill cuttings, and frequent drive samples were collected to record the lithology of the subsurface material. Soil samples were collected from most 10-foot depth intervals between 10 and 100 feet bgs, all but one from 20-foot depth intervals between 120 and 480 feet bgs, and from the 490- and 500-foot depth intervals at the bottom of the hole. Samples were collected with a 2-inch inner-diameter (I.D.) split-spoon sampler driven through an 8.6- or 10-inch O.D. open-center button bit. All soil samples were collected in steam-cleaned stainless steel liners, sealed with Teflon tape and plastic end caps, wrapped with duct tape, labeled, and immediately placed on ice. Annex 2-C provides the borehole and sample log for this hole.

Two subsurface geophysical surveys were performed in the TAV-BH-01 borehole: a natural gamma log and a neutron log. Both geophysical surveys were performed through the steel drive casing after reaching the total depth of the borehole prior to installing the well casing. The natural gamma log was conducted to help characterize lithology and correlate lithologic units on the basis of natural gamma radiation. A neutron log was run to evaluate the relative moisture content in the soil. Both logs were also used to assist in monitoring well design.

2.4.4.2.2 Soil and Soil-Vapor Sampling

A single soil sample from 10 feet bgs was analyzed for gamma-emitting radionuclides by SNL/NMs Radiation Protection Sample Diagnostics (RPSD) laboratory (Department 7713) using gamma spectroscopy (EPA November 1986).

Except as noted below, samples were collected every 10 feet from 20 to 100 feet bgs and were analyzed by the Quanterra laboratory for VOCs using EPA Method 8240, semivolatile organic compounds (SVOC) using EPA Method 8270, and target analyte list (TAL) metals using EPA Methods 6010 and 7471 (EPA November 1986). Samples from these intervals were also analyzed by the TMA Eberline laboratory for tritium by distillation in soil using EPA Method 600-906.0, and for gamma-emitting radionuclides by the SNL/NM RPSD laboratory. Exceptions included no samples from the 50-foot depth interval (no soil was recovered from that interval) and no VOC and SVOC samples from 60 and 70 feet bgs because of insufficient soil volume recovered.

Soil samples were also collected every 20 feet from between 120 and 480 feet bgs. Except as noted below, samples from each of these intervals were analyzed by Quanterra for VOCs using

EPA Method 8240 and for tritium by TMA using EPA Method 600-906.0 (EPA November 1986). Exceptions included no samples from the 280-foot depth because no soil was recovered from that interval. SVOC samples were also collected from the 180-, 300-, 320-, 400-, and 480-foot intervals and were analyzed by Quanterra. Additional TAL metals samples were collected from the 160-, 240-, 320-, and 400-foot intervals and were also analyzed by Quanterra.

Soil samples were collected from the 490 and 500-foot depth intervals and were analyzed by Quanterra for VOCs using EPA Method 8240, and tritium by TMA Eberline using EPA Method 600-906.0 (EPA November 1986) An extra sample was also collected from the 490-foot interval and was analyzed for total petroleum hydrocarbons (TPH) by ATI laboratory. The single TPH sample was collected from the deepest vadose zone sampling interval in the borehole to determine if detectable levels of mineral oil from the nearby HERMES site (SWMU 36) were present immediately above groundwater at this location (none were detected).

Soil samples were also collected from selected intervals between 340 and 500 feet and were submitted to the Environmental Restoration Chemistry Laboratory (ERCL) for volumetric moisture content and grain size determinations.

Analytical results for the RCRA metals portion of the TAL metals list are summarized in Table 2.4.4-1, and the complete TAL metals analyses are presented in Annex 2-F. Selected gamma spectroscopy radionuclude analytical results are summarized in Table 2.4.4-2, and the gamma spectroscopy analyses are presented in their entirety in Annex 2-G. Tritium analyses are summarized in Table 2.4.4-3. VOC analytical results are summarized in Table 2.4.4-4, and the EPA Method 8240 analyte list and reporting limits are presented in Table 2.4.4-5. SVOC analytical results are summarized in Table 2.4.4-6, and the complete analyte list and reporting limits for EPA Method 8270 are presented in Table 2.4.4-7.

Active soil-vapor samples were collected from the 10- and 20-foot depth intervals using a hollow steel rod lined with Teflon tubing, capped with a slotted drive point, and driven about 1 foot beyond the open-center button bit. A constant-flow sample pump (pumping at 4 liters [L]/minute) was connected to the surface end of the tubing. After purging a minimum of 3 tubing volumes (i.e., 1,500 milliliter [mL]), a soil-vapor sample was collected in a 500-mL glass bulb and submitted to the ERCL for analysis. The soil-vapor samples were relinquished to the ERCL immediately after collection and were analyzed within 24 hours of receipt. Annex 2-D presents and Section 2.4.4.4.1 summarizes soil-vapor results for all soil-gas samples collected from borehole TAV-BH-01.

2.4.4.2.3 TAV-MW1 Monitoring Well Installation

Borehole TAV-BH-01 was initiated on January 31, 1995, within the TA-V seepage pits and was completed as monitoring well TAV-MW1 on February 28, 1995 (Figure 2.2.1-3). During the first installation of the polyvinyl chloride (PVC) well casing, the bentonite seal placed above the sand pack seized the steel drive casing to the PVC casing. As a result, the PVC casing had to be drilled out and replaced with another string of PVC casing. Monitoring well TAV-MW1 was completed on February 28, 1995, and was developed with a bailer and surge block between April 11 and 13, 1995. Annex 2-E provides well construction specifications.

Table 2.4.4-1
Summary of SWMU 275 RCRA Metals Plus Beryllium and Cobalt Analytical Results from Borehole TAV-BH-01, January–February 1995

Sample Attributes			Metals (EPA 6010/7471)[a] (mg/kg)									
Record Number[b]	ER Sample ID (Figure 2.2.1-3)	Sample Depth (ft)	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Mercury	Selenium	Silver
2598	TA5-BH-01-20.50	20.5	2.5	46.4	0.26	ND (0.5)	6.4	3.2	3.4 J (5)	ND (0.1)	ND(0.85)	ND (1)
2598	TA5-BH-01-30.50	30.5	1.5	23.0	ND (0.40)	ND (1)	12.5	2.4	ND (10)	0.048 J (0.10)	ND (0.5)	ND (2)
2598	TA5-BH-01-41.50	41.5	1.6 J (2)	59.0	ND (0.40)	ND (1)	15.5	3.3	ND (10)	0.065 J (0.10)	ND (1.6)	ND (2)
2602	TA5-BH-01-61.0	61	2.6	86.4	0.26	ND (0.5)	10.4	3.7	**46.2**[c]	ND (0.1)	ND (0.5)	ND (1)
2602	TA5-BH-01-70.0	70	2.0	75.4	0.21	ND (0.5)	6.8	2.9	4.1 J (5)	ND (0.1)	ND (0.5)	ND (1)
2602	TA5-BH-01-80.50	80.5	0.44 J (1)	40.6	0.39	ND (0.5)	8.4	**5.5**	ND (5)	ND (0.1)	ND (0.92)	ND (1)
2602	TA5-BH-01-90.50	90.5	3.5	83.2	0.43	ND (0.5)	8.8	4.5	7.1	ND (0.1)	ND (0.56)	ND (1)
2602	TA5-BH-01-101.0	101	2.3	42.4	0.38	ND (0.5)	7.0	3.8	4.9 J (5)	ND (0.1)	ND (0.5)	ND (1)
2605	TA5-BH-01-160.0	160	2.1	57.7	0.38	ND (0.5)	**19.5**	3.4	9.7	ND (0.1)	ND (0.51)	ND (1)
2621	TA5-BH-01-241.0	241	2.3	39.7	0.24	ND (0.5)	7.2	3.3	3.7 J (5)	ND (0.1)	ND (0.52)	ND (1)
2626	TA5-BH-01-320.25	320.25	3.5	70.9	**0.66**	ND (0.5)	10.9	**5.6**	**64.6**	ND (0.1)	ND (0.64)	ND (1)
2629	TA5-BH-01-400.50	400.5	**4.7**	67.4	0.65	ND (0.5)	9.8	**6.6**	7.2	ND (0.1)	ND (0.67)	ND (1)
2738	TA5-BH-01-480.50	480.5	3.4	120	0.44	ND (0.5)	6.4	4.1	6.2	ND (0.1)	ND (0.8)	ND (1)
Background Subsurface Soil Concentrations Southwest and Other Super Groups (mg/kg)[d]			4.4	214	0.65	0.9	15.9	5.2	11.8	<0.1	<1	<1
Quality Assurance/Quality Control Samples (mg/L)												
2613	TA5-BH-01-EB1	NA	ND (0.01)	ND (0.01)	ND (0.0020)	ND (0.005)	ND (0.01)	ND (0.010)	0.0054	ND (0.0002)	ND(0.005)	ND (0.01)
2629	TA5-BH-01-EB2	NA	ND (0.01)	ND (0.01)	ND (0.0020)	ND (0.005)	0.0065 J (0.010)	ND (0.010)	0.0039	ND (0.0002)	ND(0.005)	ND (0.01)

[a]EPA November 1986.
[b]Analysis request/chain-of-custody.
[c]Values in bold exceed background soil concentrations.
[d]From Dinwiddie September 1997.

BH = Borehole.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J ( ) = The reported value is less than the reporting limit.
mg/kg = Milligram(s) per kilogram.
mg/L = Milligram(s) per liter.
NA = Not applicable.
ND = Not detected above the reporting limit, shown in parenthesis.
SWMU = Solid waste management unit.

Table 2.4.4-2
Summary of SWMU 275 Confirmatory Soil Sampling Gamma Spectroscopy Analytical Results from Borehole TAV-BH-01, January–February 1995

Sample Attributes			Activity (pCi/g)							
			Uranium-238		Thorium-232		Uranium-235		Cesium-137	
Record Number[a]	ER Sample ID (Figure 2.2.1-3)	Sample Depth (ft)	Result	Error[b]	Result	Error[b]	Result	Error[b]	Result	Error[b]
02599	TA5-BH-01-10	10	ND(2.22E+00)	--	2.48E-01	1.18E-01	ND(3.05E-01)	--	ND(6.49E-02)	--
02599	TA5-BH-01-20	20	ND(3.25E+00)	--	4.38E-01	1.92E-01	ND(4.34E-01)	--	ND(8.88E-02)	--
02599	TA5-BH-01-30	30	ND(4.75E+00)	--	4.07E-01	2.46E-01	ND(7.08E-01)	--	ND(1.45E-01)	--
02599	TA5-BH-01-41	41	ND(2.28E+00)	--	2.40E-01	1.18E-01	ND(3.40E-01)	--	ND(6.60E-02)	--
02603	TA5-BH-01-61.5	61.5	ND (2.16E+00)	--	3.68E-01	1.43E-01	ND(2.92E-01)	--	ND(5.16E-02)	--
02603	TA5-BH-01-70.5	70.5	ND (1.95E+00)	--	4.39E-01	1.58E-01	ND(2.67E-01)	--	ND(4.90E-02)	--
02603	TA5-BH-01-80	80	ND(2.23E+00)	--	5.88E-01	2.14E-01	ND(3.35E-01)	--	ND(6.13E-02)	--
02603	TA5-BH-01-90	90	ND(2.67E+00)	--	6.11E-01	2.18E-01	ND(3.46E-01)	--	ND(6.45E-02)	--
02603	TA5-BH-01-101.5	101.5	ND(3.07E+00)	--	4.97E-01	2.02E-01	ND(4.08E-01)	--	ND(7.72E-02)	--
Background Soil Activity, Southwest Super Group[c]			1.4	NA	1.01	NA	0.16	NA	0.079	NA
Quality Assurance/ Quality Control Samples (pCi/L)										
2609	TA5-BH-01-EB1	NA	ND(8.46E-01)	NA	ND (1.23E-01)	NA	ND(1.32E-01)	NA	ND(2.13E-02)	NA

[a]Analysis request/chain-of-custody.
[b]Two standard deviations above the mean detected activity.
[c]From Dinwiddie September 1997.

BH = Borehole.
EB = Equipment blank.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
NA = Not applicable.
ND ( ) = Not detected above the minimum detectable activity, shown in parenthesis.
pCi/g = Picocurie(s) per gram.
pCi/L = Picocurie(s) per liter.
SWMU = Solid waste management unit.
-- = Error not calculated for nondetectable results.

Table 2.4.4-3
Summary of SWMU 275 Confirmatory Soil Sampling Tritium Analytical Results from Borehole TAV-BH-01, January–February 1995

Sample Attributes			Activity (pCi/L)		Activity (pci/g)[a]
			Tritium (EPA-600 906.0)		
Record Number[b]	ER Sample ID (Figure 2.2.1-3)	Sample Depth (ft)	Result	Error[c]	Result
02600	TA5-BH-01-21.5	21.5	400	210	0.01
02600	TA5-BH-01-31.25	31.25	ND (3,200)[d]	2000	0.04
02600	TA5-BH-01-42.5	42.5	ND (3,200)[d]	2000	0.12
02604	TA5-BH-01-60.5	60.5	ND (3,300)[d]	2100	0.02
02604	TA5-BH-01-71	71	ND (3,200)[d]	1900	0.31
02604	TA5-BH-01-81.5	81.5	ND (3,200)[d]	2000	0.13
02604	TA5-BH-01-91	91	ND (320)	200	0.02
02604	TA5-BH-01-100.5	100.5	ND (320)	190	0.03
02606	TA5-BH-01-120	120	ND (320)	200	0.01
02606	TA5-BH-01-140	140	360	200	0.01
02606	TA5-BH-01-160.5	160.5	ND (320)	200	0.02
02606	TA5-BH-01-180.5	180.5	320	200	0.02
02606	TA5-BH-01-200.5	200.5	**420**[e]	210	0.02
02624	TA5-BH-01-220.5	220.5	ND (320)	190	0.01
02624	TA5-BH-01-240.25	240.25	**4,600**[d]	2100	0.07
02624	TA5-BH-01-260	260	ND (320)	200	0.01
02623	TA5-BH-01-300	300	**440**	210	0.01
02623	TA5-BH-01-321	321	**420**	210	0.03
02623	TA5-BH-01-340.5	340.5	**430**	210	0.02
02623	TA5-BH-01-360	360	ND (320)	200	0.03
02623	TA5-BH-01-380.25	380.25	ND (320)	190	0.04
02630	TA5-BH-01-400	400	ND (320)	200	0.02
02630	TA5-BH-01-420	420	390	210	0.03
02737	TA5-BH-01-440	440	ND (350)	210	0.03
02737	TA5-BH-01-460	460	ND (360)	210	0.02
02737	TA5-BH-01-480	480	ND (360)	210	0.03
02737	TA5-BH-01-490	490	ND (3,500)	2100	0.22
02737	TA5-BH-01-500	500	ND (3,500)	2100	0.21
Quality Assurance/Quality Control Samples					
02608	TA5-BH-01-EB1	NA	ND(220)	140	NA
02630	TA5-BH-01-EB2	NA	250	140	NA
Nationwide Tritium Range in Precipitation and Drinking Water (pCi/L)[f]			100-400	NA	NA
Background Tritium Concentrations in Soils at SNL/NM (pCi/g)[g]			NA	NA	0.043

[a]Calculated for use in Risk Analysis; calc brief included in Annex 2-H.
[b]Analysis request/chain-of-custody.
[c]Two standard deviations about the mean detected activity.
[d]Laboratory reported that the distillation of samples TA5-BH-01-31.25, TA5-BH-01-42.5, TA5-BH-01-60.5, TA5-BH-01-71, TA5-BH-01-81.5, and TA5-BH-01-240.25 yielded low soil moisture volumes suits for tritium analysis, resulting in 1 mL. aliquots. The relatively high tritium activity level or minimum detected activity (MDA) reported for these samples was due entirely to the analysis of such small aliquots.
[e]Values in bold exceed tritium range in precipitation and drinking water.
[f]EPA October 1993.
[g]From Oldewage September 1998.

BH = Borehole.
EB = Equipment blank.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
NA = Not applicable.
ND ( ) = Not detected at or above the minimum detectable activity, shown in parentheses.
pCi/g = Picocurie(s) per gram.
pCi/L = Picocurie(s) per liter.
SNL/NM = Sandia National Laboratories/New Mexico.
SWMU = Solid waste management unit.

Table 2.4.4-4
Summary of SWMU 275 VOC Analytical Results for Soil and QA/QC Samples from Borehole TAV-BH-01, January–February 1995

Sample Attributes			VOCs (EPA 8240)[a] (µg/kg)					
Record Number[b]	ER Sample ID (Figure 2.2.1-3)	Sample Depth (ft)	Acetone	2-Hexanone	2-Butanone	4-Methyl 2-Pentanone	Methylene Chloride	Xylene
2598	TA5-BH-01-21	21	**7.3 J (10)**[c]	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
2598	TA5-BH-01-31	31	**6.1 J (10)**	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
2598	TA5-BH-01-42	42	**15**	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
2602	TA5-BH-01-81	81	**7**	ND (10)	ND (10)	ND (10)	**1 J (5)**	ND (5)
2602	TA5-BH-01-91.75	91.75	**13**	ND (10)	ND (10)	ND (10)	**1 J (5)**	ND (5)
2602	TA5-BH-01-100.25	100.25	**7.2 J (10)**	ND (10)	ND (10)	ND (10)	**1.2 J (5)**	ND (5)
2605	TA5-BH-01-120.5	120.5	**5.2 J (10)**	ND (10)	ND (10)	ND (10)	**2.4 J (5)**	ND (5)
2605	TA5-BH-01-140.25	140.25	**6.8 J (10)**	ND (10)	ND (10)	ND (10)	**2.7 J (5)**	ND (5)
2605	TA5-BH-01-160.75	160.75	**9 J (10)**	ND (10)	ND (10)	ND (10)	**3.5 J (5)**	ND (5)
2605	TA5-BH-01-181	181	**5.5 J (10)**	ND (10)	ND (10)	ND (10)	**3.3 J (5)**	ND (5)
2605	TA5-BH-01-200.25	200.25	**7.3 J (10)**	ND (10)	ND (10)	ND (10)	**3.2 J (5)**	ND (5)
2621	TA5-BH-01-221	221	**9.7 JB (10)**	ND (10)	ND (10)	ND (10)	**1.4 J (5)**	ND (5)
2621	TA5-BH-01-240.75	240.75	**7.9 JB (10)**	ND (10)	ND (10)	ND (10)	**1.2 J (5)**	ND (5)
2621	TA5-BH-01-260.5	260.5	**6 JB (10)**	ND (10)	ND (10)	ND (10)	**1.2 J (5)**	ND (5)
2626	TA5-BH-01-300.5	300.5	**22 B**	**6 J (10)**	ND (10)	**4.2 J (10)**	**3.4 J (5)**	ND (5)
2626	TA5-BH-01-320.75	320.75	**34 B**	ND (10)	ND (10)	ND (10)	**4.7 J (5)**	ND (5)
2626	TA5-BH-01-341	341	**11 B**	ND (10)	ND (10)	ND (10)	**1.2 J (5)**	ND (5)
2626	TA5-BH-01-360.5	360.5	**8.4 JB (10)**	ND (10)	ND (10)	ND (10)	**1.1 J (5)**	ND (5)
2626	TA5-BH-01-380.75	380.75	ND (10)	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
2629	TA5-BH-01-420.5	420.5	**7.2 JB (10)**	ND (10)	ND (10)	ND (10)	**1.6 J (5)**	ND (5)
2738	TA5-BH-01-440.5	440.5	ND (10)	ND (10)	ND (10)	ND (10)	**1.6 J (5)**	ND (5)
2738	TA5-BH-01-460.5	460.5	ND (10)	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
2738	TA5-BH-01-481	481	ND (10)	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
2738	TA5-BH-01-491	491	ND (10)	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)

Refer to footnotes at end of table.

Table 2.4.4-4 (Concluded)
Summary of SWMU 275 VOC Analytical Results for Soil and QA/QC Samples from Borehole TAV-BH-01, January–February 1995

Sample Attributes			VOCs (EPA 8240)[a] (µg/kg)					
Record Number[b]	ER Sample ID (Figure 2.2.1-3)	Sample Depth (ft)	Acetone	2-Hexanone	2-Butanone	4-Methyl 2-Pentanone	Methylene Chloride	Xylene
2738	TA5-BH-01-500.75	500.75	ND (10)	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
Quality Assurance/Quality Control Samples (µg/L for water, µg/kg for soil))								
2613	TA5-BH-01-EB1 (aqueous EB)	NA	10 J	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)
2629	TA5-BH-01-TB (soil TB)	NA	**180 B**	**16**	**110**	**7.5 J (10)**	**2.6 J (5)**	**1.3 J (5)**
2629	TA5-BH-01-EB2 (aqueous EB)	NA	ND (10)	ND (10)	ND (10)	ND (10)	ND (5)	ND (5)

[a]EPA November 1986.
[b]Analysis request/chain-of-custody.
[c]Values in bold exceed background concentrations.

B = Analyte detected in associated blank.
BH = Borehole.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = The reported value is less than the reporting limit.
NA = Not applicable.
ND = Not detected above the reporting limit, shown in parenthesis.
QA/QC = Quality assurance/quality control.
SWMU = Solid waste management unit.
TB = Trip blank.
VOC = Volatile organic compound.
µg/kg = Microgram(s) per kilogram.
µg/L = Microgram(s) per liter.

Table 2.4.4-5
Summary of VOC Compound Analytical
Reporting Limits Used for SWMU 275 Soil Sampling from
Borehole TAV-BH-01, January–February 1995,
EPA Method 8240

Analyte	Reporting Limit (µg/kg)
Acetone	10
Benzene	5
Bromodichloromethane	5
Bromoform	5
Bromomethane	10
2-butanone	10
Carbon disulfide	5
Carbon tetrachloride	5
Chlorobenzene	5
Chloroethane	10
Chloroform	5
Chloromethane	10
Dibromochloromethane	5
1,1-dichloroethane	5
1,2-dichloroethane	5
1,1-dichloroethene	5
1,2-dichloroethene	5
1,2-dichloropropane	5
Cis-1,3-dichloropropene	5
Trans-1,3-dichloropropene	5
Ethylbenzene	5
2-Hexanone	10
4-Methyl-2-pentanone	10
Methylene chloride	5
Styrene	5
1,1,2,2-Tetrachloroethane	5
Tetrachloroethene	5
Toluene	5
1,1,1-Trichloroethane	5
1,1,2-Trichloroethane	5
Trichloroethene	5
Vinyl acetate	10
Vinyl chloride	10
Xylenes (total)	5

µg/kg = Microgram(s) per kilogram.
SWMU = Solid waste management unit.
VOC = Volatile organic compound.

Table 2.4.4-6
Summary of SWMU 275 SVOC Analytical Results for Soil and QA/QC Samples from Borehole TAV-BH-01, January–February 1995

Sample Attributes			SVOC (EPA 8270)[a] (µg/kg)			
Record Number[b]	ER Sample ID (Figure 2.2.1-3)	Sample Depth (ft)	Bis(2-ethylhexyl)phthalate	N-Nitrosodiphenylamine	N-Nitrosopropylamine	Di-n-butyl phthalate
2598	TA5-BH-01-30.5	30.5	ND (330)	**140 J[c] (330)**	ND (330)	ND (330)
2598	TA5-BH-01-41.5	41.5	ND (330)	**230 J (330)**	ND (330)	**81 J (330)**
2602	TA5-BH-01-80.5	80.5	ND (330)	ND (330)	ND (330)	ND (330)
2602	TA5-BH-01-91.5	91.5	ND (330)	ND (330)	ND (330)	ND (330)
2602	TA5-BH-01-101	101	ND (330)	ND (330)	ND (330)	ND (330)
2605	TA5-BH-01-181.25	181.25	ND (330)	ND (330)	ND (330)	ND (330)
2626	TA5-BH-01-301.25	301.25	**66 J (330)**	**570**	ND (330)	ND (330)
2626	TA5-BH-01-320.25	320.25	ND (1600)	**14,000[d]**	ND (1600)	ND (1,600)
2738	TA5-BH-01-480.5	480.5	ND (330)	ND (330)	**130 J (330)**	ND (330)
Quality Assurance/Quality Control Samples (µg/L)						
2613	TA5-BH-01-EB1	NA	**8.8 J (10)**	ND (10)	ND (10)	ND (10)
2629	TA5-BH-01-EB2	NA	ND (10)	ND (10)	ND (10)	ND (10)

[a]EPA November 1986.
[b]Analysis request/chain-of-custody.
[c]Value in bold exceed background soil concentrations.
[d]Pieces of plastic sand catcher were found in sample TA5-BH-01-320.25, most likely accounts for the 14,000 µg/kg n-nitrosodiphenylamine detected in this sample.

BH = Borehole.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J ( ) = The reported value is less than the reporting limit shown in parenthesis.
NA = Not applicable.
ND = Not detected above the reporting limit, shown in parenthesis.
QA/QC = Quality assurance/quality control.
SVOC = Semivolatile organic compound.
SWMU = Solid waste management unit.
TB = Trip blank.
µg/kg = Microgram(s) per kilogram.
µg/L = Microgram(s) per liter.

Table 2.4.4-7
Summary of SVOC Analytical Reporting
Limits Used for SWMU 275 Soil Sampling from
Borehole TAV-BH-01, January–February 1995,
EPA Method 8270

Analyte	Reporting Limit (µg/kg)
1,2,4-Trichlorobenzene	330-1600
1,2-Dichlorobenzene	330-1600
1,3-Dichlorobenzene	330-1600
1,4-Dichlorobenzene	330-1600
2,4,5-Trichlorphenol	1600-8000
2,4,6-Trichlorophenol	330-1600
2,4-Dichlorophenol	330-1600
2,4-Dimethylphenol	330-1600
2,4-Dinitrophenol	1600-8000
2,4-Dinitrotoluene	330-1600
2,6-Dinitrotoluene	330-1600
2-Chloronaphthalene	330-1600
2-Chlorophenol	330-1600
2-Methyl-4,6-dinitrophenol (Dinitro-o-cresol)	1600-8000
2-Methylnaphthalene	330-1600
2-Methylphenol (o-Cresol)	330-1600
2-Nitroaniline	1600-8000
2-Nitrophenol	330-1600
3,3-Dichlorobenzidine	660-3300
3-Nitroaniline	1600-8000
4-Bromophenyl phenyl ether	330-1600
4-Chloro-3-methylphenol	330-1600
4-Chloroaniline (4-Chlorobenzenamine)	330-1600
4-Chlorophenyl phenyl ether	330-1600
4-Methylphenol	330-1600
4-Nitroaniline	1600-8000
4-Nitrophenol	1600-8000
Acenaphthene	330-1600
Acenaphthylene	330-1600
Anthracene	330-1600
Benzo(a)anthracene	330-1600
Benzo(a)pyrene	330-1600
Benzo(b)fluoranthene	330-1600
Benzo(g,h,i)perylene	330-1600
Benzo(k)fluoranthene	330-1600
Benzoic Acid	1600-8000
Benzyl Alcohol	330-1600
Bis(2-chloroethoxy) methane	330-1600
Bis(2-chloroethyl) ether	330-1600
Bis(2-chloroisopropyl) ether	330-1600

Refer to footnotes at end of table.

Table 2.4.4-7 (Concluded)
Summary of SVOC Analytical Reporting
Limits Used for SWMU 275 Soil Sampling from
Borehole TAV-BH-01, January–February 1995,
EPA Method 8270

Analyte	Reporting Limit (µg/kg)
Bis(2-ethylhexyl)phthalate	330-1600
Butylbenzylphthalate	330-1600
Carbazole	330-1600
Chrysene	330-1600
Dibenzo(a,h)anthracene	330-1600
Dibenzofuran	330-1600
Diethylphthalate	330-1600
Dimethylphthalate	330-1600
Di-n-butylphthalate	330-1600
Di-n-octylphthalate	330-1600
Fluoranthene	330-1600
Fluorene	330-1600
Hexachlorobenzene	330-1600
Hexachlorobutadiene	330-1600
Hexachlorocyclopentadiene	330-1600
Hexachloroethane	330-1600
Indeno(1,2,3-cd)pyrene	330-1600
Isophorone	330-1600
Naphthalene	330-1600
Nitrobenzene	330-1600
N-nitroso-di-n-propylamine	330-1600
N-nitrosodiphenylamine	330-1600
Pentachlorophenol	1600-8000
Phenanthrene	330-1600
Phenol	330-1600
Pyrene	330-1600

µg/kg = Microgram(s) per kilogram.
SVOC = Semivolatile organic compound.
SWMU = Solid waste management unit.

2.4.4.3 Data Gaps

Characterization activities of SWMU 275 contain no data gaps.

2.4.4.4 Results and Conclusions

This section summarizes analytical results for both the soil-vapor and soil samples collected during the drilling of borehole TAV-BH-01.

2.4.4.4.1 Active Soil-Vapor Sample Results

On-site soil-vapor samples were analyzed by SNL/NM's ERCL within 24 hours of receipt. The GC/MS was calibrated according to EPA SW-846 Method 8260 (EPA November 1986). The instrument passed all QC criteria (i.e., bromofluorobenzene tune, system performance check compounds, and calibration check compounds) without alteration of initial calibration mass spectrometer parameters. The soil-vapor sample was subsequently injected into a Viking or Hewlett-Packard GC/MS. The analytical instrument was calibrated according to the EPA Method 8260 described in EPA SW-846 (EPA November 1986). The target compounds (reported in ppbv) that were identified in soil-vapor samples from the pilot borehole for monitoring well TAV-MW1 are summarized as follows:

- Ethylbenzene at 76 ppbv at the 10-foot depth
- Xylene at 140 ppbv at the 10-foot depth and 12 ppbv at the 20-foot depth
- Toluene at 26 ppbv at the 70-foot depth.
- 1,1,2-trichloroethane at 9 ppbv (J value) at the 70-foot depth.
- TCE at 44 ppbv at the 80-foot depth
- PCE at 4 ppbv (J value) at the 80-foot depth.

Compound detections qualified with a "B" footnote (indicates that constituent was also found in an associated method blank) are not included in the above summary—they are likely because of external or laboratory contamination.

The National Bureau of Standards organic compound library data were used in identifying chromatographic peaks appearing on each sample chromatogram that were not target compounds. From between 10 and 200 feet bgs, these tentatively identified compounds both included and contained ketones, alcohols, aliphatic hydrocarbons, and aldehydes. Estimated concentrations in these samples ranged from 1 to 800 ppbv. From 200 feet to the deepest soil-vapor sample collected from 500 feet bgs, these compounds were less prevalent and typically contained more branched alkanes (i.e., fuel artifacts up to an estimated concentration of 5 ppm); only one sample contained TCE. Minor concentrations (estimated concentrations from 1 to 500 ppbv) of hexanol, xylene, phenol, carboxylic acid, and 2-butanone were identified in the soil-vapor samples. These compounds also were identified in an analysis of a lubricant used to thread drill casing and pipe. Therefore, the presence of hexanol, xylene, phenol, carboxylic acid, and 2-butanone may be the result of equipment contamination. In addition, some of these compounds also were detected in the method blanks. Complete active soil-vapor sample results are provided in Annex 2-D.

2.4.4.4.2 Soil Analytical Results

This section summarizes soil analytical results from samples that were collected during drilling of borehole TAV-BH-01. Soil samples are numbered with codes that identify specifics of the samples. For example, TA5-BH-01-20.50 refers to a sample from TA-5 (also referred to as TA-V), Borehole 01, and from the depth interval beginning at 20.5 feet bgs.

Metals

Soil samples were collected from selected depths of between 20 and 480 feet bgs and were analyzed for total metals (using EPA Method 6010/7471 [November 1986]). Table 2.4.4-1 summarizes sample depths and lists the RCRA metals plus beryllium and cobalt results. Beryllium and cobalt were identified as potential COCs at the TA-V LWDS, therefore, they are considered potential COCs at SWMU 275 as well. RCRA metals that were detected include arsenic, barium, chromium, lead, and mercury plus beryllium and cobalt. Cadmium, selenium, and silver were not detected in borehole TAV-BH-01 at the method reporting limits. Arsenic (at 4.7 milligrams [mg]/kilogram [kg]) was slightly above the approved maximum background concentration of 4.4 mg/kg, at the 400.5-foot depth. The maximum barium concentration (120 mg/kg) was detected at the 480.5-foot depth; this is well below the approved maximum background concentration of 214 mg/kg. Chromium slightly exceeded the maximum approved background concentration of 15.9 mg/kg in one sample at a value of 19.5 mg/kg at the 160-foot depth. Lead exceeded the maximum approved background concentration of 11.8 mg/kg in two samples from TAV-BH-01. Lead was detected at 46.2 and 64.6. mg/kg at the 61- and 320.25-foot depths, respectively. Mercury has no quantifiable background concentration. Mercury was detected in two samples ranging from 0.048 (J) to 0.065 (J) mg/kg at the 30.5- and 41.5-foot depths, respectively. Beryllium very slightly exceeded the maximum approved background concentration of 0.65 mg/kg in the 320.5-foot sample (at 0.66 mg/kg) and was detected at 0.65 mg/kg in the 400.5-foot sample. Cobalt very slightly exceeded the maximum approved background concentration of 5.2 mg/kg in three samples (at 5.5, 5.6, and 6.6 mg/kg in samples from 80.50, 320.5, and 400.5 feet bgs, respectively). Annex 2-F provides complete TAL metal results.

Gamma Spectroscopy

Nine soil samples were collected for gamma spectroscopy analysis from between 10 and 101.5 feet bgs. Table 2.4.4-2 summarizes selected gamma spectroscopy analyses for the nine soil samples from TAV-BH-01. Gamma activity for uranium-238 and uranium-235 was not detected in any of the samples, although the minimum detectable activities (MDA) for all samples exceeded the approved background limit of 1.4 picocuries per gram (pCi/g) and 0.16 pCi/g, respectively. However, the MDA for uranium-235 was still several orders of magnitude less than a preliminary remedial goal for that isotope; therefore, there is no human health or environmental concern. Thorium-232 gamma activity was well below the 1.01-pCi/g background limit. Cesium-137 gamma activity was not detected in any of the samples; however, the MDA exceeded the approved background limit in two of the nine samples. Annex 2-G provides complete gamma spectroscopy results.

Tritium

Samples for tritium analysis (using EPA Method 600-906.0 [November 1986]) were collected from intervals of approximately 10 feet between the 20- and 100-foot depths (except for the 50-foot interval), where no samples were recovered, and from 480 to 500 feet bgs. Between the 120- and 480-foot depths, tritium samples were collected from approximately every 20 feet, except for the 280-foot interval where no samples were recovered. The tritium soil analytical results ranged from no detections (less than 320 to 3,500 pCi/L in soil moisture) to 4,600 pCi/L at 240.25 feet bgs (Table 2.4.4-3). At some depth intervals, low soil moisture volumes yielded relatively high activity levels or high MDAs because of the insufficient soil moisture aliquots. The data were converted from pCi/L in water to pCi/g in soil for the purposes of comparison to SNL/NM background tritium concentrations in soils, which are expressed in pCi/g. Conversion of data to pCi/g in soil indicates that except for the sample from the 240.25 foot depth, no tritium detections for soil were identified above the background tritium concentration of 0.043 pCi/g in soil at SNL/NM (Oldewage September 1998). The relatively high tritium activity level detected in the 240.25-foot sample was attributed (by the laboratory) to an insufficient soil moisture aliquot. Annex 2-H provides a calculation brief for the converting tritium from pCi/L in soil moisture to pCi/g in soil.

VOCs

Samples for VOC analysis (using EPA Method 8240 [November 1986]) were typically collected from intervals of approximately 10 feet between the 20- and 100-foot depths, except for the 50-, 60-, and 70-foot depth intervals, where insufficient or no sample recovery precluded VOC sample collection, and from 480 to 500 feet bgs. Between the 120- and 480-foot depths, VOC samples were collected approximately every 20 feet except for the 280- and 400-foot intervals, where insufficient or no sample recovery precluded collection of VOC samples. Table 2.4.4-4 summarizes all VOCs that were detected in the samples. Table 2.4.4-5 lists the complete method analytes and their respective reporting limits. Acetone and methylene chloride were the most prevalent compounds detected in soil samples from the borehole. Acetone was detected at a maximum concentration of 34 (B) micrograms (µg)/kg at the 320.75-foot depth (acetone was also detected in the associated laboratory method blank). Only estimated values for methylene chloride were identified below the reporting limit of 5 µg/kg. Two additional VOCs (2-hexanone and 4-methyl 2-pentanone [methyl isobutyl ketone]) were detected in the sample from the 300.5-foot depth at below reporting limit concentrations of 6 and 4.2 µg/kg, respectively.

These constituents may represent laboratory contamination because several of these compounds were detected in associated laboratory method blank analyses and in soil trip blank sample TA5-BH-01-TB (Table 2.4.4-4).

SVOCs

Nine soil samples from selected intervals of between 30 and 480 feet bgs were analyzed for SVOCs using EPA Method 8270 (EPA November 1986). Table 2.4.4-6 summarizes the detected SVOCs in soil samples from TAV-BH-01. Table 2.4.4-7 provides the complete method analytes and their respective reporting limits. SVOCs that were identified at below reporting limits (330 µg/kg) in soil samples include bis(2-ethylhexyl)phthalate at 66 (J) µg/kg from

the 301.25-foot depth; di-n-butyl phthalate at 81 (J) µg/kg from the 41.5-foot depth; and n-nitrosopropylamine at 130 (J) µg/kg from the 480.5-foot depth. N-nitrosodiphenylamine was detected below the reporting limit of 330 (J) µg/kg in two soil samples from TAV-BH-01: at 140 (J) µg/kg from the 30.5-foot depth and at 230 (J) µg/kg from the 41.5-foot depth. N-nitrosodiphenylamine was also detected in samples from the 301.25-foot depth at a concentration of 570 µg/kg and from the 320.25-foot depth at a concentration of 14,000 µg/kg. The sample from the 320.25-foot depth was later found to contain a piece of a plastic sand catcher, part of the split spoon sampling equipment. Phthalates are a common component in plastics, and are recognized as common SVOC laboratory contaminants.

TPH

A single sample was collected from 490.5 feet bgs and was analyzed for TPH by EPA Method 418.1 (EPA November 1986). The single TPH sample was collected from the deepest vadose zone sampling interval in the borehole to determine if detectable levels of mineral oil from the nearby HERMES site (SWMU 36) were present immediately above groundwater at this location (none were detected). TPH was not detected at the reporting limit of 20 mg/kg.

Data Validation

SNL/NM Department 7713 (RPSD) reviewed all gamma spectroscopy results according to "Laboratory Data Review Guidelines," Procedure No. RPSD-02-11, Issue No. 02 (SNL/NM July 1996). In addition, all off-site laboratory results were reviewed and verified/validated according to "Data Verification/Validation Level 2—DV-2" in Attachment C of the Technical Operating Procedure 94-03, Rev. 0 (SNL/NM July 1994). Annex 2-I summarizes off-site data validation results. The verification/validation process confirmed that the data are acceptable for use in this NFA proposal for SWMU 275.

2.5 Site Conceptual Model

The site conceptual model for SWMU 275 is based upon the COCs identified in the soil samples that were collected during the drilling of borehole TAV-BH-01. Active and passive SVSs are not included in the site conceptual model because results from these surveys proved inconclusive, and because there is no way to definitively correlate soil-gas concentrations to soil concentrations, which are used in risk assessment.

2.5.1 Nature and Extent of Contamination

The data collected during drilling activities at SWMU 275 were based upon the assumption that the most likely COCs in the soil are metals, radionuclides, VOCs, and SVOCs (Table 2.5.1-1). Whether any metal or radiological COCs exceeded the background concentration limits in any sample was the determining factor in designating potential contaminants. In the case of no-detection results, the highest reporting limit (for metals) or MDA (for radionuclides) was compared to the background limit.

Elevated metal concentrations occur sporadically with depth in borehole TAV-BH-01. Arsenic and chromium only slightly exceeded the approved maximum background concentrations in

Table 2.5.1-1
Summary of COCs for SWMU 275

COC Type	Number of Samples	COCs Greater than Background	Maximum Background Limit/Southwest Super Group[a] (mg/kg except where noted)	Maximum Concentration (mg/kg except where noted)	Average Concentration[b] (mg/kg except where noted)	Sampling Locations Where Background Concentration is Exceeded[c]
Metals	13 environmental	Arsenic	4.4	4.7	2.5	TA5-BH-01-400.50
		Beryllium	0.65	0.66	0.39	TA5-BH-01-320.5
		Cadmium	0.9	ND (1)	0.6	TA5-BH01-30.5 TA5-BH-01-41.50
		Chromium	15.9	19.5	10.0	TA5-BH-01-160.0
		Cobalt	5.2	6.6	4.02	TA5-BH-01-80.5 TA5-BH-01-320.5 TA5-BH-01-400.5
		Lead	11.8	64.6	14	TA5-BH-01-61.0 TA5-BH-01-320.25
		Mercury	<0.1	ND (0.1)	0.09	TA5-BH-01-20.50 TA5-BH-01-61.0 TA5-BH-01-70.0 TA5-BH-01-80.50 TA5-BH-01-90.50 TA5-BH-01-101.0 TA5-BH-01-160.0 TA5-BH-01-241.0 TA5-BH-01-320.25 TA5-BH-01-400.50 TA5-BH-01-480.50
		Selenium	<1	ND (1.6)	0.70	TA5-BH-01-41.50
		Silver	<1	ND (2)	1.2	All Samples
Radionuclides	9 environmental	Uranium-238	1.4 pCi/g	ND (4.75E+00)	Not calculated[d]	All Samples
		Uranium-235	0.16 pCi/g	ND (7.08E-01)	Not calculated[d]	All Samples
		Cesium-137	0.079 pCi/g	ND (1.45E-01)	Not calculated[d]	TA5-BH-01-20 TA5-BH-01-30
VOCs	25 environmental	Acetone	NA	34 (B) (µg/kg)	10.2 (µg/kg)	TA5-BH-01-21 TA5-BH-01-31 TA5-BH-01-42 TA5-BH-01-81 TA5-BH-01-91.75 TA5-BH-01-100.25 TA5-BH-01-120.5 TA5-BH-01-140.25 TA5-BH-01-160.75 TA5-BH-01-181 TA5-BH-01-200.25 TA5-BH-01-221 TA5-BH-01-240.75 TA5-BH-01-260.5 TA5-BH-01-300.5

Refer to footnotes at end of table.

Table 2.5.1-1 (Concluded)
Summary of COCs for SWMU 275

COC Type	Number of Samples	COCs Greater than Background	Maximum Background Limit/Southwest or Other Super Group[a] (mg/kg except where noted)	Maximum Concentration (mg/kg except where noted)	Average Concentration[b] (mg/kg except where noted)	Sampling Locations Where Background Concentration is Exceeded[c]
VOCs (continued)	25 environmental	Acetone (continued)	NA	34 B (µg/kg)	10.2 (µg/kg)	TA5-BH-01-320.75 TA5-BH-01-341 TA5-BH-01-360.5 TA5-BH-01-420.5
		2-Hexanone	NA	6 J (10) (µg/kg)	9.8 (µg/kg)	TA5-BH-01-300.5
		4-Methyl 2-Pentanone (MIBK)	NA	4.2 J (10) (µg/kg)	9.8 (µg/kg)	TA5-BH-01-300.5
		Methylene Chloride	NA	4.7 J (5) (µg/kg)	3.0 (µg/kg)	TA5-BH-01-81 TA5-BH-01-91.75 TA5-BH-01-100.25 TA5-BH-01-120.5 TA5-BH-01-140.25 TA5-BH-01-160.75 TA5-BH-01-181 TA5-BH-01-200.25 TA5-BH-01-221 TA5-BH-01-240.75 TA5-BH-01-260.5 TA5-BH-01-300.5 TA5-BH-01-320.75 TA5-BH-01-341 TA5-BH-01-360.5 TA5-BH-01-420.5 TA5-BH-01-440.5
SVOCs	9 environmental	Bis(2-ethylhexyl)phthalate	NA	66 J (330) (µg/kg)	442 (µg/kg)	TA5-BH-01-301.25
		N-nitrosodiphenylamanine	NA	14,000 (µg/kg)	1843 (µg/kg)	TA5-BH-01-30.5 TA5-BH-01-41.5 TA5-BH-01-301.25 TA5-BH-01-320.25
		N-nitrosopropylamine	NA	130 J (330) (µg/kg)	449 (µg/kg)	TA5-BH-01-480.5
		Di-n-butylphthalate	NA	81 J (330) (µg/kg)	443 (µg/kg)	TA5-BH-01-41.5

[a]From Dinwiddie September 1997.
[b]Average concentration includes all samples, duplicates, and splits. For nondetectable results, the reporting limit is used to calculate the average.
[c]Includes samples with nondetect results where the MDL or MDA exceeds the approved background limit.
[d]An average minimum detectable activity is not calculated due to the variability in instrument counting error and the number of reported nondetectable activities.

B = Analyte detected in associated blank.
COC = Constituent of concern.
J ( ) = The reported value is less than the reporting shown in parenthesis.
MDA = Minimum detectable activities.
MDL = Minimum detection limit.
mg/kg = Milligram(s) per kilogram.
NA = Not applicable.
ND ( ) = Not detected at or above the MDL or MDA, shown in parenthesis.
pCi/g = Picocurie(s) per gram.
SNL/NM = Sandia National Laboratories, New Mexico.
SVOC = Semivolatile organic compound.
SWMU = Solid waste management unit.
VOC = Volatile organic compounds.
µg/kg = Microgram(s) per kilogram.

soils. Lead concentrations exceeding the approved maximum background concentration were encountered in two samples: one at 61 feet bgs, and the second at 320 feet bgs. These variances are most likely the result of natural variations of soil metal concentrations that are expected in natural soil environments. Mercury was detected in only two samples at below reporting-limit concentrations of 0.048 and 0.065 mg/kg. Although cadmium, selenium, and silver were not detected in soil samples from TAV-BH-01, they are included in the list of COCs because the associated reporting limit was equivalent to or greater than the approved maximum background concentrations for these analytes.

Radiological COCs included uranium-238, uranium-235, and cesium-137 because the associated MDAs exceeded the approved background limit. VOCs detected in soil samples from borehole TAV-BH-01 include acetone, 2-hexanone, 4-methyl 2-pentanone, and methylene chloride. Acetone and methylene chloride were found to be the most prevalent VOCs; this may be associated with laboratory contamination. Acetone was detected in the laboratory method blank analyses. With the exception of five samples containing acetone, the remaining analytes were detected at concentrations below the laboratory reporting limits.

SVOCs detected at SWMU 275 include bis(2-ethylhexyl)phthalate, n-nitrosodiphenylamine, n-nitrosopropylamine, and di-n-butyl phthalate. With the exception of n-nitrosodiphenylamine, the detected analytes were reported below laboratory reporting limits and may be attributed to laboratory contamination. N-nitrosodiphenylamine is associated with plastics and was identified as part of a sand catcher used to collect split-spoon samples.

All releases of COCs would have been to subsurface soils because the gravel-bottomed drain of the seepage pits is approximately 20 feet bgs. A uniform distribution of COCs at SWMU 275 is expected because the industrial sanitary liquid waste was mixed in the septic tanks prior to distribution to the six seepage pits. A single boring in the center of the seepage pits area would, therefore determine the potential extent of vertical contamination from the seepage pits to the groundwater. Because the borehole was located in essentially the center of the group of seepage pits, maximum concentrations of COCs in the subsurface would be expected at this location. Therefore, concentrations of COCs through lateral migration at SWMU 275 are expected to be less than maximum concentrations found in the center of the pit area.

The sample collection protocol used at SWMU 275 is representative of the media potentially impacted by the site activities and is sufficient to determine the vertical extent of COC migration.

In summary, the design of the confirmatory sampling event was appropriate and adequate to determine the nature, rate, and extent of contamination at this site.

2.5.2 Environmental Fate

The most likely COCs at SWMU 275 are metals, radionuclides, VOCs, and SVOCs associated with uncontained disposal of liquid waste to a seepage pit system. Figure 2.5.2-1 diagrams the environmental fate for the constituents at SWMU 275. The current and future land use for the site is industrial. Because the first occurrence of COCs is expected to be at a depth greater than 20 feet bgs, there are no surface pathways to receptors. This depth also realistically precludes the possibility of uptake by biota and ingestion by animals. The potential human receptor is the industrial worker. There are no primary pathways of the COCs to the industrial worker.

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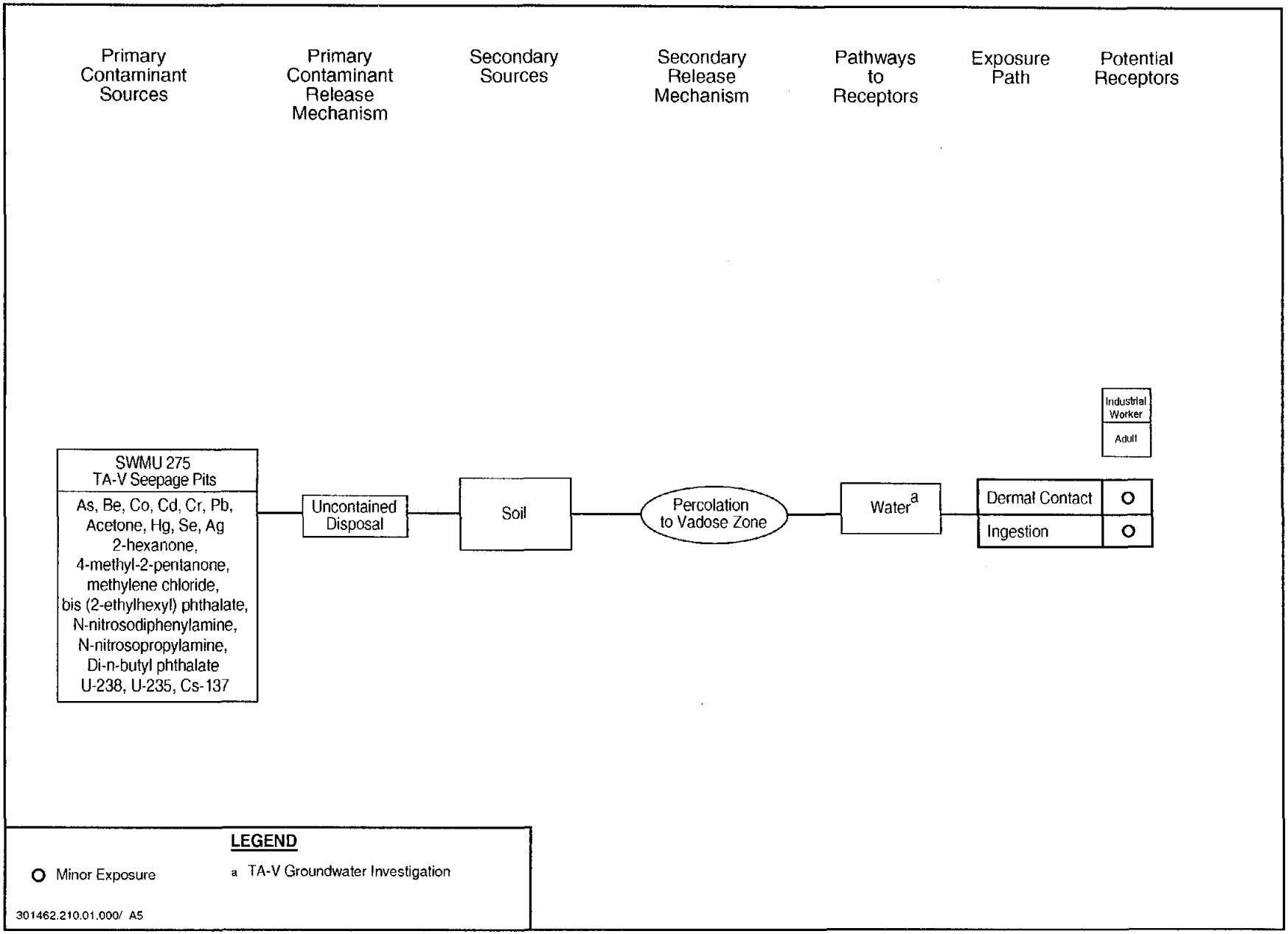

Figure 2.5.2-1

Conceptual Model Flow Diagram for SWMU 275, TA-V Seepage Pits

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Depth to groundwater is approximately 500 feet bgs. High partitioning coefficients and low mobility of the COCs in the transporting medium would even further dilute the low detected concentrations of these constituents. A separate groundwater assessment is being performed under the TA-V groundwater investigation. This assessment task will be described in the TA-V groundwater data report, which is expected to be completed in December 1998.

2.6 Site Assessments

The site assessment process for SWMU 275 includes risk screening assessments followed by risk baseline assessments (as required) for both human health risk and ecological risk. The following sections briefly summarizes the site assessment results. Annex 2-J provides details of the site assessment.

2.6.1 Summary

The site assessment concludes that SWMU 275 does not have potential to affect human health under an industrial land use scenario. Because of the subsurface depth of the SWMU 275 seepage pits, no complete ecological pathways exist and evaluation of ecological risk is not warranted. This section briefly describes and Annex 2-J provides details of the site assessments.

2.6.2 Screening Assessments

Risk screening assessments were performed for both human health risk and ecological risk for SWMU 275. This section briefly summarizes the risk screening assessment results.

2.6.2.1 Human Health

SWMU 275 has been recommended for industrial land-use (DOE et al. September 1995). A complete discussion of the risk assessment process, results, and uncertainties is provided in Annex 2-J. Because of the presence of COCs in concentrations or activities greater than background levels, it was necessary to perform a health risk analysis for the site. Besides COC metals, any VOCs or SVOCs detected above their reporting limits and any radionuclide compounds detected above either background levels and/or MDAs were included in this assessment. The risk assessment process provides a quantitative evaluation of the potential adverse human health effects caused by constituents in the site's soil. The Risk Screening Assessment Report calculated the hazard index (HI) and excess cancer risk for both an industrial land-use and residential land-use setting. The excess cancer risk from nonradiological COCs and the radiological COCs is not additive (EPA 1989).

In summary, the HI calculated for SWMU 275 nonradiological COCs is 0.02 for an industrial land-use setting, which is less than the numerical standard of 1.0 suggested by risk assessment guidance (EPA 1989). Incremental risk is determined by subtracting the risk associated with background levels from potential nonradiological COC risk. The incremental HI is 0.01. The total excess cancer risk for SWMU 275 nonradiological COCs is 4E-6 for an industrial land-use setting. Guidance from the NMED indicates that excess lifetime risk of developing cancer by an

individual must be less than 1E-6 for Class A and B carcinogens and less than 1E-5 for Class C carcinogens (NMED March 1998). Thus, the total excess cancer risk for this site is above the suggested acceptable risk value (1E-6). The incremental excess cancer risk for SWMU 275 is 1.1E-6. The excess cancer risk is driven by arsenic. However, if the average arsenic concentration (2.5 mg/kg) is used in the risk calculations, the incremental risk (7E-8) is below the NMED proposed guidelines. Because the site is adequately characterized, use of average arsenic concentrations is more realistic than use of the maximum arsenic concentration in the risk calculations. The detection occurred at depth so, realistically, no inhalation or ingestion pathway exists.

The incremental total effective dose equivalent for radionuclides for an industrial land-use setting for SWMU 275 is 0.12 millirem (mrem) per year (yr), which is well below the recommended dose limit of 15 mrem/yr found in EPA's OSWER Directive No. 9200.4-18 and reflected in a document entitled "Sandia National Laboratories/New Mexico Environmental Restoration Project—RESRAD Input Parameter Assumptions and Justification" (SNL/NM February 1998). The incremental excess cancer risk for radionuclides is 1.4E-6 for an industrial land-use scenario, which is much less than risk values calculated from naturally occurring radiation and from intakes considered background concentration values.

The residential land-use scenarios for this site are provided only for comparison in the Risk Screening Assessment Report (Annex 2-J), which concludes that SWMU 275 has insignificant potential to affect human health under an industrial land-use scenario.

2.6.2.2 Ecological

An ecological screening assessment that corresponds with the screening procedures (NMED March 1998) in EPA's Ecological Risk Assessment Guidance for Superfund (EPA 1989) was performed as set forth by the NMED Risk-Based Decision Tree. An early step in the evaluation is a comparison of COC concentration levels and identification of potentially bioaccumulative constituents. This is presented in Annex 2-I Sections III, VI, and VII.2. This methodology requires the development of a site conceptual model and food web model, and selection of ecological receptors. Each of these items is presented in the "Predictive Ecological Risk Assessment Methodology for SNL/NM ER Program, Sandia National Laboratories/New Mexico" (IT July 1998) and will not be duplicated here. The screen also includes estimating exposure and ecological risk.

All COCs at SWMU 275 are found at depths greater than 5 feet bgs. For this reason, none of the COCs is considered a constituent of potential ecological concern, and bioaccumulation potential is not evaluated. No ecological receptors or viable habitat exist at the site to support receptors. Therefore, food-chain uptake is not expected to be a potential transport mechanism for COCs associated with this site. For these reasons, no ecological pathways are expected to exist at this site and no further evaluation of ecological risk is warranted.

2.6.3 Baseline Risk Assessments

This section discusses the baseline risk assessments for human health risk and ecological risk.

2.6.3.1 Human Health

Based upon the fact that the human health results of the screening assessment (Section 2.6.2.1) indicate that SWMU 275 does not have potential to affect human health under an industrial land-use scenario, a baseline human health risk assessment is not required for SWMU 275.

2.6.3.2 Ecological

Based upon the fact that ecological results of the screening assessment (Section 2.6.2.2) indicate that SWMU 275 has no ecological pathways at the site, a baseline ecological risk assessment is not required for SWMU 275.

2.6.4 Other Applicable Assessments

2.6.4.1 Groundwater

The TA-V groundwater investigation includes quarterly monitoring and assessment of TAV-MW1.

2.7 No Further Action Proposal

SWMU 275 is proposed for an NFA decision based upon all the supporting information contained in this chapter. This section provides the rationale and criterion for the NFA proposal.

2.7.1 Rationale

Based upon field investigation data and the human health risk assessment analysis, an NFA is recommended for SWMU 275 for the following reason: No COCs (metals, radionuclides, VOCs, and SVOCs) are present in concentrations considered hazardous to human health for an industrial land use scenario.

2.7.2 Criterion

Based upon the evidence provided above, SWMU 275 is proposed for an NFA decision in conformance with Criterion 5 (NMED March 1998), which states that "The SWMU/AOC has been characterized or remediated in accordance with current applicable state or federal regulations and that available data indicate that contaminants pose an acceptable level of risk under current and projected future land use."

REFERENCES

Dawson L. "Environmental Restoration Project Activities," memorandum to Jim Bryson addressing TA-V investigation activities, including a reference to the TA-V seepage pits. December 29, 1994.

Dawson, L. "Sampling Requirements for TAV-BH-01/TAV-MW1, SWMU 275," notes recorded during telephone conference with N. Morlock, U.S. Environmental Protection Agency, Region 6, January 4, 1995.

Dinwiddie, R.S. (New Mexico Environment Department). Letter to M.J. Zamorski (U.S. Department of Energy), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," September 24, 1997.

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

Hoagland, S. and R. Dello-Russo, February 1995. "Cultural Resources Investigation for Sandia National Laboratories/New Mexico, Environmental Restoration Program, Kirtland Air Force Base, New Mexico," Butler Service Group, Albuquerque, New Mexico.

IT, see IT Corporation.

IT Corporation (IT), February 1995. "Sensitive Species Survey Results, Environmental Restoration Project, Sandia National Laboratories/New Mexico," IT Corporation, Albuquerque, New Mexico.

IT Corporation (IT), July 1998. "Predictive Ecological Risk Assessment Methodology for SNL/NM ER Program, Sandia National Laboratories, New Mexico," IT Corporation, Albuquerque, New Mexico.

Lord, K.J. (Chambers Group, Inc.). Personal Communication to C. Medrano regarding cultural resources inventory of Sandia National Laboratories Technical Area V, Project No. 8067AG, Albuquerque, New Mexico. November 1990.

NERI, see Northeast Research Institute, Inc.

New Mexico Environment Department (NMED), March 1998. "RPMP Document Requirement Guide," RCRA Permits Management Program, Hazardous and Radioactive Materials Bureau, New Mexico Environment Department, Santa Fe, New Mexico.

NMED, see New Mexico Environment Department.

Northeast Research Institute, Inc. (NERI). Letter to L. Dawson. Findings of the Phase 1 PETREX Soil Gas Survey, Sandia National Laboratories/New Mexico. September 21, 1994.

Northeast Research Institute, Inc. (NERI). Letter to L. Dawson. Findings of the Phase 2 PETREX Soil Gas Survey, Sandia National Laboratories/New Mexico. December 1, 1994.

Oldewage, H., September 3, 1998. "Memo from H. Oldewage to Mark Miller re basis for tritium background activity level in SNL/NM soils," Sandia National Laboratories, Albuquerque, New Mexico. September 3, 1998

Sandia National Laboratories/New Mexico (SNL/NM), June 1967. "Sandia National Laboratories/New Mexico Facilities Engineering Drawing Numbers 90206 M-1 and 90206 M-12.1," Plan and Section Schematics of the TA-V Seepage Pit System, June 29, 1967, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 1987. "Sandia National Laboratories/New Mexico Facility Engineering Drawing Number 82378 M-18," Plan and Section Schematics of the TA-V Seepage Pit System, June 22, 1987, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 1994. "Verification and Validation of Chemical and Radiological Data," Technical Operating Procedure (TOP) 94-03, Rev. 0, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), December 1995. "Conceptual Geological Model of Sandia National Laboratories and Kirtland Air Force Base," Sandia National Laboratories, Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 1996. "Well Locations at Kirtland Air Force Base," Geographic Information System, Map No. 961160, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 1996. "Laboratory Data Review Guidelines," Radiation Protection Sample Diagnostics Procedure No. RPSD-02-11, Issue 02, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), January 1997, "Site Summary Report for ER Site No. 275; TA-V Seepage Pits," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1997. "Groundwater Protection Program, Calendar Year 1996, Annual Groundwater Monitoring Report," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), February 1998. "RESRAD Input Parameter Assumptions and Justification," Sandia National Laboratories/New Mexico Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 1998. Personal Communication from R. Lynch (Department 6134), regarding most recent water level for Well TAV-MW1, Sandia National Laboratories, Albuquerque, New Mexico.

SNL/NM, see Sandia National Laboratories/New Mexico.

U.S. Department of Energy (DOE), Albuquerque Operations Office, Environmental Safety and Health Division, Environmental Program Branch, September 1987, draft. "Comprehensive Environmental Assessment and Response Program (CEARP) Phase 1: Installation Assessment, Sandia National Laboratories, Albuquerque," Albuquerque Operations Office, U.S. Department of Energy, Albuquerque, New Mexico.

U.S. Department of Energy (DOE), U.S. Air Force, and U.S. Forest Service, September 1995. "Workbook: Future Use Management Area 2," prepared by Future Use Logistics and Support Working Group in cooperation with the Department of Energy Affiliates, the U.S. Air Force, and the U.S. Forest Service.

U.S. Environmental Protection Agency (EPA), November 1986. "Test Methods for Evaluating Solid Waste," 3rd ed., Update III, SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

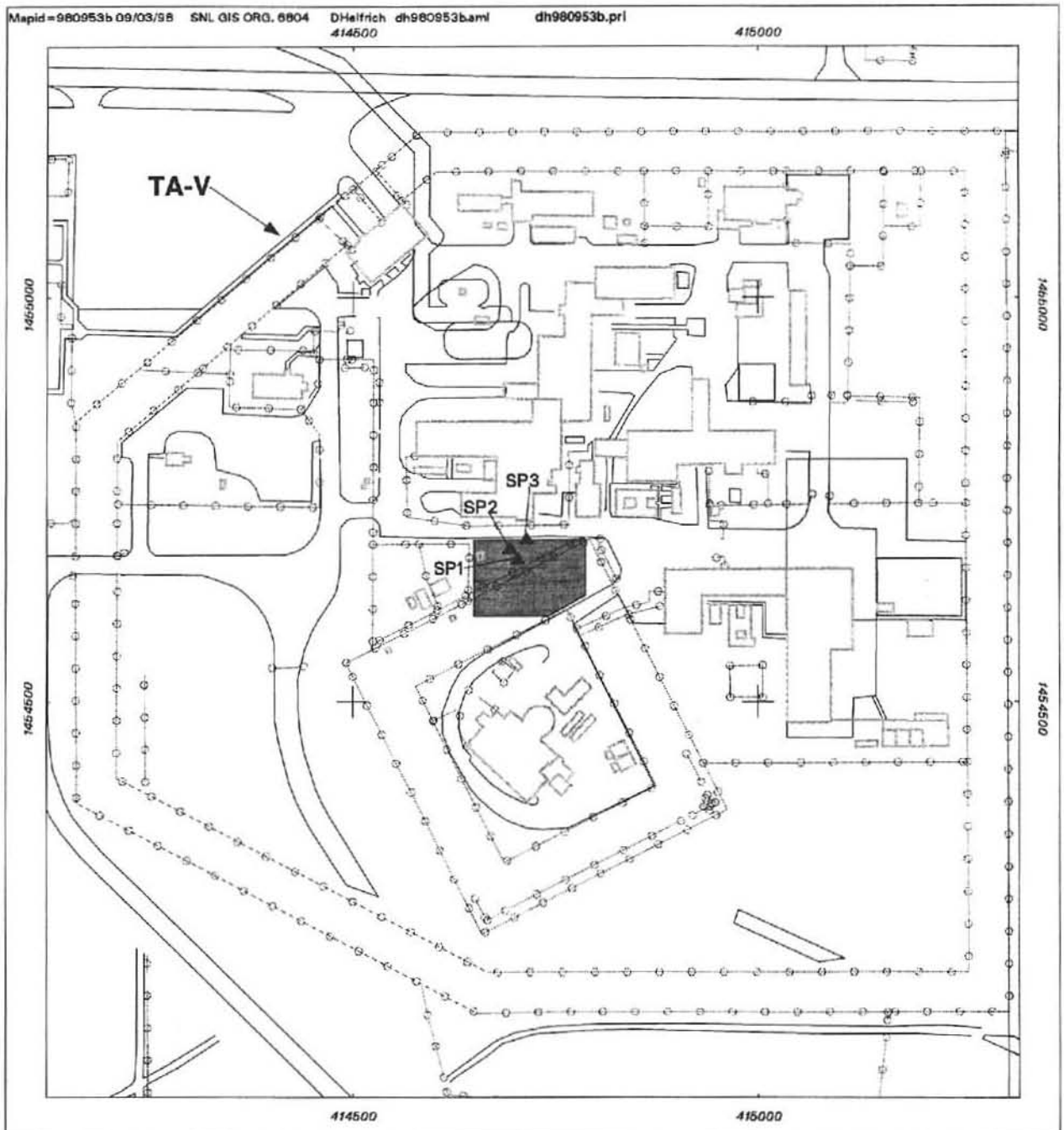
U.S. Environmental Protection Agency (EPA), April 1987. "Final RCRA Facility Assessment Report of Solid Waste Management Units at Sandia National Laboratories, Albuquerque, New Mexico," Contract No. 68-01-7038, Region 6, U.S. Environmental Protection Agency, Dallas, Texas.

U.S. Environmental Protection Agency (EPA), 1989. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual," EPA/540-1089/002, Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), October 1993. "Environmental Radiation Data Report 73, January–March 1993," Report No. EPA4/2-R-93-192, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, Alabama.

Young, M., September 1994. "Unexploded Ordnance/High Explosives (UXO/HE) Visual Survey of SWMUs Final Report," Sandia National Laboratories, Albuquerque, New Mexico.

ANNEX 2-A
Active Soil Vapor Survey Results
July 15, 1994
TA-V, SWMU 275



Legend

- SWMU 275 Borehole, 1994
- Road
- Fence
- Building / Structure
- SWMU 275
- Other SWMUs

SWMU 275: Subsurface Active Soil-VaporSurvey Borehole Locations July 1994

0 100 200
Scale in Feet

0 24 48
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Sandia National Laboratories
Albuquerque, New Mexico 87185

Date: July 20, 1994

To: Lon Dawson, 7582, MS 1347

TBA Second pass.

From: Mark Lyon, ML 7584/IT Corp., MS 1350

Subject: Liquid Waste Disposal Site Active Soil Gas Survey, July 15, 1994, Analysis Results

Summary tables of analysis results, tentatively identified compounds (TIC), and laboratory quality control measures for the Liquid Waste Disposal Site (LWDS) active soil gas survey, July 15, 1994, are attached. Additionally, instrument printouts from the Department 7584, Building 6542, Viking™ gas chromatograph/mass spectrometer showing summary data analysis, chromatograms, tuning results, and standards calibrations are enclosed. Also included are blue carbonless copies of the original Analysis Request Chain of Custody Records. Please review the data and contact me at the Building 6542 Laboratory with any questions.

Eight soil gas samples in 500-milliliter glass bulbs were received at Building 6542 Laboratory on July 15. The samples were analyzed that same day following procedures outlined in the draft, "Determination of Volatile Organic Compounds (VOC) in Water, Soil, and Gas by Gas Chromatography/Mass Spectrometry Using the Viking™ 600 GC/MS Instrument Operating Procedure," (IT Corporation, 1993).

Prior to analysis, three-point calibration curves for each compound of interest were constructed by gravimetrically preparing a primary standard and analyzing subsequent primary standard dilutions. Mass spectrometer tuning was checked against Environmental Protection Agency Method 8260 criteria prior to analysis each day. Calibration check samples and laboratory blanks were analyzed in conjunction with this project.

Target compounds included 1,1,1-trichloroethane, carbon tetrachloride, benzene, trichloroethene, toluene, and tetrachloroethene. 4-Bromofluorobenzene was also added to the primary standard as a surrogate spike. However this addition proved to be of little utility as a commercial mixture containing 4-bromofluorobenzene, toluene-d8, and

1,2-dichloroethane-d4 was obtained and served to provide the internal calibration standard (toluene-d8) and surrogate spiking compound (4-bromofluorobenzene). 1,2-Dichloroethane-d4 appears on the samples chromatograms but was not utilized as an internal standard or surrogate.

The commercially prepared surrogate spike and internal standard mixture was added to each soil gas sample, calibration verification sample, and laboratory blank to monitor analytical accuracy and calculate the target compound concentrations. Applicable quality control results for the surrogate spikes, daily calibration verification samples, and laboratory blank samples are included in the tables of results.

Target analyte concentrations less than the least concentrated standard used to construct the calibration curves are noted with a "J"-flag. "J" indicates an estimated value less than the lower limit of quantitation (LLOQ). "J"-flagged values are shown down to one-tenth (1/10th) the LLOQ for each target compound, ranging from two (2) to five (5) parts per billion by volume (ppbv). Observations made during sample analysis and data processing indicate that the target compounds were identifiable at the 2 to 5 ppbv level but were nearly indistinguishable from the baseline, or "background noise." Target compound concentrations that the Viking™ data analysis software found and reported at less than 1/10th the LLOQ are reported as undetected, or "U", on the summary tables. Instrumental detection limits for each target compound were not statistically determined for this project.

The Viking™ National Bureau of Standards organic compound library was used to try and identify chromatographic peaks appearing on each sample chromatogram that were not target compounds or quality control components. These tentatively identified compounds are listed in the attached table. The TICs reported met two criteria. First, the spectral match quality with a compound in the library exceeded 80%. Second, the compound was not a siloxane or hydrocarbon characteristic of GC column degradation that are common artifacts of the analysis system.

Carrier gas flow unexpectedly stopped during desorption of sample TA5SP-3-30. A salvage method was performed in order to continue the analysis. Target analyte data analysis for this sample was performed manually.

ANALYSIS RESULTS

Liquid Waste Disposal Site Active Soil Gas Survey
Analysis Request Chain Of Custody Records 00051, 00052, and 00053

Department 7584 Laboratory
Building 6542

Samples Collected July 15, 1994

Samples Analyzed July 15, 1994

			Sample Identification							
Compound	Units	Lower Limit of Quantitation	TA5SP-1-15	TA5SP-1-30	TA5SP-2-15	TA5SP-2-30	TA5SP-2-44	TA5SP-3-15	TA5SP-3-30	TA5SP-3-45
1,1,1-trichloroethane	ppbv	23	U	U	U	U	U	U	U	U
carbon tetrachloride	ppbv	21	U	U	U	U	U	U	U	U
benzene	ppbv	43	13 JB	15 JB	9 JB	19 JB	15 JB	14 JB	18 JB	12 JB
trichloroethene	ppbv	23	U	3 J	U	4 J	17 J	U	5 J	25
toluene	ppbv	35	11 J	22 J	13 J	19 J	15 J	9 J	18 J	12 J
tetrachloroethene	ppbv	21	U	U	U	U	U	U	U	5 J
Surrogate spike 4-bromofluorobenzene	% R	- - -	87	90	85	87	77	84	87	78

ppbv = Parts per billion by volume.
U = Compound was undetected.
J = Estimated concentration less than the lower limit of quantitation (LLOQ).
"J" values are reported down to 1/10 the LLOQ.
B = Compound was also detected in the laboratory blank.
% R = Percent recovery.

TENTATIVELY IDENTIFIED COMPOUNDS

Liquid Waste Disposal Site Active Soil Gas Survey **Department 7584 Laboratory**
Analysis Request Chain Of Custody Records 00051, 00052, and 00053 **Building 6542**

Sample No.	Tentatively Identified Compound (TIC)	Molecular Weight	Match Quality
TA5SP-1-15	1,3-dimethylbenzene	106	91%
TA5SP-1-30	1,3-dimethylbenzene	106	94%
TA5SP-2-15	p-xylene	106	94%
TA5SP-2-30	1,3-dimethylbenzene	106	94%
TA5SP-2-30	1,2,4-trimethylbenzene	120	83%
TA5SP-3-15	1,3-dimethylbenzene	106	94%
TA5SP-3-45	p-xylene	106	95%

QUALITY CONTROL SAMPLE RESULTS

Liquid Waste Disposal Site Active Soil Gas Survey
Analysis Request Chain Of Custody Records 00051, 00052, and 00053

Department 7584 Laboratory
Building 6542

Compound	Known	Control Sample CVS715-2		Duplicate Control Sample CVS715-3		Relative Percent Difference
	ppbv	ppbv	%R	ppbv	%R	RPD
1,1,1-trichloroethane	45.3	59	130	8	18	152
carbon tetrachloride	41.6	52	124	25	59	71
benzene	85.6	103	120	92	108	11
trichloroethene	46.0	49	106	43	94	12
toluene	69.4	72	104	65	94	10
tetrachloroethene	41.0	31	75	27	66	13
Surrogate spike 4-bromofluorobenzene	125	123	98	109	87	12

ppbv = Part per billion by volume
% R = Percent recovery

LABORATORY BLANK SAMPLE RESULTS

Liquid Waste Disposal Site Active Soil Gas Survey
Analysis Request Chain Of Custody Records 00051, 00052, and 00053

Department 7584 Laboratory
Building 6542

Compound	Units	Lower Limit of Quantitation	BLK715-2
1,1,1-trichloroethane	ppbv	23	U
carbon tetrachloride	ppbv	21	U
benzene	ppbv	43	9 J
trichloroethene	ppbv	23	U
toluene	ppbv	35	U
tetrachloroethene	ppbv	21	U
Surrogate spike 4-bromofluorobenzene	% R	---	89

ppbv = Parts per billion by volume.
U = Compound was undetected.
J = Estimated concentration less than the lower limit of quantitation (LLOQ).
"J" values are reported down to 1/10 the LLOQ.
% R = Percent recovery.

Volatile Organics

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019023-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038893
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

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ENCOTEC I.D.: 200038893
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	U	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

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ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: SNL/NM019023-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038893
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
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9.			
10.			

Note:

Form TICVWN1G

Rev. 04/17/92

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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019024-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038894
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019024-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038894
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	U	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

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ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: SNL/NM019024-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038894
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:

Form TICVWN1G Rev. 04/17/92

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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019025-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038895
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019025-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038895
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.10	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
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313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: SNL/NM019025-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038895
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:

Form TICVWN1G Rev. 04/17/92

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: Method Blank
Sample Date: NA
Date Received: NA
Date Analyzed: 07/21/94
ENCOTEC I.D.: MB072194-1E
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: Method Blank
Sample Date: NA
Date Received: NA
Date Analyzed: 07/21/94
ENCOTEC I.D.: MB072194-1E
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	U	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: Method Blank
Sample Date: NA
Date Received: NA
Date Analyzed: 07/21/94
ENCOTEC I.D.: MB072194-1E
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:

Form TICVWN1G

Rev. 04/17/92

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

AIR MATRIX SURROGATE RECOVERY
VOLATILE ORGANICS

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994
QC Set I.D.: TOEG2101A

ENCOTEC Sample No.	% Recovery D8-Toluene (94-107)**	% Recovery BFB (93-110)**	% Recovery D4-1,2-Dichloroethane (85-107)**
200038893	104	98	86
200038894	105	101	88
200038895	105	99	103
MB072194-1E	103	93	90

All samples fortified with 10 ppbv of each surrogate analyte.

* Value outside of established quality control windows.
** Percent recovery quality control windows.
MI = Matrix interferences caused distortion to recovery value.

RECOVERY: 0 out of 12 outside QC Windows.

Note:

Form LTO14A32.NDS Rev. 12/26/91

TO-14 INITIAL CALIBRATION SHEET

Lab Name: ENCOTEC

Analyst: AS

Instrument I.D.: 005

Calibration Levels (ug on column):

Calibration Date: 07/21/94

LAB FILE I.D. RRF1 = 10 RRF2 = 25

RRF3 = 50 RRF4 = RRF5 =

COMPOUND	RRF1	RRF2	RRF3	RRF4	RRF5	RRF	% RSD	min. RRF	max. % RSD
Dichlorodifluoromethane	7.262	7.444	6.565			7.090	6.5%	0.050	30
1,2-Dichloro-1,1,2,2-tetrafluoroethane	4.965	5.906	5.795			5.555	9.3%	0.050	30
Chloromethane	2.137	2.933	2.339			2.470	16.8%	0.050	30
Vinyl chloride	1.566	1.703	1.209			1.493	17.1%	0.050	30
Bromomethane	3.179	3.004	2.796			2.993	6.4%	0.050	30
Chloroethane	1.042	1.037	0.775			0.951	16.1%	0.050	30
Trichlorofluoromethane	5.332	6.276	6.266			5.958	9.1%	0.050	30
1,1-Dichloroethene	2.042	2.247	1.944			2.078	7.4%	0.050	30
1,1,2-Trichloro-1,2,2-trifluoroethane	4.218	4.822	5.104			4.715	9.6%	0.050	30
3-Chloropropene	0.272	0.330	0.339			0.314	11.6%	0.050	30
Methylene chloride	1.782	1.914	1.520			1.739	11.5%	0.050	30
1,1-Dichloroethane	4.577	4.699	3.677			4.318	12.9%	0.050	30
cis-1,2-Dichloroethene	1.751	2.118	1.713			1.861	12.0%	0.050	30
Chloroform	4.461	5.514	4.810			4.928	10.9%	0.050	30
1,1,1-Trichloroethane	5.971	6.038	5.312			5.774	6.9%	0.050	30
arbon tetrachloride	5.804	6.271	6.504			6.193	5.8%	0.050	30
Benzene	0.997	1.120	1.015			1.044	6.4%	0.050	30
1,2-Dichloroethane	2.185	2.865	2.424			2.491	13.8%	0.050	30
Trichloroethene	0.601	0.768	0.835			0.735	16.4%	0.050	30
1,2-Dichloropropane	0.589	0.663	0.558			0.603	8.9%	0.050	30
cis-1,3-Dichloropropene	0.613	0.830	0.744			0.729	15.0%	0.050	30
Toluene	0.797	0.935	0.887			0.873	8.0%	0.050	30
trans-1,3-Dichloropropene	0.355	0.467	0.495			0.439	16.9%	0.050	30
1,1,2-Trichloroethane	0.572	0.708	0.729			0.670	12.7%	0.050	30
Tetrachloroethene	0.651	0.833	0.958			0.814	19.0%	0.050	30
1,2-Dibromoethane	2.613	3.574	3.422			3.203	16.1%	0.050	30
Chlorobenzene	1.303	1.615	1.316			1.411	12.5%	0.050	30
Ethylbenzene	0.585	0.708	0.625			0.639	9.8%	0.050	30
m,p-Xylene	1.450	1.758	1.628			1.612	9.6%	0.050	30
o-Xylene	0.138	0.197	0.177			0.171	17.6%	0.050	30
Styrene	3.520	4.553	4.337			4.137	13.2%	0.050	30
1,1,2,2-Tetrachloroethane	2.077	2.486	2.222			2.262	9.2%	0.050	30
4-Ethyltoluene	1.729	2.361	2.203			2.098	15.7%	0.050	30
1,3,5-Trimethylbenzene	2.112	2.120	1.902			2.045	6.0%	0.050	30
1,2,4-Trimethylbenzene	1.701	2.210	1.990			1.967	13.0%	0.050	30
1,3-Dichlorobenzene	0.957	1.331	1.286			1.191	17.1%	0.050	30
1,4-Dichlorobenzene	1.179	1.532	1.472			1.394	13.5%	0.050	30
Benzyl chloride	0.128	0.222	0.212			0.187	27.6%	0.050	30
1,2-Dichlorobenzene	1.169	1.399	1.339			1.302	9.2%	0.050	30
1,2,4-Trichlorobenzene	0.243	0.421	0.345			0.336	26.6%	0.050	30
Hexachlorobutadiene	0.672	0.742	0.625			0.680	8.7%	0.050	30

inimum RF for all compounds is 0.050

laximum % RSD for all compounds is 30.0 %

ENVIRONMENTAL
CONTROL
TECHNOLOGY
CORPORATION

July 20, 1994

RECEIVED
JUL 25 1994
SNL/SMO

Sandia National Labs
Katherine M. Becker, 7576, MS 1305
P.O. Box 5800
Albuquerque, NM 87185-1305

Dear Katherine,

Enclosed please find the documentation for samples received July 19, 1994. Please feel free to contact me if you have any questions about this project.

Sincerely,

ENCOTEC INC.

Scott DeVore

Scott DeVore
Sample Login Supervisor

SHD

Enclosure

#76100

ENCOTEC, INC.
3985 Research Park Drive
Ann Arbor, MI 48108-2296

Project Sheet

SUBMISSION NUMBER	CUSTOMER	SITE/JOB	PROJECT NUMBER	PROJECT MANAGER	PROJECT COORDINATOR	FSTRN/I
1C0006520	SANDIA LABORATORIES	LWDS DRILLING	76190	ROGER ROUSSEL	DUANE MCDOWELL	

CASE/SAS NUMBER	SAMPLE DELIVERY GROUP	LOG-IN DATE	SUB DUE-DATE	RUSH JOB	QC LEVEL I	QC LEVEL 2	FSTRN/O
3624.312/00050	SNL-LW-070	07/19/94	08/04/94	NO	LEVEL 3M	LEVEL 3M	

PROJECT MANAGER COMMENTS:

PROJECT SHEET APPROVAL: [signature]

APPROVAL DATE: 19 July 94

Sample ID	Sample Date	Client Sample ID	Material Name	Profiles
200038893	07/15/94	SNL/NM019023-1	AIR	TO14
200038894	07/15/94	SNL/NM019024-1	AIR	TO14
200038895	07/15/94	SNL/NM019025-1	AIR	TO14

SAMPLE ID	PROFILE	SPECIAL ANALYTE LIST	SPECIAL INSTRUCTIONS
200038893	TO14		LOW LEVEL + TIC
200038895	TO14		LOW LEVEL + TIC

SAMPLE ID	PROFILE	SPECIAL ANALYTE LIST	SPECIAL INSTRUCTIONS
200038894	TO14		LOW LEVEL + TIC

PRE-LOGIN CHECKLIST

Login Technician: DC

Project name: Sandia

Receipt date/time: 7/19/94 0845

Project #: 76100

Submission #: 6520

Courier: Fed ex

Airbill number: 332 4413 005

SHIPPING CONTAINER(S)

YES NO N/A • Were shipping container seals intact on arrival?

YES NO N/A • Were shipping containers packed with ice or icepacks?

YES NO N/A • If containers were packed with icepacks, are the icepacks still frozen?

• If a temperature blank was included in the cooler, what is its temperature? N/A

YES NO • Were containers and sample bottles subjected to radiologic scan on arrival?

CHAIN OF CUSTODY SHEET (COC)

YES NO • Is COC present? **If COC is not present, do not proceed before contacting Project Manager or Coordinator.**

Project Manager/Coordinator was contacted _____ (date/time)

YES NO • Is COC signed and dated?

YES NO N/A Is COC an ENCOTEC form?

YES NO • Were all requests for analysis listed on the COC sheet (and/or other included documents) matched with sample bottles found in the shipping container(s)?

YES NO N/A • Is all preservation information on the COC in agreement with the preservation specified on the sample bottles?

SAMPLE BOTTLES

YES NO • Are all sample bottles intact and undamaged?

YES NO Were ENCOTEC (pre-preserved) sample bottles used?

YES NO • Are the sample bottles labeled?

YES NO Were ENCOTEC labels used?

YES NO N/A Were those samples preserved in the field marked SP (site-preserved)?

YES NO • Is each sample bottle the correct type for the analyses specified on it?

YES NO N/A • Are those sample bottles scheduled for POC, POX, VOA, or TOX without air bubbles?

YES NO • Does each bottle contain sufficient sample for the analyses specified on its label/COC form?

YES NO N/A Is the preservation specified on each bottle label proper for the analyses specified?

If a question marked with * has not been answered "YES" please describe the deviation here.

If necessary, continue the description on the reverse of this sheet.

DEVIATION(S): _____

OTHER OBSERVATION(S): _____

PROJECT MANAGER/COORDINATOR RESOLUTION(S): _____

her Resolutions (if called for) _____

Enter Laboratory Support Group and Project Management authorizing signatures on the reverse of this sheet.

Deviation (con't): _____

Other Observations (con't): _____

P.M. Resolutions (con't): _____

Other Resolutions (con't): _____

Other _____ Date _____
Signature of Group Leader involved in "Other resolution" or his/her Designee

LSG _____ Date 7/19/94
Signature of Laboratory Support Group Leader or his/her Designee

Project Mngr/Coord. _____ Date 19 July 94
Signature of Project Manager or his/her Designee

Sandia National Laboratories

SNL/NM 019023 SNL/NM 019024 SNL/NM 019025

ENVIRONMENTAL PROGRAMS SAMPLE COLLECTION LOG

SCL- 00810

AR/COC No.: AR/COC- 00050

PAGE 1 OF 1

SF 2001-SCL (12-93)

GENERAL INFORMATION	DATE: 7/15/94	WEATHER: Sunny, calm, 70's-90's	SAMPLING INFORMATION	ON-SITE CONTACT: Lon Dawson	ORG. 7582	PHONE 844-0458
	SAMPLING PROCEDURE REFERENCE: SOP for Soil-Gas Sampling			AREA: TA5	LOCATION: Seepage Pits	
	PURPOSE OF SAMPLING: Subsurface active soil-gas sampling					

SAMPLE DESCRIPTION

MATRIX: [X] GAS [ ] LIQUID [ ] SLUDGE [ ] SOLID [ ] WATER [ ] OIL [ ] SOIL [ ] HAZ WASTE [ ] OTHER

COLLECTED FROM: [ ] DRUM [ ] TANK [ ] SURFACE WATER [X] SOIL [ ] WASTE WATER [ ] GROUND WATER [ ] OTHER

ANALYSES

Sample Number - Fraction	Time	LOCATION	COMMENTS	Sample Type Grab/Comp.	QC Sample (Y/N)	TO14 (low Level)						
SNL/NM 019023-1	0956	TA5 SP-1-30	SUMMA #9441BB (#SNL/NM 023)	G	N	X						
SNL/NM 019024-1	1208	TA5 SP-2-30	SUMMA #9438BB (SNL/NM GR #2)	G	N	X						
SNL/NM 019025-1	1322	TA5 SP-3-30	SUMMA #9444BB (SNL/NM GR #7)	G	N	X						

PROJECT	PROJECT NAME: LWDS Drilling	CASE NUMBER: 3624-312	PROJECT CONTACT: Lon Dawson	ORG. 7582	PHONE 844-0458
*ADDITIONAL INFORMATION: (Log Book Ref. #)	Project # 30455.140.02				

SAMPLE TEAM MEMBERS	NAME	SIGNATURE	INIT	COMPANY/ORGANIZATION
	1. T. Woodard	[signature]	TW	IT Corporation
	2. D. Flores	[signature]	DF	IT Corporation
	3.			

SAMPLE TRACKING			
	SAMPLE DISTRIBUTION: ENCOTEC	TRANSPORTED BY: A 44296	SPECIAL HANDLING:
	DATE SHIPPED (MM-DD-YY): 7/18/94	DATA ENTERED (MM-DD-YY):	BY: [signature] 7/29/94

*NOTE: Any additional sampling information must be recorded in an SNL-Issued Log Book or SCL Continuation Form with a Reference No. entered in this space.

WHITE - To Sample Management Office PINK- Originator

[ ] TO BE COMPLETED BY SMO

Sandia National Laboratories

SF 2001-COC (12-93)

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

AR/COC- 07050

PAGE 1 OF 1

Department No.:	7582	Date Samples Shipped:	7/18/94
Project/Task Manager:	Lon Dawson	Carrier/Waybill No.:	A 44296
Project Name:	Lwds D. Ill..	Lab Destination:	ENCOTEC
Sample Team Members	T. Wilson	Lab Contact:	Roger Roussel
	D. Flores	SMO Contact/Phone:	Dan Salmi
		Send Report to SMO:	Debra Compton
SCL or Logbook Ref. No.:	~~3745.7~~ SCL 00810	SMO Reference No.:	3624.3.14.0.012

Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Contract No.: 67-9736A
Case No.: 3624.312
SMO Authorization: [signature]

Sample Number - Fraction	Sample Matrix	Date/Time Collected	Container Type	Sample Volume	Preservative	Required Analytical Testing	Lab Sample Number	Condition on Receipt
✓ SNL/NM 019023-1	GAS	7/15/94 0916	Summa*	6L	None	*TO-14 low level + TIC	38893	OK
✓ SNL/NM 019024-1	↓	1208	↓	↓	↓	**TO-14 low level + TIC	38894	↓
✓ SNL/NM 019025-1	↓	1322	↓	↓	↓	**TO-14 low level + TIC	38895	↓

Possible Hazard Identification
☒ Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Radiological

*Reference attached radiological screening for specific contact readings.

Turnaround Time
☒ Normal ☐ Rush _____ Required Report Date per contract

Sample Disposal
☐ Return to Client ☒ Disposal by Lab Archive Until _____

Special Instructions/QC Requirements
* Clean and prep. ~~contain~~ canister and return to SNL/NM
** Suspected 10-20 ppb

1. Relinquished by [signature]	Org. 7716CP	Date 7-18-94	Time 1303	4. Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. SMO-7576	Date 7-18-94	Time 1303	4. Received by	Org.	Date	Time
2. Relinquished by [signature]	Org. SMO-7576	Date 7-18-94	Time 1400	5. Relinquished by	Org.	Date	Time
2. Received by [signature]	Org. ENCOTEC	Date 7/19/94	Time 0845	5. Received by	Org.	Date	Time
3. Relinquished by	Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by	Org.	Date	Time	6. Received by	Org.	Date	Time

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

SHIPPER

SF 0861-AE(1-83)

Sandia National Laboratories

1 [X] New Mexico [ ] California [ ] Other

SHIP TO: *Typed or neatly printed*

2 Environmental Controls Technology Corp.
Encotec
3985 Research Park Drive
Ann Arbor, MI 48108
Attn: Mr. Roger Roussel
Contract No. 67-9736 A

AR/COC # 00452 / 00050

Gate Exit Time & Date 5

Highest Material Security Class 4 Unl

Page of

Date Shipment Returned 9 [X] No Return

Document No. A 44296

Shipping Code 6 C

Shipment Replacer No. 7 5083

Due at Destination 8 7/18/94 Date

[ ] Air (Premium transportation authorized)
[X] Rail (Most economical transportation)

Originator of Form 9 D. b. McLaughlin | Org. 7576 | Phone 4-0941 | Date Prepared 10 7/18/94

FROM: 11 Site TAI | Bldg. 870B | Room 1 | Org. 7576 | Requester's E No. 12 03319 | Requester's Name (Write "Same" if also originator) same | Org. | Phone | Case No. 13 6987.200

Material Billing 14: [ ] Charge [X] No Charge

Freight Billing 15: [X] Prepaid [ ] Collect (If collect, carrier & acct no. (if known))

Reason for Shipment 16: Lab Analysis of Environmental Samples

Authority for Shipment 17: n/a

Item No. 18	Sec. Class. 19	Quantity 20	Unit 21	Haz. Mat'l. 22	Property Tag No. And/Or MD No. 23	Description 24	Unit Value 25	Total 26
1	U	1	EA	No	N/A	Environmental Water Samples	N/A	N/A
2	U	1	EA	NA	N/A	SUMMA CANISTERS (SOIL) OAS samples	N/A	N/A

IMPORTANT: SANDIA TRAFFIC ANALYST, PLE[illegible] X COPY OF COMPLETED SHIPPER AND WAYBILL TO SMO FACILITY, FAX # [illegible] 332 4412 896 IMMEDIATELY UPON SHIPMENT

40# 332 4413 005

7/18/94 3:30

Grand Total 27 $

DOE Transportation Safeguards Div. Courier Required? 28 [ ] YES [X] NO

Service Class 29 [illegible]

Property Mgmt Rep. 30 N/A

Date Shipped or Hand-carried 31 FEDERAL EX JUL 1[illegible]

Routing 32

B/L No. 33

No. of Boxes 34 2

Unit 35

Weight 36 63 lbs

Total Cubic Feet/Dimensions 35 21 / 23x15x17 17x20x14"

Authorizing Signature 37 Jim D. Fish, 7576

Signature of manager above typed or printed name and Org.

I certify that the material being offered for shipment is nonhazardous unless noted as hazardous in block 22 and required information is being provided.

Special Approval 38 Name Org.

Special Approval Name Org.

39 Bearer's Signature

40 Receipt Acknowledged Recipient's Signature/Company Date

Contract or PEL/MEL Rep. 41 [ ] External Loan Name Org.

The listed material and accompanying information has been examined and the hazardous material designations and all preparations for shipment are certified correct. 42

43

Ply 1: Corporate File - Retained by the Traffic

ENVIRONMENTAL
CONTROL
TECHNOLOGY
CORPORATION

3985 RESEARCH PARK DRIVE
ANN ARBOR, MICHIGAN 48108
313/761-1389

August 11, 1994

RECEIVED
AUG 12 1994
SNL/SMO

Sandia National Labs SMO
Debra Constant, MS 1305
BDM Building
2301 Buena Vista SE
Albuquerque, NM 87106

Dear Ms. Constant:

Enclosed is the data package for SDG# SNL-LW-070, a LWDS groundwater monitoring project. This SDG consists of ENCOTEC Batch# 6520 which is Sandia RFA# 050. Please review at your earliest convenience and call if you have any questions.

Sincerely,

ENCOTEC, Inc.

Roger Roussel
Laboratory Manager

RR/qos

Enclosure

#76100

DATA REVIEWED
By: MB Garcia Date: 8-25-94
Checked:
Approved:

ENVIRONMENTAL PROGRAMS DEPARTMENT

SANDIA NATIONAL LABORATORIES

SAMPLE DATA REVIEW CHECKLIST

DATE 8-25-94
CASE NO 3624.312
PROJECT NAME LWDS TA-5
LABORATORY ENCOTEC
CHECKED BY MS Garcia
APPROVAL/DATE

SAMPLE IDENTIFICATION	SAMPLE COLLECTION LOG											COCs AND RFAs								LAB REPORT										DATA QUALITY							
	SAMPLE ID	SAMPLING PURPOSE	SAMPLE LOCATION	COLLECTION DATE AND TIME	SAMPLE MATRIX	COLLECTION TECHNIQUE	SAMPLE CONTAINERS	SAMPLE PRESERVATION	FIELD OBS. AND MEAS.	SAMPLER	ANALYSES	COC RECORD COMPLETE	RFA RECORD COMPLETE	SAMPLE ID	LAB SAMPLE ID	ANALYSES REQUESTED	DATA REVIEWED	DATE SAMPLE RECEIVED	DATE SAMPLE PREPARED	DATE SAMPLE ANALYZED	HOLDING TIME MET	SAMPLE ID	LAB SAMPLE ID	ANALYST	METHOD REF. NUMBER	REPORTING LIMIT	ANALYSES REQUESTED	CONSISTENCY OF UNITS	① ACCURACY DATA REPORTED AND MET	PRECISION DATA REPORTED AND MET	MATRIX SPIKE DATA REPORTED AND MET	BLANK DATA REPORTED AND MET	SURROGATE DATA REPORTED AND MET	COMPARABILITY OF UNITS	REASONABLENESS OF DATA	VALIDATION RANKING
SN4/4M 019023-1	Y	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	Y	NA	NA	NA	A
024-1	Y	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	Y	NA	NA	NA	A
025-1	Y	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	Y	NA	NA	NA	A

QUALITY CONTROL SAMPLES

ADDITIONAL COMMENTS: ① Initial calibration sheets shows the instrument to be within lab calibration ~~date~~ prior to analyses.

VALIDATION RANKING: U - UNUSABLE DATA A - ACCEPTABLE C - CONDITIONALLY ACCEPTABLE

SANDIA LABORATORY NARRATIVE TEMPLATE

Project Name:	Sandia
Project Number:	76100
Sample Delivery Group:	SNL-LW-070
Batch Number(s):	6520
Narrative Date:	August 10, 1994

Sample Receipt

The samples were received at ENCOTEC without incident. Standard chain-of-custody procedures were followed. Samples were collected in prepreserved sample containers, where appropriate, supplied by ENCOTEC. Following log-in, the samples were stored at 4°C, where required, per EPA protocol until sample preparation or analysis.

Sample Analysis - Organics

Sample analysis was performed without incident, within holding times, with chain of custody maintained, and according to the referenced methods. Initial and continuing calibration criteria, as found in the ENCOTEC SOP(s) for the referenced method(s), were adhered to for all samples included in this sample delivery group. Quality control results are summarized as follows:

- Analysis of surrogates was performed on all samples; please see the appropriate form(s) for results.

- The method blank(s) did not contain any target analytes at or above the reported detection limits.

Summary

No significant problems were encountered during the analysis of the sample(s) by the referenced method(s). All pertinent QC documentation has been provided.

I certify that the data presented as part of this report meets the minimum quality assurance standard specified in the referenced analytical method(s). I have examined and am familiar with the information contained in this report and that, based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true accurate, complete and meets the minimum standards specified in 40 CFR 136 and/or SW846. Any exceptions, outliers and/or problems encountered during the analysis of sample contained within this report have been narrated and an assessment of the quality of the data is presented. I am aware that there are significant penalties for submitting with knowledge, false information, including the possibility of fines and/or imprisonment.

Jane Hancock

Jane Hancock
QA/QC Chemist

8/10/94
Date

ENCOTEC
Analyst Cross-Reference List

SDG#: SNL-LW-070

Test	**Analyst**
TO14	A. Stefan

Volatile Organics

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019023-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038893
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019023-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038893
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	U	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
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ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: SNL/NM019023-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038893
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:

Form TICVWN1G Rev. 04/17/92

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019024-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038894
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019024-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038894
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	U	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
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ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: SNL/NM019024-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038894
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:

Form TICVWN1G Rev. 04/17/92

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019025-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038895
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
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ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: SNL/NM019025-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038895
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.10	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
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ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: SNL/NM019025-1
Sample Date: 07/15/94
Date Received: 07/19/94
Date Analyzed: 07/21/94
ENCOTEC I.D.: 200038895
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:

Form TICVWN1G Rev. 04/17/92

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: Method Blank
Sample Date: NA
Date Received: NA
Date Analyzed: 07/21/94
ENCOTEC I.D.: MB072194-1E
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Benzene	71-43-2	U	0.10
Benzyl chloride	100-44-7	U	0.10
Bromomethane	74-83-9	U	0.10
Carbon tetrachloride	56-23-5	U	0.10
Chlorobenzene	108-90-7	U	0.10
Chloroethane	75-00-3	U	0.10
Chloroform	67-66-3	U	0.10
Chloromethane	74-87-3	U	0.10
3-Chloropropene	107-05-1	U	0.10
1,2-Dibromoethane	106-93-4	U	0.10
1,2-Dichlorobenzene	95-50-1	U	0.10
1,3-Dichlorobenzene	541-73-1	U	0.10
1,4-Dichlorobenzene	106-46-7	U	0.10
Dichlorodifluoromethane	75-71-8	U	0.10
1,1-Dichloroethane	75-34-3	U	0.10
1,2-Dichloroethane	107-06-2	U	0.10
1,1-Dichloroethene	75-35-4	U	0.10
cis-1,2-Dichloroethene	156-60-5	U	0.10
1,2-Dichloropropane	78-87-5	U	0.10
1,2-Dichloro-1,1,2,2-tetra-fluoroethane	76-14-2	U	0.10
cis-1,3-Dichloropropene	10061-01-5	U	0.10
trans-1,3-Dichloropropene	10061-02-6	U	0.10
Ethylbenzene	100-41-4	U	0.10
4-Ethyltoluene	622-96-8	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994

Sample I.D.: Method Blank
Sample Date: NA
Date Received: NA
Date Analyzed: 07/21/94
ENCOTEC I.D.: MB072194-1E
QC Set I.D.: TOEG2101A

U = Analyte not detected.
B = Analyte present in method blank.

VOLATILE ORGANICS	CAS NUMBER	CONC. (ppmv)	DETECTION LIMIT (ppmv)
Hexachlorobutadiene	87-68-3	U	0.10
Methylene chloride	75-09-2	U	0.10
Styrene	100-42-5	U	0.10
1,1,2,2-Tetrachloroethane	79-34-5	U	0.10
Tetrachloroethene	127-18-4	U	0.10
Toluene	108-88-3	U	0.10
1,2,4-Trichlorobenzene	120-82-1	U	0.10
1,1,1-Trichloroethane	71-55-6	U	0.10
1,1,2-Trichloroethane	79-00-5	U	0.10
Trichloroethene	79-01-6	U	0.10
Trichlorofluoromethane	75-69-4	U	0.10
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	U	0.10
1,2,4-Trimethylbenzene	95-63-6	U	0.10
1,3,5-Trimethylbenzene	108-67-8	U	0.10
Vinyl chloride	75-01-4	U	0.10
o-Xylene	95-47-6	U	0.10
m-Xylene	108-38-3	U	0.10
p-Xylene	106-42-3	U	0.10

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

ORGANIC ANALYSIS DATA SUMMARY SHEET
TENTATIVELY IDENTIFIED VOLATILE COMPOUNDS

Project Name: Sandia
Project Number: 76100
Method: 624___ 8240___ 8260___ TO-14_X_
Report Date: July 27, 1994

Sample I.D.: Method Blank
Sample Date: NA
Date Received: NA
Date Analyzed: 07/21/94
ENCOTEC I.D.: MB072194-1E
QC Set I.D.: TOEG2101A

B = Analyte present in method blank.

TENTATIVELY IDENTIFIED VOLATILE ORGANICS	CAS NUMBER	RETENTION TIME	ESTIMATED CONC. (mg/L)
1. No Volatile Compounds Detected	--	--	--
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:

Form TICVWN1G Rev. 04/17/92

ENVIRONMENTAL CONTROL TECHNOLOGY CORPORATION
3985 Research Park Drive * Ann Arbor, MI 48108
313 / 761-1389

AIR MATRIX SURROGATE RECOVERY
VOLATILE ORGANICS

Project Name: Sandia
Project Number: 76100
Method: TO-14
Report Date: July 27, 1994
QC Set I.D.: TOEG2101A

ENCOTEC Sample No.	% Recovery D8-Toluene (94-107)**	% Recovery BFB (93-110)**	% Recovery D4-1,2-Dichloroethane (85-107)**
200038893	104	98	86
200038894	105	101	88
200038895	105	99	103
MB072194-1E	103	93	90

All samples fortified with 10 ppbv of each surrogate analyte.

* Value outside of established quality control windows.
** Percent recovery quality control windows.
MI = Matrix interferences caused distortion to recovery value.

RECOVERY: 0 out of 12 outside QC Windows.

Note:

Form LTO14A32.NDS Rev. 12/26/91

TO-14 INITIAL CALIBRATION SHEET

Lab Name: ENCOTEC

Analyst: AS

Instrument I.D.: 005

Calibration Levels (ug on column):

Calibration Date: 07/21/94

LAB FILE I.D.			RRF1 = 10			RRF2 = 25			
RRF3 = 50			RRF4 =			RRF5 =			
COMPOUND	RRF1	RRF2	RRF3	RRF4	RRF5	RRF	% RSD	min. RRF	max. % RSD
Dichlorodifluoromethane	7.262	7.444	6.565			7.090	6.5%	0.050	30
1,2-Dichloro-1,1,2,2-tetrafluoroethane	4.965	5.906	5.795			5.555	9.3%	0.050	30
Chloromethane	2.137	2.933	2.339			2.470	16.8%	0.050	30
Vinyl chloride	1.566	1.703	1.209			1.493	17.1%	0.050	30
Bromomethane	3.179	3.004	2.796			2.993	6.4%	0.050	30
Chloroethane	1.042	1.037	0.775			0.951	16.1%	0.050	30
Trichlorofluoromethane	5.332	6.276	6.266			5.958	9.1%	0.050	30
1,1-Dichloroethene	2.042	2.247	1.944			2.078	7.4%	0.050	30
1,1,2-Trichloro-1,2,2-trifluoroethane	4.218	4.822	5.104			4.715	9.6%	0.050	30
3-Chloropropene	0.272	0.330	0.339			0.314	11.6%	0.050	30
Methylene chloride	1.782	1.914	1.520			1.739	11.5%	0.050	30
1,1-Dichloroethane	4.577	4.699	3.677			4.318	12.9%	0.050	30
cis-1,2-Dichloroethene	1.751	2.118	1.713			1.861	12.0%	0.050	30
Chloroform	4.461	5.514	4.810			4.928	10.9%	0.050	30
1,1,1-Trichloroethane	5.971	6.038	5.312			5.774	6.9%	0.050	30
Carbon tetrachloride	5.804	6.271	6.504			6.193	5.8%	0.050	30
Benzene	0.997	1.120	1.015			1.044	6.4%	0.050	30
1,2-Dichloroethane	2.185	2.865	2.424			2.491	13.8%	0.050	30
Trichloroethene	0.601	0.768	0.835			0.735	16.4%	0.050	30
1,2-Dichloropropane	0.589	0.663	0.558			0.603	8.9%	0.050	30
cis-1,3-Dichloropropene	0.613	0.830	0.744			0.729	15.0%	0.050	30
Toluene	0.797	0.935	0.887			0.873	8.0%	0.050	30
trans-1,3-Dichloropropene	0.355	0.467	0.495			0.439	16.9%	0.050	30
1,1,2-Trichloroethane	0.572	0.708	0.729			0.670	12.7%	0.050	30
Tetrachloroethene	0.651	0.833	0.958			0.814	19.0%	0.050	30
1,2-Dibromoethane	2.613	3.574	3.422			3.203	16.1%	0.050	30
Chlorobenzene	1.303	1.615	1.316			1.411	12.5%	0.050	30
Ethylbenzene	0.585	0.708	0.625			0.639	9.8%	0.050	30
m,p-Xylene	1.450	1.758	1.628			1.612	9.6%	0.050	30
o-Xylene	0.138	0.197	0.177			0.171	17.6%	0.050	30
Styrene	3.520	4.553	4.337			4.137	13.2%	0.050	30
1,1,2,2-Tetrachloroethane	2.077	2.486	2.222			2.262	9.2%	0.050	30
4-Ethyltoluene	1.729	2.361	2.203			2.098	15.7%	0.050	30
1,3,5-Trimethylbenzene	2.112	2.120	1.902			2.045	6.0%	0.050	30
1,2,4-Trimethylbenzene	1.701	2.210	1.990			1.967	13.0%	0.050	30
1,3-Dichlorobenzene	0.957	1.331	1.286			1.191	17.1%	0.050	30
1,4-Dichlorobenzene	1.179	1.532	1.472			1.394	13.5%	0.050	30
Benzyl chloride	0.128	0.222	0.212			0.187	27.6%	0.050	30
1,2-Dichlorobenzene	1.169	1.399	1.339			1.302	9.2%	0.050	30
1,2,4-Trichlorobenzene	0.243	0.421	0.345			0.336	26.6%	0.050	30
Hexachlorobutadiene	0.672	0.742	0.625			0.680	8.7%	0.050	30

Minimum RF for all compounds is 0.050
Maximum % RSD for all compounds is 30.0 %

ANNEX 2-B
Passive Soil Vapor Survey Results
Phase I, August 1994,
Phase 2 October/November 1994
TA-V, SWMU 275

NER
rtheast Research Institute LLC

605 Parfet Street • Suite 100
Lakewood, Colorado 80215
303-238-0090 • 800-845-5137
Fax 303-238-2522

Serptember 21, 1994

Mr. Lon Dawson
Sandia National Laboratories
MS - 1347
1515 Ubank SE.
Albuquerque, New Mexico 87123

Phone: (505) 293-2804
Fax: (505) 848-0417

Dear Mr. Dawson:

Enclosed please find the preliminary report on the findings of the **PETREX** Soil Gas Survey performed at Technical Area V, Sandia National Laboratories, Albuquerque, New Mexico.

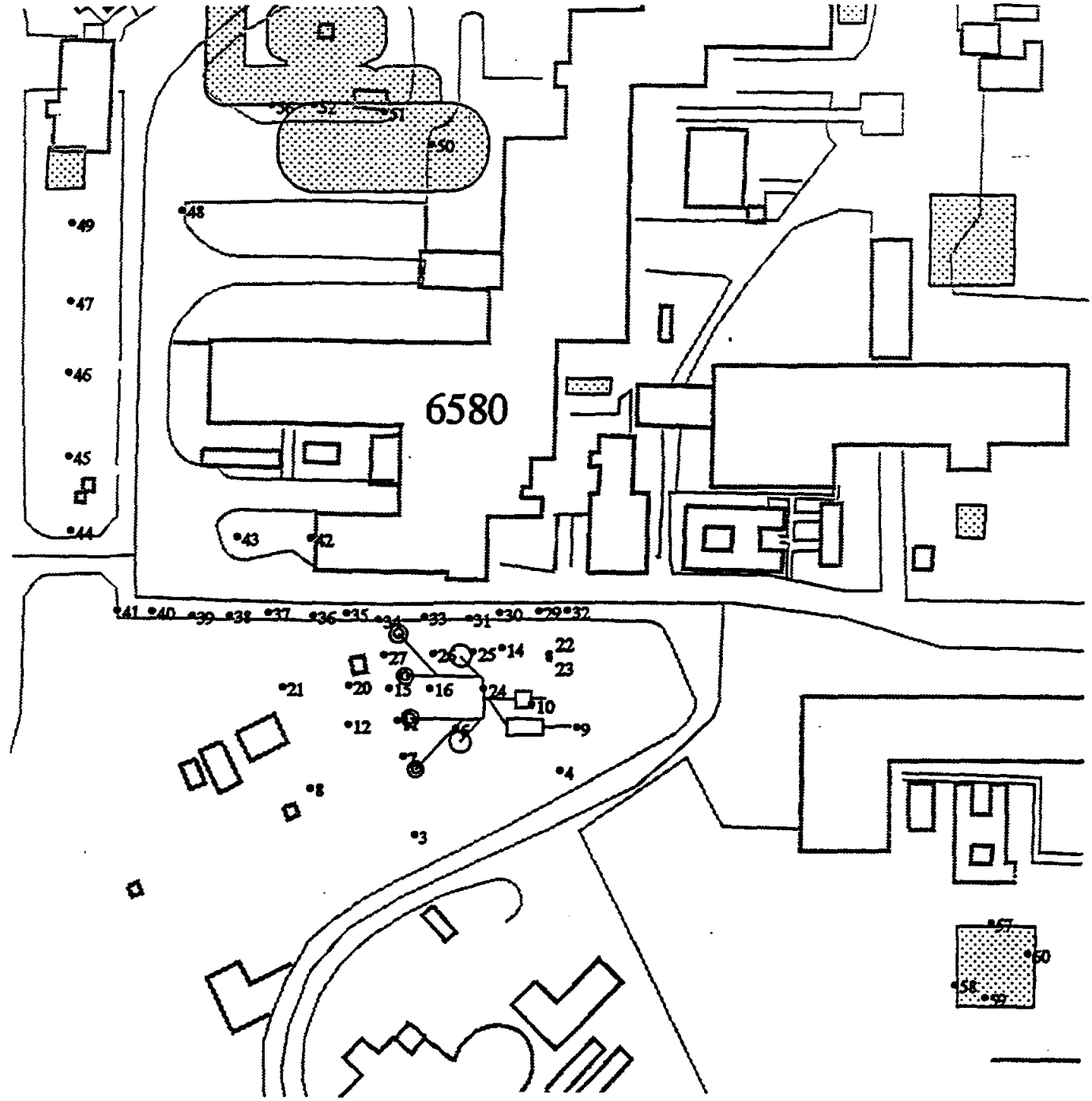
If you have any questions concerning the enclosed, please do not hesitate to call. We will await your comments prior to issuing our final report.

Respectfully Submitted,
NORTHEAST RESEARCH INSTITUTE

Julia Olney Gullett
Senior Geologist
Project Manager

encl

D20966JG/9.21.94



SWMU 275: Phase I Passive Soil Gas Survey

28 0 28 56 Feet

N

Lwds NERI GPS Locations
Seepage Pits
Building
Roads
ER Sites

SWMU 275:Phase I Passive Soil Gas Survey Results.

Table 1

PETREX Relative Soil Gas Response Values

(in ion counts)

SNL Site TA-V

Sample	TCE	PCE	BTEX
3	ND	2,812	2,008
4	235	5,932	1,018
6	ND	ND	3,141
7	ND	1,052	104,500
8	ND	ND	946
9	ND	851	469
10	ND	2,004	ND
11	ND	1,607	615
12	692	ND	2,933
14	ND	ND	566
15	ND	482	726
16	ND	816	3,990
20	ND	ND	459
21	ND	ND	16,737
22	ND	521	570
23	ND	ND	5,226
24	1,038	ND	8,159
25	ND	ND	1,727
26	ND	ND	14,531
27	ND	ND	1,213
29	ND	ND	16,112
30	3,791	973	49,436
31	ND	ND	633
32	2,357	3,845	18,398
33	ND	ND	2,101
34	1,710	1,433	36,190
35	ND	ND	12,972
36	790	ND	38,096
37	ND	ND	2,373
38	ND	ND	1,588
39	ND	ND	2,777
40	ND	ND	1,697
41	ND	ND	1,697
42	ND	ND	779
43	ND	ND	757
44	ND	ND	497
45	ND	ND	6,933

Table 1
PETREX Relative Soil Gas Response Values
(in ion counts)
SNL Site TA-V (Concluded)

Sample	TCE	PCE	BTEX
46	ND	ND	2,024
47	ND	ND	1,800
48	ND	ND	ND
49	ND	ND	1,017
50	ND	ND	2,336
51	ND	212	2,065
52	ND	ND	4,032
56	ND	ND	2,227
57	ND	ND	2,439
58	ND	ND	5,457
59	709	ND	2,696
60	ND	ND	761
* 61	ND	ND	ND
* 62	ND	ND	ND
D 1007	ND	1,412	169,011
D 1027	ND	ND	5,331
D 1035	ND	ND	13,412
D 1042	ND	ND	560
D 1052	ND	ND	5,661

TCE - Trichloroethene
Indicator Mass Peak(s) 130

PCE - Tetrachloroethene
Indicator Mass Peak(s) 164

BTEX - Benzene, Toluene, Ethylbenzene/Xylene(s)
Indicator Mass Peak(s) 78, 92, 106

D - Duplicate Sample
Sample numbers in thousands duplicate of sample numbers in hundreds

* QA/QC Travel Blank Sample - No Compounds Detected above the PETREX Normal reporting Limits

NER
theast Research Institute LLC

605 Parfet Street • Suite 100
Lakewood, Colorado 80215
303-238-0090 • 800-845-5137
Fax 303-238-2522

December 1, 1994

Mr. Lon Dawson
Sandia National Laboratories
MS - 1347
1515 Ubank SE.
Albuquerque, New Mexico 87123

Phone: (505) 293-2804
Fax: (505) 848-0417

Dear Mr. Dawson:

Enclosed please find a table of results on the findings of the PETREX Soil Gas Survey performed at your site of investigation, Sandia National Laboratories, Albuquerque, New Mexico.

The VOC's trichloroethene (TCE), tetrachloroethene (PCE) and several petroleum hydrocarbon compounds were detected in soil gas. The occurrences of benzene, toluene, ethylbenzene/xylenes (BTEX) and total petroleum hydrocarbons (TPH) were reported. In addition limited occurrences of trichlorotriflouromethane (Freon 113) and naphthalene were also detected. The relative response of these detections are provided on Tables 1 and 2, enclosed. In order to report the compounds detected, mass spectral peaks indicative of the compounds were selected and their corresponding ion counts were summed and reported.

Table 3 lists the reported compounds and peaks which were summed to represent the compound occurrences reported on Tables 1 and 2.

TABLE 3
REPORTED COMPOUNDS AND THEIR INDICATOR MASS PEAKS

Compound	Indicator peaks
PCE	164
TCE	130
BTEX	78, 92, 106
TPH	56, 70, 78, 84, 92, 98, 106, 120, 126, 140, 154

Mass Spectra of the compounds identified are provided as Figures 1-7, also enclosed.

The response values are reported in ion counts. Ion counts are the unit of measure assigned by the mass spectrometer to the relative intensities associated with each of the reported compounds. These intensity levels or response levels do not represent an actual concentration of the reported compounds; however are best utilized as a semiquantitative measure where a change in ion count values in orders of magnitude is considered significant for interpreting potential source areas and migration/dispersion pathways versus background areas.

The occurrences of PCE and TCE appear to be limited to a few locations. High relative response levels of PCE were detected at sample locations 14, 25, 38, and 51; while high levels of TCE were detected at sample locations 14 and 50.

The number of samples exhibiting elevated response for BTEX and TPH may be indicating significant occurrences in the subsurface. It may be beneficial to map the distribution of these compounds so that an interpretation can be made with respect to the spatial relationship of their occurrences.

Please keep in mind that levels below 100,000 ion counts for a given compound such as PCE and TCE, under normal site conditions generally do not represent detectable levels by standard quantitative methods for soils and/or groundwater. Normal site conditions are considered to be sites in which the depth to groundwater is less than 100 feet below the surface, groundwater flow rates are undisturbed, and normal precipitation occurs during sampler exposure. Corresponding levels for a class of compounds such as BTEX and TPH, in which several masses are summed and reported, are equivalent to 200,000 ion counts. Areas of subsurface contamination are generally illustrated by a number of spatially contiguous samples exhibiting elevated response, rather than isolated occurrences.

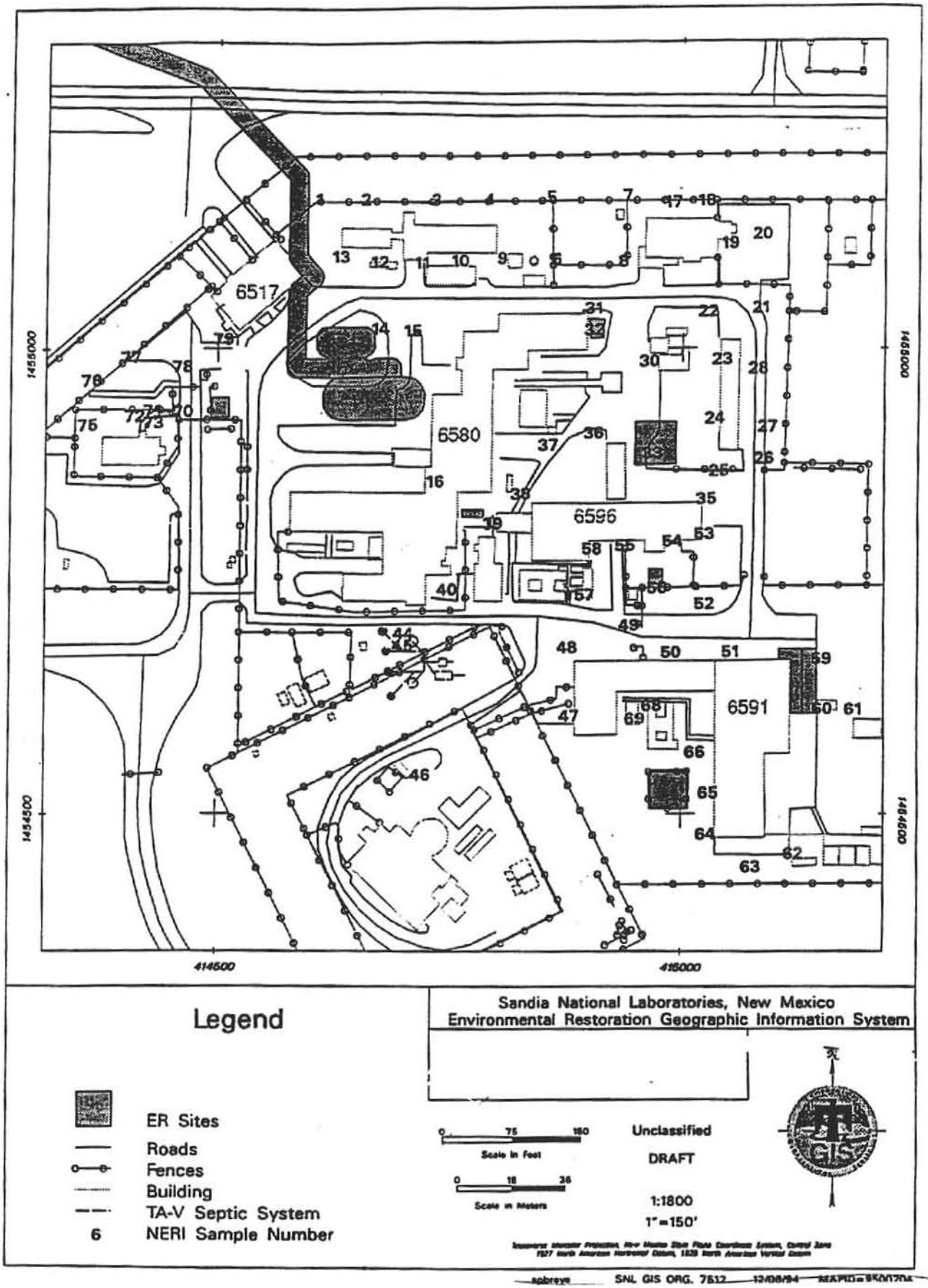
Please let me know if you would like the distribution of these compounds mapped, and send a sample location map at your earliest convenience. I will begin preparing the draft report of our findings once we have decided to proceed with mapping the compounds or not. If you have any questions concerning the enclosed, please do not hesitate to call.

Respectfully,
NORTHEAST RESEARCH INSTITUTE LLC,

Julia Olney Gullett

Julia Olney Gullett
Senior Geologist

L20968JG/11.30.94



SWMU 275: Phase II Passive Soil Gas Survey Results.
Sample Location Map

Table 1
PETREX Relative Soil Gas Response Values

Sample	PCE	TCE	BTEX	TPH
1	ND	ND	43,143	68,751
2	ND	ND	19,017	32,364
3	ND	ND	17,290	59,247
4	ND	ND	39,926	48,207
5	ND	ND	23,244	29,236
6	ND	ND	47,444	133,169
7	ND	ND	29,436	54,012
8	ND	ND	84,518	160,695
9	ND	ND	91,077	169,056
10	ND	ND	55,802	85,327
11	ND	ND	2,802	4,755
12	ND	ND	39,993	101,419
13	ND	ND	178,115	292,006
14	2,487,530	110,241	40,523	479,510
15	ND	ND	T	T
16	ND	ND	T	T
17	10,307	ND	34,156	51,588
18	ND	ND	69,596	117,326
19	ND	ND	54,050	102,305
20	29,836 H	ND	805,201	2,472,071
21	ND	ND	70,079	152,693
22	ND	ND	268,200	556,583
23	ND	ND	167,396	489,893
24	ND	ND	251,024	675,741
25	132,768	4,582	70,840	176,757
26	ND	ND	151,452	247,959
27	ND	ND	372,552	848,201
28	ND	ND	111,217	198,689
29	ND	ND	162,922	375,121
30	ND	ND	250,488	4,574,192
31	ND	ND	410,264	916,752
32	ND	ND	41,956	76,561
33	ND	ND	328,546	749,684
34	10,937	ND	120,251	219,046
35	ND	ND	485,487	1,081,825
36	ND	ND	99,314	208,980
37	8,335	ND	67,296	261,292
38	107,086	9,773	922,493	5,040,596

Table 1

PETREX Relative Soil Gas Response Values

Continued

Sample	PCE	TCE	BTEX	TPH
39	7,632	ND	15,250	36,321
40	ND	ND	131,198	284,609
41	ND	ND	156,867	298,615
42	ND	ND	54,350	98,868
46	9,997	ND	389,838	756,888
47	ND	ND	131,267	348,427
48	3,016	ND	153,075	328,412
49	2,298	ND	45,133	91,776
50	ND	400,989	45,801	133,620
51	315,984	26,046 H	544,205	3,224,333
52	ND	ND	121,297	271,601
53	8,459	ND	64,413	103,464
54	24,706	ND	196,489	358,424
55	6,400	ND	27,502	47,335
56	ND	ND	25,735	79,669
57	ND	ND	667,841	1,085,222
58	2,847	ND	106,313	200,697
59	5,494	ND	138,495	260,433
60	9,212	ND	125,200	278,005
61	ND	ND	601,068	775,477
62	ND	ND	192,021	342,169
63	ND	ND	232,758	658,415
64	ND	ND	57,948	148,395
65	4,828	ND	34,262	46,394
66	ND	ND	119,601	439,634
67	ND	ND	74,730	152,538
68	ND	ND	114,160	244,698
69	ND	ND	27,653	67,180
70	ND	ND	2,849,939	19,959,176
71	ND	ND	6,747	19,895
75	ND	ND	11,300	292,769
76	ND	ND	25,092	45,396
77	4,223	ND	20,354	77,730
78	ND	ND	23,861	45,474
79	ND	ND	11,983	17,151
* 900	ND	ND	ND	2,586
* 901	ND	ND	ND	ND
D - 2026	ND	ND	66,443	120,404

Table 1
PETREX Relative Soil Gas Response Values
Concluded

Sample	PCE	TCE	BTEX	TPH
D - 2031	ND	ND	581,647	1,160,333
D - 2038	104,256	8,754	655,410	4,052,082
D - 2050	ND	381,306	31,941	95,950
D - 2059	6,089	ND	156,467	296,492
D - 2063	ND	ND	300,065	766,496

PCE - Tetrachloroethene
Indicator Mass Peak(s) 164

TCE - Trichloroethene
Indicator Mass Peak(s) 130

BTEX - Benzene, Toluene, Ethylbenzene/Xylene(s)
Indicator Mass Peak(s) 78, 92, 106

TPH - Total Petroleum Hydrocarbons
Indicator Mass Peak(s) 78, 92, 106, 56, 70,
84, 98, 112, 126, 140, 154

ND - Not Detected

T - Compound identification not possible due to terpene interference.

* QA/QC Travel Blank Sample

D - Duplicate Sample
Sample numbers in thousands are duplicates of sample numbers in hundreds.

H - Hydrocarbon Interference
Compound identification not possible due to interference associated with detection of high levels of hydrocarbons.

Table 2
Additional Compounds Detected in Soil Gas

Compound	Sample Location	Relative Response (in ion counts)
Freon 113	49	12,119
Naphthalene	31	3,315,410
	49	71,884
	63	198,178

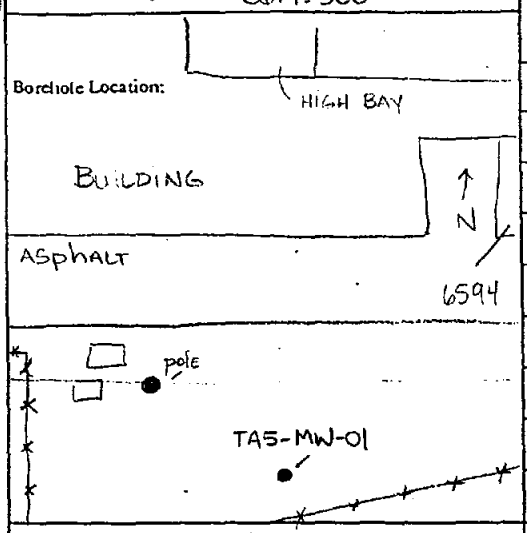
Freon 113 - Triclorotrifluoromethane
Indicator Mass Peak(s) 151

Naphthalene -
Indicator Mass Peak(s) 128

ANNEX 2-C
Borehole Lithologic and Sample Log for Borehole TAV-BH-01 and Monitor Well TAV-MW1 (TA5-MW-01)

WE/TA5 MW01/LOGS/LITH Byrnes, D

SNL/NM ER Project	3617.300	PROJECT: TA5 TCE Plume	Borehole/Well No.: TA5-MW-01
			ADS No.:
Borehole Location:	HIGH BAY	Logged By: M. Wade	Instruments: PID
		Task Leader: Lon Dawson	Drill Rig: CP-650
		Drilling Contractor: Stewart Bros.	Ground Elev (ft.MSL)
		Driller/Helper: R. Stewart; Roy;	
		Drilling Method: 0-200': 10.5" ID DRIVE CASING w/ 10" ø OPEN-CENTER button bit; 0-520': 9" ø ID DRIVE CASING w/ 8 5/8" ø OPEN-CENTER button bit	
		Sample Method: 2" ø ID split-spoon sampler; 11.5" ø steel drive casing; 8 5/8" ø hollow tree	
		Hammer Weight/Drop: 140 lb/30 in.	Borehole Diameter: 8 5/8" ø
		Start Time: 8:35	Date: 1/31/95
		Finish Time: 14:51	Date: 2/28/95



Notes: Soil Samples/Soil Vapor Samples every 10 ft (0-100) & every 20 ft (120-520)
SP = Split spoon

Water Depth (BGL)	NO WATER	499.8	499.2	498.9	498.6	499.4
Boring/Casing Depth	390	520	520	520	509.5	509.5
Time	7:28	10:21	15:44	8:21	7:37	15:17
Date	2/8/95	2/10/95	2/10/95	2/13/95	2/21/95	2/27/95

Total Depth: 520	Casing Depth:
Screened Interval:	Screen Size: 0.010
Sand Pack Interval:	Sand Size: 40/60
Well Development Method: Bail - 150 gallons	
Time: 4.5 hrs Date: 2/23/95	Flow Rate: NA
Geophysical Logs, Type: Natural Gamma; Neutron	
By: USGS	Date: 2/13/95

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circulation/Moisture/Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy/Contacts	LITHOLOGIC DESCRIPTION
		- Drill w/ DRIVE CASING:	10" ø CENTER 0-200 ft				bit w/	11 3/4" OD (10.5" ID)			1		Silty SAND (SM); lt brown to yellowish brn; moist to dry; MED. DENSE to DENSE; 10-20% Silt; <5% Clay; VFG to locally CG MICACEOUS SAND; MOD. to HIGH EST. K
		- Drill w/ DRIVE CASING:	8 5/8" ø CENTER 0-520 ft				bit w/	10.5" OD (9" ID) (DRIVE CASING to 513')			2		
											3		
											4		
											5	SP BLANK PVC	
										SOLID	6		
											7		
											8		
											9		
											10		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
10.0-SVS-001			36	12	6	fair							
			50+	10.0	Gamma Spec								
	Drill 2 ft and drill sample again										11		
											12		
											13		
											14		
											15		15-20'- minor Subrounded pbls of ls, qtz fdsp to 1/2"d; ~5-10%;
											16		
											17		
											18		18-20- GRAVEL LENSE - driller; cuttings
											19		
20.0-SVS-002 SP-20.0			17	24	24	Good			VOLCLAY GROUT	5' ϕ BLANK PVC	20		Silty SAND (SM) yellow-brn to brn; damp to moist, DENSE to MED. DENSE; 15-25% Silt; ~5% clay; <5% SR ls pbls to 3/4"d; MICA; MOD. EST. IK;
			25	20.0 - Gamma Spec							21		
			32	20.5 - TAL/SVOCS 21.0 - 8240 21.5 - Tritium									
			35								22		
											23		
											24		
											25		
											26		
											27		
											28		28'- GRAVELLY SAND (SM); Brown; damp; V. DENSE; 15-25% ANG ls pbls to 2"d+; VFG to CG SAND; ~10% FINES; MOD. to HIGH EST. IK;
											29		
											30		

Project/ADS No.:

Borehole/Well No.: TA5-M1-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
30.0 - SVS-003			5	24	18	fair							CG ls pbls to 2.5"ϕ
Sp-30.0			8	30.00 - Gamma Spec 30.50 - TAL; 8270									
			26	31.00 - 8240							31		
			47	31.25 - Tritium									
											32		
											33		
											34		
											35		SR pbls to 3"ϕ, ls; w/ MG - CG SAND; HIGH EST. IK;
											36		
											37		
											38		
											39		
41.0 - SVS-004									VOLCLAY GROUT	5" ϕ BLANK PVC	40		GRAVEL @ 40 - NO RECOVERY - DRILL AHEAD;
SP-41.0			8	24	18	fair					41		Silty SAND (SM); lt. brn; dry; V. DENSE; 15-20% Silt, 5% Clay; ~10% SR; SA pbls to 1"ϕ - ls; VFG to CG SAND; MICA; MOD. EST. IK;
			24	41.0 - GAMMA SPEC 41.5 - TAL; SVOCS							42		
			37	42.0 - 8240 42.5 - Tritium									
			50+								43		
											44		
											45		
											46		
											47		? ~47' - SANDY GRAVEL (GP); brn to grey-brn; dry to moist; V. DENSE; 20-35% VFG to CG SAND; ~10% FINES; SA, SR ls pbls to 2"ϕ +; hard to SAMPLE; MOD. to HIGH EST. IK;
											48		
											49		
											50		

TD = 50 ft; 16:41; 1/31/95

Project/ADS No.: 3617.300 | Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
50.0- SV5-006 Sp-50.00			50+	6	2	poor							ls clasts to 3"ø+; no SAMPLE recovery
			50+	6	0	poor					51		only gravel recovered. drill AHEAD to
											52		
											53		
											54		
											55	2	~55'- Silty SAND (SM); lt. brn; dry to moist; DENSE to v. DENSE; 15-20% Silt; <5% Clay; 10-15% SR, SA ls pbls to 1.5"ø, HIGHEST. IK; MICA
											56		
											57		
											58		
											59		
60.0- SV5-006 Sp-60.0			200	6	0	—			VOC CLAY (Gray)	PVC	60		NO RECOVERY; only LARGE ls pbls preventing recovery/sampling; drill to 60.5- Grab SAMPLES from cyclone 60.5-62 (NO VOCs or SVOCs)
			150	6	0	—					61		
Grab from cyclone			60.5- Tritium 61.0- TAL METALS 61.5- GAMMA SPEC							BLANK	62		SANDY GRAVEL (GP); lt. brn; dry to moist; 25-35% VFG to VCG SAND w/ MICA; ~10% FINES; SR, SA pbls to 2"ø+; ALL ls FRAGS.; HIGHEST. IK;
											63		
											64		
											65		
											66		
											67		
											68		
											69		
											70		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
70.0 - SVS-007			100+	3	3	poor → ALL ls pbls							15-25% VFG to VCG SAND; ANG, SUBA
SP-70.0			100+	0	0	—							ls pbls; VERY HIGH EST. IK;
				70.0 - TAL Metals (sp)							71		
PID - SVS		READ		70.5 - Gamma Spec									
500 ppb before			full	71.0 - Tritium PURGE							72		
						FROM CYCLONE							
											73		
											74		
											75		
											76		
											77		Less GRAVEL @ ~77-79' - cuttings;
											78		
											79		
									Grout	PVC			
80.0 - SVS-008			50+	24	24	fair to good					80		Silty SAND (SM); lt. brn; Moist; V. DENSE;
SP-80.0			50+	80.00 - Gamma Spec									25-30% Silt; ~5% Clay; ~20% SA, SR
			50+	80.5 - TAL; SVOCS					VOCLAY	5" ϕ BLANK	81		ls pbls to 2"ϕ; MOD. EST. IK;
			50+	81.0 - 8240									
			50+	81.50 - Tritium							82		
											83		
											84		
											85		
											86		
											87		
											88		ls pbls to 3"ϕ - cuttings; 88'-90';
											89		
											90		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
90.0 - SVS-009			50+	24	24	fair							LARGE ls cobble, broken; est. 3"ϕ+
SP-90.0			50+	90.0 - 90.5		GAMMA Spec TAL Metals		Grab from cyclone					@ 90 ft;
SVS-300 ppb			50+	91.0 - 91.5		Tritium - 8270					91		SANDY GRAVEL (GP); brn to grey-brn; MOIST; V. DENSE; 25-30% VFG to CG SAND w/ MICA; ~10% FINES; SR,
			50+	91.75 - 8260							92		SA ls pbls to 2"ϕ+; MOD. to high
											93		est. ik;
											94		
											95		
											96		~96' - little to no GRAVEL in cuttings
											97		
											98		
											99		
100.0 SVS-010			50+	24	24	Good			NEAT CEMENT GROUT	5"ϕ BLANK PVC	100		Silty SAND (SM); lt to yellow-brn; MOIST;
SP-100.0			50+	100.00 - 100.25		8260 8240					101		V. DENSE; 15-25% SiH; ~10% Clay; VFG
			50+	100.50 - 101.00		Tritium SVOCS; Metals							to MG SAND, locally CG; minor SR ls
			50+	101.500 -		Gamma Spec					102		pbls to 1/2"ϕ; low est. ik
											103		
											104		
											105		
											106		
											107		~107 to 120' increased clay content;
											108		
											109		
											110		

TD=100 ft
2/1/95; 16:51

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
											111		
											112		
											113		111-120 ft, ~5% SA is pbls est. to 1.5" ø;
											114		
											115		
											116		~116-117 - increased clay content;
											117		
											118		
											119		
120.0 - SVS-11			50+	12	9	FAIR			VOLCLAY Grout	5" ø BLANK PVC	120		Clayey SAND (SC); brn; moist; 20-25% Clay; 15-20% Silt; VFG to MG SAND; micaceous; v. low est IK; < 2% SR SA is pbls;
SP-120.5			50+										
				120.5 - B2.40 120.0 - Tritium							121		
											122		
											123		
											124		
											125		
											126		
											127		
											128		
											129		
											130		

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
													Project/ADS No.: Borehole/Well No.: TA5-MW-01
													Notes:
											121		
											122		
											123		
											124		
											125		
											126		
											127	?	~127 - Silty SAND (SM); lt. to yellow-brn, moist; 10-20% Silt; ~5% Clay; ~5% SR, ANG ls pbls to 1"ø estimated; MICACEOUS; VFG to MG SAND; low. to mod? est. IK;
											128		
											129		
											130		
											131		
											132		
											133		
											134		
											135		
											136		~136-137 - Silty/Sandy Gravel or Gravelly Silt - cuttings
											137		
											138		
											139		
											140		

Annulus/Seal: GROUT (NOVOLAY)

Casing/Screen: 5"ø BLANK PVC

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Depth in Feet	Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Stratigraphy Contacts	Notes
140.0	SVS-012		↓	50+	12	6	fair						GRAVELLY SAND (SM); brn to lt. brn;
	SP-140.0			50+	140.0 – Tritium 140.25 – 8240								moist; v. DENSE; 20-30% SR, SA
141													pbls, ls, fdspr, to 3/4"ϕ avg.; VFG to
@ 140 ft = .7 ppm from exhaust;													locally CG SAND; MICACEOUS; 15-20%
142													Fines (Silt & Clay); low est. (K);
0 to .2 in breathing zone from exhaust;													
143													
.7 to .9 ppm in drill rod – 0.0 to 0.2													
when away 6 in. from rod													
144													
SVS-012 = .7 ppm													
145													
146													
147													
148													
149													
150										VOLCLAY GROUT	5" ϕ BLANK PVC		
151													
152													
153													
154													
155													~155 – 156 – minor GRAVEL w/ SAND;
156													cuttings
157													
158													
159													
160													

Project/ADS No.:

Borehole/Well No.: TAS-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
160.0 - SVS-013			50+	18	15	Fair-good						~155	Silty SAND (SM); brn, moist; V. DENSE;
SP-160.0			50+	160.00 - Metals 160.50 - Tritium									15-25% Silt; ~5-10% Clay; 10-20%
			50+	~~160.95 - 8240~~ 161.00 - 8200 - onsite lab							161		SR, SA ls pbls to 1.5" ϕ; VFG to CG
											162		SAND, generally Mg-micaceous; low
Tube may have been reused during SVS sampling - NO VOCs detected													to MOD.? est. 1K;
											163		
											164		
											165		
											166		
											167		
											168		
											169		
											170		~BELOW 170': ~2% Clay; 15-20% Silt;
									Volclay Grout	5" ϕ BLANK PVC	171		VFG to CG SAND w/ ls, fdspr grains;
													MOD. EST. 1K; ~5-10% SR, ANG ls pbls to
											172		1 1/4" ϕ;
											173		
											174		
											175		
											176		
											177		
											178		
											179		
180.00 - SVS-014											180		

Project/ADS No.:

Borehole/Well No.: TAS-MW-01

Notes:

Depth in Feet	Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Stratigraphy Contacts	Notes
180.0	SVS-014 (600 ppb)	SP-180.00		50+	18	15	Good/Fair						5-10% Clay; 15-25% Silt; VFG to MG SAND; v. low to low est. 1K; 25% is v. FG SAND; micaceous;
				50+	180.25- 8260								
					180.50- Tritium								
181				50+	181.00- 8240								
					181.25- 8270								
182													
													TD=180 @ 14:08; 2-2-95
183													
184													
185													
186													
187													
188													
189													
190													
191													
192													
193												2-	(Still in silty SAND - NO GRAVEL LENSES) ~193-200' - VFG to FG SAND; MICACEOUS; 15-25% Silt; ~5% Clay; <1% SR, SA 1s pbls to 1/2" ϕ; low est. 1K;
194													
195													
196													
197													
198													
199													
200													

Well Annulus/Seal: VOLCLAY GROUT

Well Casing/Screen: 5" ϕ BLANK PVC

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

TD. @ 2/2/94, 15:21

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes:
200.00-SV5-015			50+	12	9	fair	good						<5% CLAY;
SP- 200.00			50+	200.25- 200.50-	8240 Tritium								
800 ppb on SV5-015											201		
											202		
				11.5" ϕ DRIVE CASING TO 200 FT, INSTALL 9" ϕ ~~DRIVE CASING INSIDE~~ & switch to 8 5/8" bit							203		
											204	?	~204 - GRAVELLY SAND (SM); DK brn to brn; DRY; DENSE to v. DENSE (est.); 20-25% SR + SA 1s pbls, FELDSPAR to 1" ϕ; 15-20% Silt; ~5% Clay; MOD. to HIGH EST. IK
											205		
											206		
											207		
											208		
											209		
									GROUT	PVC BLANK	210		
									VOLCLAY	5" ϕ	211		
											212		
											213		
											214		
											215		~215- little to no gravels;
											216		
											217		
											218		
											219		
											220		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
220.0- SVS-016			50+	18	15	good							~215- Silty SAND (SM), yellow-brn; dry to moist; v. dense; 10-15% Silt; ~2% Clay; VFG to MG SAND w/ mica; <1% SA, SR ls pbls to 1/4" ø; mod. est. lk;
SP-220.0			50+	220.5-221.0	87	Tritium 40							
			50+	221.25-		8260	-onsite				221		
SVS-800		PPb	UCCS								222		
											223		
											224		
											225		
											226		
											227		
											228		
											229		
									VOLCLAY Grout	5' ø BLANK PVC	230		~230 to 240- VFG to VCG SAND; ~5% SR, SA ls pbls, qtz + feldspar minor; 2-5% Clay; 10-20% Silt, low to mod. est. lk;
											231		
											232		
											233		
											234		
											235		
											236		
											237		
											238		increase in Silt + Clay ~ 237-238' cuttings
											239		
											240		

Project/ADS No.:	Borehole/Well No.: TA5-NW-01
Notes:	

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
240.0- SVS-	017		50	18	15	Good-	Fair						-237.5- 15-25% Silt; 5-10% Clay;
SP-	240.0		50	240.25-7		Tritium							VFG to locally MG SAND; MICACEOUS;
			50+	240.75-8	240						241		low to MOD.? EST. 1K; little to NO pbls;
				241.00-	TAL	METALS							
SVS=	500 ppb										242		
											243		
											244		244-260- SMOOTH Drilling in SAND - NO NEED to DRIVE CASING;
											245		change to 10-15% SiH; <5% Clay; <1% SR 1s pbls to 1/8" ϕ; poorly graded;
											246		MOD. to HIGH EST. 1K;
											247		
											248		
											249		
									VOLCAN TUFF	5" PVC BLANK	250		
											251		
											252		
											253		
											254		Cuttings still dry-no sign of water;
											255		
											256		
											257		
											258		
											259		
											260		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

TD=260, 15:03, 2-6-95

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
260.0 - SVS-018			50	18	12								260-260' - moist w/ SR ls, dark mafic
SP-260.0			50-	~62.3 - Tritium 260.50 - 9240 260.75 - 8240 - onsite									rock frags. to 3"ø in cuttings;
SVS = 500 ppb											261		
											262		
											263		
											264		
											265		
											266		
											267		
											268		
											269		
									VOLCLAY grout	5"ø BLANK PVC	270		Minor ls. mafic rocks to 2.5"ø ~ 270'; still a moist silty SAND;
											271		
											272		
											273		
											274		
											275		
											276		
											277		
											278		
											279		~below 279 - VFG to FG SAND w/ 10-20% Silt; Dry; very powdery
											280		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
280.0 - SVS - 01T			50+	12	0	—							NO SAMPLES RECOVERED AFTER SEVERAL
- SVS - 01d													tries in 45 mins.; V. DENSE; Drill
SP - 280.0			50+								281		AHEAD to 300 ft;
SVX - 01 - 280.0			—										
											282		- Collect two active SVS
													- collect 1 Petrex tube (in borehole
											283		overnight - 15 hrs)
											284		
											285		
											286		
											287		
											288		288-300: VFG to locally MG & CG
											289		SAND; MICACEOUS;
									VOLCLAY GROUT	5" ϕ BLANK PVC	290		
											291		
											292	?	292 - SANDY Silt (ML); brn; dry; v. stiff; 30-40% VFG to MG SAND; ~15% Clay; <1% SR pbls; low EST. IK; pbls to 1" ϕ;
											293		
											294		
											295		
											296		
											297		
											298		
											299		
											300		

2/4
7/2/2000
16:32

Project/ADS No.:

Borehole/Well No.: TA5-MW01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
300.0 - SVS-020			50	18	9	Good							RATE SR 1s pbls (<1%) to 1.5"ϕ,
SP-300.0			50										
SP-300.75			50+	12	6	Good					301		
				300.0 - Tritium									
				300.50 - 8240							302		
				301.00 - 8260 - onsite									
				301.25 - 8VOCS									
											303		
											304		
											305	?	Silty SAND (SM); ill bin; dry to moist; V. DENSE?; 25-35% Silt; 5-10% Clay; ~5% SA, SR 1s pbls to 1"ϕ; low est. K
											306		
											307		
											308		
									Grout	PVC	309		
											310		
									Volclay	5"ϕ Blank	311		
											312		
											313		
											314		313-320 - RATE 1s pbls to 2"ϕ;
											315		
											316		
											317		
											318		
											319		
											320		

Project/ADS No.:

Borehole/Well No.: TA5-MW 01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts
320.0 SVS-021			50	18	15	Good						
				320.25-TAL METALS								
SP	320.0		50	320.75-8240								
SVS	initially		50+	321.00-Tritium							321	
went	to 2.4 ppm										322	
then	leveled to		400	ppb								
											323	?
											324	
											325	
											326	
											327	
											328	
											329	
									VOL CLAY grout	5" ϕ BLANK P/C	330	
											331	?
											332	
											333	
											334	
											335	
											336	
											337	
											338	
											339	
											340	

~323-SANDY SILT(ML); brn; Dry; stiff; 30-40% VFG SAND; ~10% Clay; V. Low Est. 1K

320-SVS tubing stuck-remove AND replace w/ 500 ft of NEW tubing

~331 - GRAVELLY SAND (SM); brn to DK brn; moist; V. DENSE; 20-30% SR SA ls, qtz, fdspr pbls to 1" ϕ; 15-25% Silt <1% Clay; VFG to CG SAND; low Est. 1K;

Minor GRAVEL; more silt in cuttings;

Project/ADS No.:	Borehole/Well No.: TA5-MW-01
Notes:	

2-7-95; 13:06 TD = 340'

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
340.0 - SVS-022			50	18	18	Good							Silty SAND (SM) lt. brn M.D. - V. DENSE
SP-340		.0	50	340.00-340.50		Grain Size		Wal-onsite			341		30-35% Silt; ~5-10% Clay; RARE SR SA 1s
			50+	341.00-341.25		8240							pbls to ½"ø (<1%); VFG to MG SAND -
8001	1K ppb or		SVS	PID		8260 - onsite					342		locally; CG; low est. ik; ~338
340.0 - volumetric				moisture		content:		20%			343		
											344		
											345		
											346		
											347		
											348		~346 to about 353: 2-5% SR, SA 1s,
											349		feldspar, mafic pbls to 1.5"ø; CG
									Volclay Grout	5"ø Blank PVC	350		SAND ALSO present;
											351		
											352		
											353		
											354		
											355		
											356		
											357		
											358		
											359		
											360		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
360.0 - SVS-023			50	15	12	Good							20-30% Silt; ~10% Clay. VFG to
				360.00 - Tritium									locally MG SAND; still moist - NO
SP-360.00			50+	360.50 - 8240									WATER THOUGH;
				360.75 - Grain Size Analysis - onsite							361		@ 360 - locally a SANDY Silt (ML); brn;
											362		Dry to moist; stiff; 40-50% VFG
											363		SAND to MG; ~10% Clay; V. LOW EST. IK;
											364		variable from 338 to ~370 ft but
													mainly Silty SAND;
											365		
											366		
											367		
											368		
											369		368 to about 375: ~2-4% Clay;
									VOLCANIC tuff	5" ϕ BLANK PVC	370		15-25% Silt; local CG SAND;
											371		
											372		
											373		
											374		
											375		
											376		
											377		
											378		
											379		
											380		

TD = ?
2-7-1
15:18

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes:
380.00 SVS-024			50	18	15	Good							Silty Sand (SM) - moist to saturated;
SP-380.00			50	380.25-Trocum 380.75-8240							381		[illegible] - Slough back down hole - No
			50										moisture. Drill [illegible]
				381.00-8260-onsite							382		[illegible]
				380.00: Grain Size Analysis - onsite									5:15; 2-7-95 - checked for WL - no
* 380.0 - VOL. Moisture content: 35%											383		reading from meter
													@ 380' - 25-30% Silt; 20-25% Clay; VFG to
											384		MG Sand; V. loose est. IK;
											385		Saturated @ 380 but not producing
													water
											386		
											387		
											388		
											389		
													TD = 390.0
											390		CK WL on 2/8/95; 7:28 am after 14 hrs - 16' 35 2-7-95
													no water; blow through drill rods at
											391		390 - no water
									VOLCLAY Grout	5" 6 Blank P/C			
											392	?	Gravelly Sand (SM); bm; moist; v.
													dense; 20-25% Sil, SA pbls to 1.25";
											393		[illegible] Tuff; VFG to CG Sand, Mod. Cd.
													IK;
											394		
											395		
											396		
											397		Finer-grained materials
											398		
													TD = 400; no water; samples continue to
											399		drill
											400		

Project/ADS No.:

Borehole/Well No.: TAS-MW 01

Page 2 of 28

Project/ADS No.:

Borehole/Well No.: TA15-MW01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
400.0- SVS-005			50	18	18	Good							Hammer stuck @ 400 ft - [illegible]
SP 400.00			50	400.0 - Tritium 400.50 - TAL METALS/SVOCs									Line broken;
			50+	400.75 - 92240 401.00 - 82260 401.25 - Speciation analysis - onsite							4/1		~397 - Sandy Silt (ML); lt brn; dry to
											4/2		moist; v. stiff to stiff; VFG to FG/MG
													Sand; 10-15% Clay; v. low est. IK; 2%
401.25 - VOL. WATER CONTENT: 21%											4/3		SR, SA ls pbls to 1/2" ϕ
											4/4		
											4/5		
											4/6		~406 - Silty Sand (SM); brn; moist;
											4/7		Dense; 20-25% Silt; ~5% Clay; VFG to
											4/8		CG Sand; SA ls, mafic, qtz, fspar pbls
											4/9		to 3/4" ϕ; low to mod? est. IK;
									Volclay Grout	15' Blank Pipe	4/10		
											4/11		Clayey Silt (ML); lt. brn; moist; v.
											4/12		stiff to stiff; 10-20% Clay; 5-15% VFG
													to FG Sand; Rare SA ls pbls to 1.25" ϕ
											4/13		(<1%); v. low est. IK
											4/14		
											4/15		~415 - 14:05; 2-8-95 - Drill bit "plugged"
											4/16		as soon as we got into clay;
											4/17		
											4/18		Minor clay in cuttings ~418;
											4/19		
											4/20		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
420.0 - SVS-026			50	18	9	Good							Silty SAND (SM); lt brn; Dry; v DENSE;
				420.00 - Tuffum									
SP-420.00			50	420.50 - 82.40							421		20-35% Silt; ~5% Clay; VFG - FG SAND;
													MICACEOUS; low est IK to v. low; <1% SR
											422		ls pbls to 1/2"ϕ;
											423		
											424		
											425		
											426		~425-437: Rare SR, SA ls, mafic
													pbls to 1.5"ϕ;
											427		
											428		
											429		
											430		~429 - SANDY SILT (ML); lt brn to yel-brn; v. stiff to stiff; 40-45% VFG to MG
											431		SAND; ~5% CLAY; V. LOW EST. IK;
											432		
											433		
											434		
											435		
											436		MORE SAND;
											437		
											438		
											439		
											440		

NOCLAY GROUT

5"ϕ BLANK PVC

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
440.0 - SV5-027			50	18	9								Silty SAND (SM); lt. brn; dry to moist;
SP-440.0			50	440.0 - Tritium 440.0 - 8240							441		v. DENSE; 25-35% Silt; 5-15% clay; <2%
													SR, SA 1s pbls to 3/4"ϕ; VFG to FG SAND-
											442		locally MG; v. LOW to LOW EST. IK;
											443		
											444		
											445		
											446		
											447		
											448		
											449	?	SANDY Silt (ML); lt. brn; moist; stiff;
									VOLCLAY GROUT	5"ϕ BLANK PVC	450		25-35% VFG to FG SAND; 15-20% Clay;
											451		v. LOW EST. IK; slight plasticity; <1% SR
											452		1s pbls to 3/4"ϕ (FINE GRAVELS)
											453		
											454		
											455		
											456		
											457		less clay, silt?; ~457'
											458		
											459		
											460		

Project/ADS No.:

Borehole/Well No.: TA5-1001-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts	Notes
460.0 SVS-028			50	18	12	GOOD							Silty SAND (SM), brn; dry to moist, DENSE to v. DENSE; 25-30% Silt; ~10% Clay; ~2% SR pbls to 3/4" ϕ; v. Low to Low Est. K;
SP-460.00		↓	50+	460.0 - Tritium 460.50-8240 460.75-moisture content; GS analysis							461		
									VOCLAY		462		
											463		
											464		
											465		
											466		
											467		
									BENTONITE		468		
											469		
										5" ϕ BLANK PVC	470		~470-480 - 15-20% Clay; 30% Silt; <2% SA pbls, ls. qtz. to 1/2" ϕ; low to MODERATE plasticity;
											471		
											472		
											473		
											474		
											475		
											476		
									0.100 SAND		477		CLAYEY/Silty;
											478		
											479		
											480		

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/Other	Depth in Feet	Stratigraphy Contacts	Notes
480.0 SVS-029			50	21	21	Good					SANDY SILT (ML); lt. brn; moist, stiff
SP-480.0			50	480.0 - Tritium 480.50 - TAL METALS / SVOCS					481		30-35% VFG to FG SAND; 10-20% Clay;
			50+	481.00 - 8240							V LOW EST. JK;
			50	481.25 - 8260 - onsite 481.50 - moisture content / GS analysis - onsite					482		
									483		
									484		
									485		~485-490 - v. stiff
									486		
									487		
									488		
									489		
490.0 SVS-030			50	18	18	Good			490		SATURATED ZONE FROM 491 to 491.5 2-9-95
SP-490.0			50	490.0 - Tritium 490.5 - 418.1 - TPH							~30% Silt; 15-20% Clay; VFG to FG
			50+	490.75 - 8260 491.0 - 8240 491.25 - GS and / Soil moisture content					491		SAND;
TPH 418.1									492		
									493		
									494		
									495		
									496		Bailed 150 gals; recovered
									497		2-24-95; 7:37; TD=507.5 (EST.); WL=498.6
											2-10-95; 7:39; WL=498.6 - MUD mostly; probably
									498		SEALED OFF FROM CASING; TD=500 ft
											GRAVELS / SANDY
									499		
									500		

Well Annulus/Seal: 0.100 SAND; 10/20 SAND

Well Casing/Screen: 5" ϕ BLANK PVC; 0.020 Slotted Screen

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts
500.0 SVS-030			50	18	18	Good						
				500.00 - Tritium								
SP-500.0			50	500.50 - 8260							501	
SVS-PID = 800 ppb			50+	500.75 - 8240								
				501.25 - GRAIN SIZE MOISTURE								
											502	
											503	
											504	
									10/20 SAND	0.020 SLOTTED	505	
											506	
											507	
											508	
											509	?
											510	
											511	
											512	
											513	
											514	
											515	
									SLOUGH		516	
											517	
											518	
											519	
											520	

Project/ADS No.:

Borehole/Well No.: TA5-MW-C

Notes:

500 ft - SATURATED; 2-9-95 - 17:21; TD 500 ft

~498 - Silty SAND (SM); brn; wet, v. DENSE; 20-25% Silt; ~10% Clay; 15-20% SA, SR, pbls of ls, RED Schist, mafics, qtz to 1½"ø; VFG to VCG SAND, MICACEOUS; low to MOD.? EST. IK;

500-510: variable silt/clay; SR pbls, SA, to 2" up to 20%;

SANDY GRAVEL (GP); lt brn to brn; wet; V. DENSE; 20-35% VFG to CG SAND; 5-10% Clay; 10-15% Silt; MICACEOUS SAND; SA, SR pbls to 3"ø + in cuttings of ls, qtz, RED Schist, MAFICS, FELDSPAR; MOD.? EST. IK;

~ making 1-3 gpm BASED ON Drill cuttings;

2-10-95; 10:01; TD=520

Lab Sample ID	Lab Analysis Requested	Sampler Type/Depth	Blows/ 6 Inch	Inches Driven	Inches Recovered	Sample Condition/RQD	Soil Vapor Concentration	Circ/Moisture/ Other	Well Annulus/Seal	Well Casing/Screen	Depth in Feet	Stratigraphy Contacts
											521	
											522	
											523	
											524	
											525	
											526	
											527	
											528	
											529	
											530	
											1	
											2	
											3	
											4	
											5	
											6	
											7	
											8	
											9	
											0	

Project/ADS No.:

Borehole/Well No.: TA5-MW-01

Notes:

2-10-95 10:01 TD = 520 ft

10:21; 2-10-95, WL = 499.8

10:31; 2-10-95 - WL = 503.7 - 4.5 = 499.2

10:56 - 2-10-95 - Pulled GW samples for 8010/8020 #2270 (WL = 499.1') TD = 520 ft

7:37; 2/24/95; Bailed GW samples for 8010/8020

15:44; 2-10-95, WL = 499.2; TD = 500 ft

1 PVC = 19.82 (25) = 495.5 = 515.3 = 515.9

1 19.82 0.020

- MATERIALS USED -

18 BAGS 10/20 SAND

4 BAGS 0.100 SAND

3 BAGS Bentonite Pellets (50 Lbs bags)

43 BAGS VOLCLAY

25 19.82-ft Long blank PVC

1 19.82-ft long 0.02 Slotted PVC

1 0.47-ft long screw-type end cap (bar-)

ANNEX 2-D
Active Soil-Vapor Results
Borehole TAV-BH-01
February 1995

(The "Estimated Quantity" column of the first page of the "Tentatively Identified Compounds" table is missing. This is a problem from the original laboratory report and cannot be corrected.)

Sandia National Laboratories

Albuquerque, New Mexico 87185-1132

date: March 27,1995

to: Lon Dawson, MS1347 (7582)

Richard

from: R. J. Kottenstette MS1132 (7584)

subject: TA 5-BH01 Seepage Pits, Soil Vapor Survey Results

Analyses for the first well of TA 5 seepage pits is completed. Enclosed you will find the analytical results reports, duplicate analysis reports, surrogate recovery reports, tentatively identified compounds (TICs) reports, and all of the raw data associated with each sample analysis. The raw data package, including the tune report, consists of the quantitation and area summaries, chromatograms, and TIC ion spectra.

Soil vapor samples collected in 500 ml glass bulbs were received over a period of seven days and analyzed within twenty four hours of receipt. The analytical instrument (GC/MS) was calibrated according to EPA SW-846 8260 methodology. The instrument passed all quality control criteria (bromofluorobenzene tune, system performance check compounds, and calibration check compounds) without alteration of initial calibration mass spectrometer parameters.

Target analytes detected below the method detection limit were quantified and given a "UC" qualifier. "UC" indicates an estimated value below the method detection limit (MDL). Target analytes detected in both the method blank and the soil gas samples are quantified and given a "B" qualifier. A "B" indicates the presence of an analyte at any detectable concentration up to ten times the amount of analyte found in the blank. A "B" qualifier also indicates that the presence of the analyte may be due to laboratory contamination. A "J" indicates that the analyte was detected in the sample at a concentration above the method detection limit but at a concentration less than ten times the MDL.

The National Bureau of Standards organic compound library was used to attempt to identify chromatographic peaks appearing on each sample chromatogram that were not target compounds or quality control compounds. These TICs are listed in the attached tables.

Generally TICs that have spectral matches less than 80% are not reported, however, several samples in this data set appeared to contain fuel "artifacts" that were included because of their branched chain structures. Seven samples contained 4-hydroxy-4-methyl-2-pentanone with spectral matches ranging from 47% to 83%. An extracted ion specta of the four major ions for this compound was compared to the sample spetra for that peak. All of the major ions in the library spectrum were in fact present in the sample spectrum. This is very good evidence that the compound is 4-hydroxy-4-methyl-2-pentanone. Subsequent analysis has determined that this compound is a lab contaminant from ink used to identify the tenax traps used in the analysis. This type of marking will no longer be used.

From 10 to 200 feet, the samples contained alcohols, ketones, aldehydes, and aliphatic hydrocarbons. These compounds are typically found in paint products. From 200 to 500 feet, these compounds were less prevalent and contained more branched alkanes which I have called fuel "artifacts". Only one sample (008-080) was found to have a significant quantity of TCE.

Analysis of the thread lubricant used in the drilling process yielded very minute quantities of 2-butanone, Hexanal, Xylene, carboxylic acid, and Phenol. With the exception of the carboxylic acid, these compounds were found in the samples, mostly at higher levels. The apperance of these compounds in the samples could be due to equipment contamination.

ANALYTICAL RESULTS

LTS
TA5
SEEPAGE PITS
SOIL VAPOR SURVEY

Project Name	TCE PLUME	Case Number	3624.300
Task Leader	Lon Dawson		
Date of Analysis	1/31/95		

Sample Identification	Method Blank	Qualifier	TA5-SVS-001-010.0	Qualifier	TA5-SVS-002-020.0	Qualifier	Method Blank	Qualifier		Qualifier
Compound	ppbv		ppbv		ppbv		ppbv		ppbv	
	1/31/95		1/31/95		1/31/95		2/1/95			
Chloroform	U		U		U		U			
1,1,1-trichloroethane	U		U		U		U			
Carbon tetrachloride	U		U		U		U			
Benzene	U		5	UC	1	UC	U			
1,2-dichloroethane	U		U		U		U			
Trichloroethene	0.7	UC	U		U		U			
1,2-dichloropropane	U		U		U		U			
Bromodichloromethane	0.2	UC	U		U		U			
cis-1,3-dichloropropene	U		U		U		U			
Toluene	1.5	UC	10	J,B	2	UC,B	U			
trans-1,3-dichloropropene	U		U		U		U			
1,1,2-trichloroethane	0.2	UC	U		U		0.4	UC		
Tetrachloroethene	0.2	UC	0.2	UC,B	U		U			
Dibromochloromethane	0.2	UC	U		U		U			
Chlorobenzene	1.8	UC	U		U		U			
Ethyl benzene	1	UC	76		4	UC,B	U			
Xylene	1.2	UC	140		12		U			
Bromoform	0.3	UC	U		U		U			
1,1,2,2-tetrachloroethane	0.8	UC	0.2	UC,B	U		0.1	UC		

Definitions

B- The constituent was found in the method blank. Positive results within ten times the amount in blank may be due to lab contamination.
UC- The constituent was analyzed for, but was not detected above the method detection limit.
U - The constituent was not detected.
ppbv- parts per billion by volume

RESULTS
TA5
SEEPAGE PITS
SOIL VAPOR SURVEY

Project Name	TCE PLUME								Case Number		3624.300
Task Leader	Lon Dawson										
Date of Analysis	2/1/95		2/1/95		2/1/95		2/1/95		2/1/95		
Sample Identification	TA5-SVS-004-040.0	Qualifier	TA5-SVS-005-050.0	Qualifier	TA5-SVS-006-060.0	Qualifier	TA5-SVS-007-070.0	Qualifier	TA5-SVS-008-080.0	Qualifier	
Compound	ppbv		ppbv		ppbv		ppbv		ppbv		
Chloroform	U		U		U		U		U		
1,1,1-trichloroethane	U		U		U		U		U		
Carbon tetrachloride	U		U		U		U		U		
Benzene	U		U		5	UC	21	UC	0.6	UC	
1,2-dichloroethane	U		U		U		U		U		
Trichloroethene	U		U		0.1	UC	0.6	UC	44		
1,2-dichloropropane	U		U		U		U		U		
Bromodichloromethane	U		U		U		U		U		
cis-1,3-dichloropropene	U		U		U		U		U		
Toluene	U		U		4	UC	26		0.7	UC	
trans-1,3-dichloropropene	U		U		U		U		U		
1,1,2-trichloroethane	0.2	UC,B	0.4	UC,B	U		9	J	0.6	UC,B	
Tetrachloroethene	U		U		0.1	UC	0.1	UC	4	J	
Dibromochloromethane	U		U		U		U		U		
Chlorobenzene	U		U		U		U		U		
Ethyl benzene	U		3	UC	1	UC	3	UC	1	UC	
Xylene	0.5	UC	1	UC	2	UC	0.7	UC	0.3	UC	
Bromoform	U		U		U		U		U		
1,1,2,2-tetrachloroethane	0.1	UC,B	U		U		U		U		

Definitions

B- The constituent was found in the method blank. Positive results within ten times the amount in blank may be due to lab contamination.
UC- The constituent was analyzed for, but was not detected above the method detection limit.
U - The constituent was not detected.
ppbv- parts per billion by volume
J- The constituent was found in the sample at a concentration less than ten times the method detection limit

RESULTS
TA5
SEEPAGE PITS
SOIL VAPOR SURVEY

Project Name	TCE PLUME							Case Number		3624.300
Task Leader	Lon Dawson									
Date of Analysis	2/1/95		2/2/95		2/2/95		2/2/95		2/2/95	
Sample Identification	TA5-SVS-009A-090.0	Qualifier	Method Blank	Qualifier	TA5-SVS-009B-090.0	Qualifier	TA5-SVS-010-100.0	Qualifier	TA5-SVS-011-120.0	Qualifier
Compound	ppbv		ppbv		ppbv		ppbv		ppbv	
Chloroform	U		U		U		U		U	
1,1,1-trichloroethane	U		U		U		0.2	UC	U	
Carbon tetrachloride	U		U		U		U		U	
Benzene	3	UC	0.3	UC	2	UC,B	1	UC,B	6	UC,B
1,2-dichloroethane	U		U		U		U		U	
Trichloroethene	1	UC	U		0.7	UC	0.3	UC	U	
1,2-dichloropropane	U		0.2	UC	U		U		U	
Bromodichloromethane	U		0.1	UC	U		U		U	
cis-1,3-dichloropropene	U		U		U		U		0.6	UC
Toluene	9	UC	0.6	UC	9	UC,B	11	J,B	7	UC,B
trans-1,3-dichloropropene	U		U		U		U		U	
1,1,2-trichloroethane	U		0.3	UC	U		U		U	
Tetrachloroethene	U		0.2	UC	0.1	UC,B	0.1	UC,B	4	B,J
Dibromochloromethane	U		0.1	UC	U		U		U	
Chlorobenzene	U		0.7	UC	U		U		U	
Ethyl benzene	0.4	UC	0.7	UC	0.4	UC,B	0.5	UC,B	0.5	UC,B
Xylene	0.6	UC	0.8	UC	0.9	UC,B	0.6	UC,B	0.4	UC,B
Bromoform	U		0.3	UC	U		U		U	
1,1,2,2-tetrachloroethane	U		0.5	UC	U		U		U	

Definitions

B- The constituent was found in the method blank. Positive results within ten times the amount in blank may be due to lab contamination.

UC- The constituent was analyzed for, but was not detected above the method detection limit.

U - The constituent was not detected.

ppbv- parts per billion by volume

J- The constituent was found in the sample at a concentration less than ten times the method detection limit

RESULTS
TA5
SEEPAGE PITS

Project Name	TCE PLUME								Case Number	3624.300
Task Leader	Lon Dawson									
Date of Analysis	2/2/95		2/2/95		2/2/95		2/2/95		2/2/95	
Sample Identification	TA5-SVS-012-140.0	Qualifier	TA5-SVS-013-160.0	Qualifier	TA5-SVS-014-180.0	Qualifier	TA5-SVS-015-200.0	Qualifier	TA5-SVS-015-200DUP.0	Qualifier
Compound	ppbv		ppbv		ppbv		ppbv		ppbv	
Chloroform	U		U		U		U		0.1	UC
1,1,1-trichloroethane	U		U		0.2	UC	0.4	UC	0.7	UC
Carbon tetrachloride	U		U		U		U		U	
Benzene	5	UC,B	2	UC,B	4	UC,B	8	UC,B	8	UC,B
1,2-dichloroethane	U		U		U		U		U	
Trichloroethene	2	UC	U		4	UC	2	UC	2	UC
1,2-dichloropropane	U		0.1	UC,B	U		U		U	
Bromodichloromethane	U		U		U		U		U	
cis-1,3-dichloropropene	U		U		U		U		U	
Toluene	6	UC,B	2	UC,B	4	UC,B	7	UC,B	8	UC,B
trans-1,3-dichloropropene	U		U		U		U		U	
1,1,2-trichloroethane	U		0.2	UC,B	U		U		U	
Tetrachloroethene	0.1	UC,B	0.1	UC,B	0.2	UC,B	U		0.2	UC,B
Dibromochloromethane	U		U		U		U		U	
Chlorobenzene	U		U		U		U		U	
Ethyl benzene	2	UC,B	2	UC,B	1	UC,B	0.8	UC,B	1	UC,B
Xylene	2	UC,B	1	UC,B	2	UC,B	1	UC,B	2	UC,B
Bromoform	U		U		U		U		U	
1,1,2,2-tetrachloroethane	U		U		U		U		0.1	UC,B

Definitions

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U - The constituent was not detected.
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RESULTS
TA5
SEEPAGE PITS

Project Name TCE PLUME
Task Leader Lon Dawson
Date of Analysis 2/6/95

Case Number 3624.300

Sample Identification	Method Blank	Qualifier	TA5-SVS-016-220.0	Qualifier	Method Blank	Qualifier	TA5-SVS-019-280.0	Qualifier	TA5-SVS-019-280DUP.0	Qualifier
	2/6/95		2/6/95		2/7/95		2/7/95		2/7/95	
Compound	ppbv		ppbv		ppbv		ppbv		ppbv	
Chloroform	U		U		U		U		U	
1,1,1-trichloroethane	U		U		U		U		0.3	UC
Carbon tetrachloride	U		U		0.2	UC	U		U	
Benzene	0.8	UC	8	UC,B	1	UC	U		0.8	UC,B
1,2-dichloroethane	U		U		U		U		U	
Trichloroethene	0.3	UC	0.7	UC,B	0.3	UC	1	UC,B	0.6	UC,B
1,2-dichloropropane	U		U		0.3	UC	U		U	
Bromodichloromethane	U		U		0.3	UC	U		U	
cis-1,3-dichloropropene	U		U		U		U		U	
Toluene	2	UC	17	B	2	UC	15	B	14	B
trans-1,3-dichloropropene	U		U		U		U		U	
1,1,2-trichloroethane	U		U		0.7	UC	U		U	
Tetrachloroethene	U		U		0.5	UC	U		U	
Dibromochloromethane	U		U		0.3	UC	U		U	
Chlorobenzene	0.5	UC	U		1		U		U	
Ethyl benzene	0.7	UC	2	UC,B	2	UC	2	UC,B	1	UC,B
Xylene	0.6	UC	U		2	UC	3	UC,B	2	UC,B
Bromoform	U		U		0.4	UC	U		U	
1,1,2,2-tetrachloroethane	0.2	UC	0.1	UC,B	U	UC	0.2	should be U, C	0.1	UC,B

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RESULTS
TA5
SEEPAGE PITS

Project Name	TCE PLUME								Case Number	3624.300
Task Leader	Lon Dawson									
Date of Analysis	2/7/95		2/7/95		2/7/95		2/7/95			
Sample Identification	TA5-SVS-020-300.0	Qualifier	TA5-SVS-021-320.0	Qualifier	TA5-SVS-022-340.0	Qualifier	TA5-SVS-023-360.0	Qualifier		Qualifier
Compound	ppbv		ppbv		ppbv		ppbv		ppbv	
Chloroform	U		U		U		U			
1,1,1-trichloroethane	U		0.3	UC	0.1	UC	0.4	UC		
Carbon tetrachloride	U		U		U		U			
Benzene	2	UC,B	1	UC,B	2	UC,B	1	UC,B		
1,2-dichloroethane	U		U		U		U			
Trichloroethene	U		0.4	UC,B	0.9	UC,B	0.5	UC,B		
1,2-dichloropropane	U		U		U		U			
Bromodichloromethane	U		U		U		U			
cis-1,3-dichloropropene	U		U		U		U			
Toluene	15	B	22	B	28	B	26	B		
trans-1,3-dichloropropene	U		U		U		U			
1,1,2-trichloroethane	U		U		U		U			
Tetrachloroethene	U		0.2	UC,B	0.3	UC,B	0.3	UC,B		
Dibromochloromethane	U		U		0.3	UC,B	U			
Chlorobenzene	U		U		U		U			
Ethyl benzene	2	UC,B	3	UC,B	2	UC,B	2	UC,B		
Xylene	3	UC,B	5	UC,B	4	UC,B	4	UC,B		
Bromoform	U		U		U		U			
1,1,2,2-tetrachloroethane	0.1	UC,B	0.2	UC,B	0.3	UC,B	0.2	UC,B		

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PI ARY
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SEEPAGE PITS

Project Name	TCE PLUME							Case Number	3624.300	
Task Leader	Lon Dawson									
Date of Analysis	2/8/95		2/8/95		2/8/95		2/8/95		2/8/95	
Sample Identification	Method Blank	Qualifier	TA5-SVS-026-400.0	Qualifier	TA5-SVS-026-420B.0	Qualifier	TA5-SVS-026-420.0	Qualifier	TA5-SVS-026-420DUP.0	Qualifier
Compound	ppbv		ppbv		ppbv		ppbv		ppbv	
Chloroform	0.6	UC	U		U		U		U	
1,1,1-trichloroethane	U		0.5	UC	U		0.5	UC	0.7	UC
Carbon tetrachloride	U		U		U		U		U	
Benzene	2	UC	1	UC,B	0.2	UC,B	2	UC,B	1	UC,B
1,2-dichloroethane	U		U		U		U		U	
Trichloroethene	0.6	UC	0.1	UC,B	U		U		U	
1,2-dichloropropane	1	UC	U		0.3	UC,B	U		U	
Bromodichloromethane	0.4	UC	U		U		U		U	
cis-1,3-dichloropropene	U		U		U		U		U	
Toluene	2	UC	26	J,B	0.6	UC,B	31	B	21	B
trans-1,3-dichloropropene	U		U		U		U		U	
1,1,2-trichloroethane	1	UC	U		0.1	UC,B	U		U	
Tetrachloroethene	0.7	UC	0.2	UC,B	U		U		U	
Dibromochloromethane	0.5	UC	U		U		U		U	
Chlorobenzene	2	UC	U		U		U		U	
Ethyl benzene	2	UC	2	UC,B	0.6	UC,B	6	B	1	UC,B
Xylene	3	UC	3	UC,B	0.3	UC,B	3	UC,B	2	UC,B
Bromoform	0.6	UC	U		U		U		U	
1,1,2,2-tetrachloroethane	2	UC	0.1	UC,B	U		U		0.1	UC,B

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RESULTS
TA5
SEEPAGE PITS

Project Name	TCE PLUME								Case Number		3624.300
Task Leader	Lon Dawson										
Date of Analysis	2/9/95		2/9/95		2/9/95		2/9/95		2/9/95		
Sample Identification	Method Blank	Qualifier	TA5-SVS-027-440	Qualifier	TA5-SVS-028-460	Qualifier	TA5-SVS-029-480.0	Qualifier	TA5-SVS-031-500	Qualifier	
Compound	ppbv		ppbv		ppbv		ppbv		ppbv		
Chloroform	U		U		U		U		U		
1,1,1-trichloroethane	U		U		U		2	UC	0.1	UC	
Carbon tetrachloride	3	UC	U		U		U		U		
Benzene	U		U		U		1	UC	2	UC	
1,2-dichloroethane	4	UC	U		U		U		U		
Trichloroethene	3	UC	U		U		U		U		
1,2-dichloropropane	4	UC	U		U		U		U		
Bromodichloromethane	3	UC	2	UC,B	U		U		U		
cis-1,3-dichloropropene	U		U		U		U		U		
Toluene	6	UC	31	J,B	17	J,B	25	J,B	20	J,B	
trans-1,3-dichloropropene	U		U		U		U		U		
1,1,2-trichloroethane	4	J	U		U		U		U		
Tetrachloroethene	2	UC	U		U		U		0.1	UC,B	
Dibromochloromethane	2	UC	U		U		U		U		
Chlorobenzene	4	UC	U		U		U		U		
Ethyl benzene	6	J	U		2	UC,B	2	UC,B	2	UC,B	
Xylene	7	J	2	UC,B	3	UC,B	2	UC,B	3	UC,B	
Bromoform	2	UC	U		U		U		U		
1,1,2,2-tetrachloroethane	5	J	0.1	UC,B	0.2	UC,B	0.1	UC,B	0.2	UC,B	

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TENTATIVELY IDENTIFIED
COMPOUNDS
TA Five
Seepage Pits
Final Report

Sample ID	Tentatively Identified Compound (TIC)	Match Quality
TA5-SVS-001-010.0	2-Butanol	96
TA5-SVS-001-010.0	2-Butanone	87
TA5-SVS-001-010.0	*1-Propanol	91
TA5-SVS-001-010.0	*1-Butanol	96
TA5-SVS-001-010.0	Butanal	93
TA5-SVS-001-010.0	*Methyl Isobutyl Ketone	87
TA5-SVS-001-010.0	Hexanal	93
TA5-SVS-001-010.0	Pentanal	72
TA5-SVS-001-010.0	*p-Xylene	95
TA5-SVS-002-020.0	*p-Xylene	97
TA5-SVS-002-020.0	Decanal	90
TA5-SVS-002-020.0	Hexanal	95
TA5-SVS-004-040.0	1-Butanol	91
TA5-SVS-004-040.0	Hexanal	94
TA5-SVS-004-040.0	#4-hydroxy-4-methyl-2-Pentanone	83
TA5-SVS-004-040.0	D-Limonene	96
TA5-SVS-005-050.0	**Hexanal	90
TA5-SVS-005-050.0	Heptanal	93
TA5-SVS-005-050.0	3-methyl-Hexadecane	64
TA5-SVS-005-050.0	Phenol	94

*TA5-SVS-001-010.0 Tics found in significant quantities
^TA5-SVS-002-020.0 Tics found in significant quantities
TA5-SVS-004-040 Tics found in significant quantities
** TA5-SVS-005-050 Tics found in significant quantities

TICS

TENTATIVELY IDENTIFIED
COMPOUNDS
TA Five
Seepage Pits
Final Report

Date of Analysis: 2/1/95

Sample ID	Tentatively Identified Compound (TIC)	Match Quality	Estimated Quantity
			ppbv
TA5-SVS-005-050.0	Hexanal	94	10 to 50
TA5-SVS-005-050.0	Heptanal	93	10 to 50
TA5-SVS-005-050.0	Phenol	94	1 to 10
TA5-SVS-006-060.0	Butanal	91	1 to 10
TA5-SVS-006-060.0	1-Butanol	76	1 to 10
TA5-SVS-006-060.0	Pentanal	83	1 to 10
TA5-SVS-006-060.0	Methyl Isobutyl Ketone	83	5 to 50
TA5-SVS-006-060.0	Hexanal	96	10 to 50
TA5-SVS-007-070.0	Hexene	90	1 to 5
TA5-SVS-007-070.0	Hexane	91	1 to 10
TA5-SVS-007-070.0	Butanal	91	1 to 5
TA5-SVS-007-070.0	Cyclohexane	90	1 to 5
TA5-SVS-007-070.0	Heptane	94	10 to 50
TA5-SVS-007-070.0	cis-1,3-dimethyl cyclohexane	93	1 to 10
TA5-SVS-007-070.0	Octane	87	1 to 10
TA5-SVS-007-070.0	Hexanal	95	10 to 50
TA5-SVS-007-070.0	4-hydroxy-4-methyl-2-Pentanone	47	5 to 50
TA5-SVS-007-070.0	Heptanal	90	1 to 10
TA5-SVS-008-080.0	1,1-dichloroethane	95	1 to5
TA5-SVS-008-080.0	1-Butanol	87	1 to 10
TA5-SVS-008-080.0	Hexanal	83	1 to 10
TA5-SVS-008-080.0	4-hydroxy-4-methyl-2-Pentanone	56	50 to 200
TA5-SVS-008-080.0	Nonanal	90	1 to 10
TA5-SVS-009A-090.0	1-Butanol	91	1 to 10
TA5-SVS-009A-090.0	Hexanal	94	5 to 50
TA5-SVS-009A-090.0	4-hydroxy-4-methyl-2-Pentanone	53	200 to 800
TA5-SVS-009A-090.0	Heptanal	90	1 to 20
TA5-SVS-009A-090.0	Nonanal	86	1 to 10

TENTATIVELY IDENTIFIED
COMPOUNDS
TA Five
Seepage Pits
Final Report

Date Of Analysis: 2/2/95

Sample ID	Tentatively Identified Compound (TIC)	Match Quality	Estimated Quantity
			ppbv
TA5-SVS-009B-090.0	Pentanal	87	1 to 5
TA5-SVS-009B-090.0	Hexanal	94	10 to 50
TA5-SVS-009B-090.0	Heptanal	90	1 to 10
TA5-SVS-009B-090.0	6-methyl-5-hepten-2-one	81	1 to 5
TA5-SVS-009B-090.0	Nonanal	90	1 to 5
TA5-SVS-010-100.0	Pentanal	87	1 to 5
TA5-SVS-010-100.0	Hexanal	94	10 to 50
TA5-SVS-010-100.0	Heptanal	90	1 to 10
TA5-SVS-010-100.0	Nonanal	86	1 to 10
TA5-SVS-011-120.0	Hexane	93	1 to 5
TA5-SVS-011-120.0	Pentanal	78	1 to 10
TA5-SVS-011-120.0	Hexanal	95	10 to 50
TA5-SVS-012-140.0	Butanal	91	1 to 5
TA5-SVS-012-140.0	Pentanal	83	1 to 5
TA5-SVS-012-140.0	Methyl Isobutyl Ketone	87	5 to 50
TA5-SVS-012-140.0	Hexanal	90	5 to 100
TA5-SVS-013-160.0	Hexanal	91	1 to 5
TA5-SVS-013-160.0	4-hydroxy-4-methyl-2-Pentanone	64	50 to 200
TA5-SVS-013-160.0	1-fluoro-Dodecane	80	1 to 10
TA5-SVS-014-180.0	Pentanal	78	1 to 10
TA5-SVS-014-180.0	Methyl Isobutyl Ketone	87	1 to 10
TA5-SVS-014-180.0	Hexanal	94	5 to 50
TA5-SVS-014-180.0	Heptanal	93	1 to 20
TA5-SVS-015-200.0	1-Hexene	90	1 to 5
TA5-SVS-015-200.0	Heptane	94	1 to 5
TA5-SVS-015-200.0	Pentanal	78	1 to 5
TA5-SVS-015-200.0	Methyl Isobutyl Ketone	80	1 to 10
TA5-SVS-015-200.0	Hexanal	94	5 to 50
TA5-SVS-015-200.0	Heptanal	86	1 to 10
TA5-SVS-015-200D.0	1-Hexene	90	1 to 5
TA5-SVS-015-200D.0	Heptane	94	1 to 5
TA5-SVS-015-200D.0	Methyl Cyclo Hexane	97	1 to 5
TA5-SVS-015-200D.0	Pentanal	83	2 to 10
TA5-SVS-015-200D.0	Methyl Isobutyl Ketone	80	1 to 10
TA5-SVS-015-200D.0	Octane	87	1 to 5
TA5-SVS-015-200D.0	Heptanal	91	1 to 5

TENTATIVELY IDENTIFIED
COMPOUNDS
TA Five
Seepage Pits
Final Report

Date of Analysis	Sample ID	Tentatively Identified Compound (TIC)	Match Quality	Estimated Quantity
				ppbv
2/6/95	TA5-SVS-016-220.0	1-methoxy-1-propene	84	1 to 5
	TA5-SVS-016-220.0	1-hexene	89	1 to 10
	TA5-SVS-016-220.0	hexane	91	5 to 50
	TA5-SVS-016-220.0	Butanal	95	1 to 10
	TA5-SVS-016-220.0	2-Butanone	72	1 to 10
	TA5-SVS-016-220.0	1-butanol	94	1 to 5
	TA5-SVS-016-220.0	Pentanal	78	10 to 50
	TA5-SVS-016-220.0	Methyl Isobutyl Ketone	91	10 to 100
	TA5-SVS-016-220.0	1-octene	95	1 to 10
	TA5-SVS-016-220.0	Octane	93	1 to 5
	TA5-SVS-016-220.0	Hexanal	94	50 to 200
	TA5-SVS-016-220.0	Decane	92	1 to 5
	TA5-SVS-016-220.0	4-hydroxy-4-methyl-2-Pentanone	72	50 to 200
	TA5-SVS-016-220.0	Fuel artifacts		1 ppm
2/7/95	TA5-SVS-019-280.0	Hexanal	94	5 to 50
	TA5-SVS-019-280.0	2-heptanone	87	1 to 5
	TA5-SVS-019-280.0	2,2,8-trimethyl decane	64	1 to 5
	TA5-SVS-019-280.0	2,2,6-trimethyl decane	53	50 to 200
	TA5-SVS-019-280.0	2,2,5-trimethyl decane	53	1 to 10
	TA5-SVS-019-280.0	Fuel artifacts		ppb
2/7/95	TA5-SVS-020-300.0	Hexanal	96	1 to 10
	TA5-SVS-020-300.0	2,2,8-trimethyl decane	94	5 to 50
	TA5-SVS-020-300.0	Undecane	93	1 to 5
	TA5-SVS-020-300.0	2,2,8-trimethyl decane	72	1 to 10
	TA5-SVS-020-300.0	3-ethyl-1-octene	89	10 to 50
	TA5-SVS-020-300.0	2,5-dimethyl dodecane	59	1 to 10
	TA5-SVS-020-300.0	Fuel artifacts	78	ppb
2/7/95	TA5-SVS-021-320.0	Pentanal	64	1 to 5
	TA5-SVS-021-320.0	Methyl Isobutyl Ketone	83	1 to 5
	TA5-SVS-021-320.0	Hexanal	87	1 to 10
	TA5-SVS-021-320.0	2-heptanone	83	1 to 5
	TA5-SVS-021-320.0	3-ethyl-1-octene	90	1 to 5
	TA5-SVS-021-320.0	Fuel artifacts	94	1 to 5 ppm
2/7/95	TA5-SVS-022-340.0	Hexanal	95	1 to 10
	TA5-SVS-022-340.0	4-hydroxy-4-methyl-2-pentanone	72	100 to 500
	TA5-SVS-022-340.0	2,2,8-trimethyl decane	80	1 to 10
	TA5-SVS-022-340.0	2,2,3-trimethyl decane	83	1 to 5
	TA5-SVS-022-340.0	3-methyl-5-propyl nonane	87	1 to 5
	TA5-SVS-022-340.0	Fuel artifacts	91	1 to 5 ppm
2/7/95	TA5-SVS-019-280dup	Hexanal	95	1 to 10
	TA5-SVS-019-280dup	Methyl Isobutyl Ketone	87	1 to 5
	TA5-SVS-019-280dup	3-ethyl-1-octene	87	1 to 5
	TA5-SVS-019-280dup	4,6-dimethyl undecane	83	10 to 20
	TA5-SVS-019-280dup	2,2,5-trimethyl decane	87	1 to 5
	TA5-SVS-019-280dup	Fuel artifacts	91	ppb

TENTATIVELY IDENTIFIED
COMPOUNDS
TA Five
Seepage Pits
Final Report

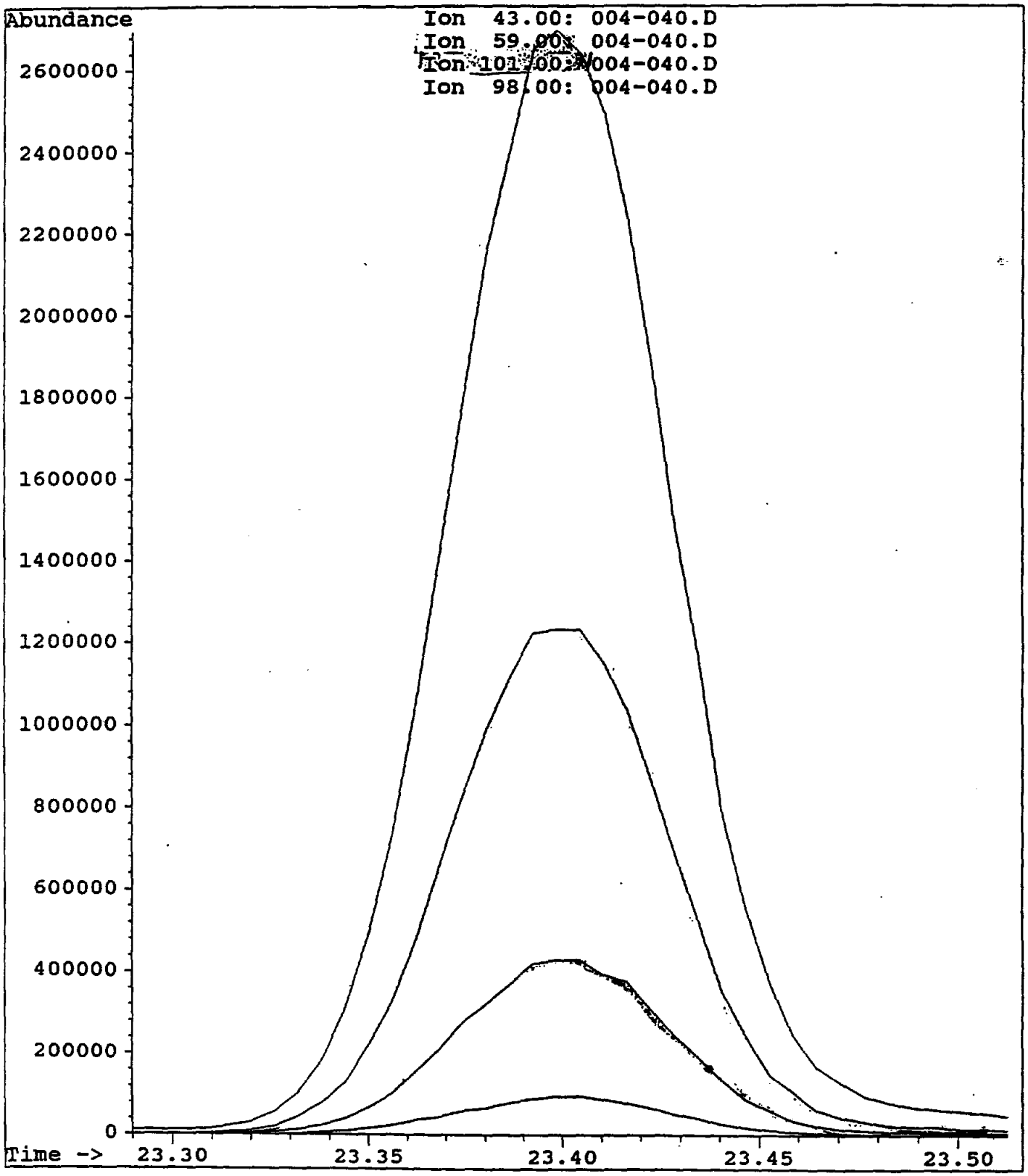
Date of Analysis	Sample ID	Tentatively Identified Compound (TIC)	Match Quality	Estimated Quantity
				ppbv
2/7/95	TA5-SVS-023-360.0	Pentanal	87	1 to 5
	TA5-SVS-023-360.0	Hexanal	95	10 to 50
	TA5-SVS-023-360.0	Fuel-old gasoline	91	1 to 5 ppm
2/8/95	TA5-SVS-025-400.0	Pentanal	80	1 to 5
	TA5-SVS-025-400.0	Hexanal	83	1 to 10
	TA5-SVS-025-400.0	3-ethyl-1-octene	90	1 to 5
	TA5-SVS-025-400.0	2,2,5-trimethyl hexane	64	10 to 50
	TA5-SVS-025-400.0	2,5,6-trimethyl octane	62	1 to 10
	TA5-SVS-025-400.0	hexadecane	72	1 to 10
2/8/95	TA5-SVS-026-420.0	Methyl Isobutyl Ketone	72	1 to 5
	TA5-SVS-026-420.0	Hexanal	96	50 to 200
	TA5-SVS-026-420.0	3-ethyl-1-octene	76	1 to 5
	TA5-SVS-026-420.0	2,2,8-trimethyl decane	78	10 to 50
	TA5-SVS-026-420.0	7,9-dimethyl hexadecane	83	1 to 10
	TA5-SVS-026-420.0	2,2,4,6,6-pentamethyl heptane	78	5 to 50
	TA5-SVS-026-420.0	hexadecane	72	50 to 100
2/8/95	TA5-SVS-026-420dup	3-methyl hexane	87	1 to 5
	TA5-SVS-026-420dup	Pentanal	86	1 to 5
	TA5-SVS-026-420dup	Methyl Isobutyl Ketone	72	1 to 5
	TA5-SVS-026-420dup	Hexanal	72	1 to 10
	TA5-SVS-026-420dup	3-ethyl-1-octene	93	1 to 10
	TA5-SVS-026-420dup	2,2,8-trimethyl decane	78	5 to 50

TENTATIVELY IDENTIFIED COMPOUNDS
TA Five
Seepage Pits
Final Report

Date of Analysis	Sample ID	Tentatively Identified Compound (TIC)	Match Quality	Estimated Quantity
				ppbv
2/9/95	TA5-SVS-027-440	2-Methyl-Hexane	80	1 to 5
	TA5-SVS-027-440	Pentanal	86	1 to 5
	TA5-SVS-027-440	Methyl Isobutyl Ketone	90	10 to 50
	TA5-SVS-027-440	Hexanal	87	10 to 40
	TA5-SVS-027-440	2,2,5,5-tetramethyl-Hexane	64	50 to 100
	TA5-SVS-027-440	2,4,6-trimethyl-Octane	64	40 to 75
2/9/95	TA5-SVS-028-460	Pentanal	87	1 to 5
	TA5-SVS-028-460	Hexanal	95	10 to 50
	TA5-SVS-028-460	2-Heptanone	83	1 to 10
	TA5-SVS-028-460	3-ethyl-1-Octene	93	1 to 10
	TA5-SVS-028-460	2,2,8-trimethyl decane	78	50 to 100
	TA5-SVS-028-460	6-propyl tridecane	90	1 to 5
	TA5-SVS-028-460	7,9 -dimethyl hexadecane	83	1 to 10
	TA5-SVS-028-460	2,5-dimethyl dodecane	72	50 to 100
	TA5-SVS-028-460	2,2,4,6,6-petamethyl heptane	78	10 to 50
	TA5-SVS-028-460	3,7-dimethyl noname	87	50 to 100
	TA5-SVS-028-460	Undecane	90	1 to 5
2/9/95	TA5-SVS-029-480	2,3-dimethyl pentane	93	1 to 10
	TA5-SVS-029-480	Pentanal	90	1 to 5
	TA5-SVS-029-480	Methyl Isobutyl Ketone	90	10 to 50
	TA5-SVS-029-480	Hexanal	91	1 to 10
	TA5-SVS-029-480	2,2,8-trimethyl decane	78	25 to 50
	TA5-SVS-029-480	3-methyl-5-propyl nonane	72	25 to 50
2/9/95	TA5-SVS-031-500	Pentanal	90	1 to 10
	TA5-SVS-031-500	Methyl Isobutyl Ketone	81	1 to 5
	TA5-SVS-031-500	Hexanal	90	10 to 50
	TA5-SVS-031-500	2,2,8-trimethyl decane	78	10 to 50
	TA5-SVS-031-500	2,2,5-trimethyl hexane	64	10 to 50
	TA5-SVS-031-500	Nonal	93	1 to 10
	TA5-SVS-031-500	Hexadecane	64	50 to 100

Data File: C:\CHEMPC\DATA\SCONGCMS\SOILVAPR.R\004-040.D
Date Acquired: 1 Feb 95 3:42 pm
Operator: MG
Sample Name: ta5svs004-040
Misc Info: ms00594

4-hydroxy-4-methyl-2-Pentanone



ANNEX 2-E
Monitoring well TAV-MW1 Construction Specifications

WELL DATABASE SUMMARY SHEET

Project Name:	TA5 SEEPAGE PITS	**Geo Location:**	TA5 SEEPAGE PITS
ER ADS #:	1306	**Well Completion Date:**	28-FEB-95
Well Name:	TAV-MW1	**Completion Zone:**	SILTY SAND
Owner Name:	SNL/NM	**Formation of Completion:**	SANTA FE GROUP
Date Drilling Started:	31-JAN-95	**Well Comment:**	WELL DEVELOPED 4/10/95 - 4/14/95. INSIDE FENCE TA-V
Drilling Contractor:	STEWART BROTHERS		
Drilling Method:	AIR CASING HAMMER W/CENTER BI		
Borehole Depth:	520		
Casing Depth:	509.5		

Survey Data

Survey Date: 13-APR-95

Surveyed By: GREINER INC.

State Plane Coordinates

(X) Easting: 414699.928

(Y) Northing: 1454667.5

Surveyed Elevations (FAMSL)

Protective Casing:	5436.204
Top of Inner Well Casing:	5435.136
Concrete Pad:	5432.535
Ground Surface:	5432.5

Calculated Depths and Elevations

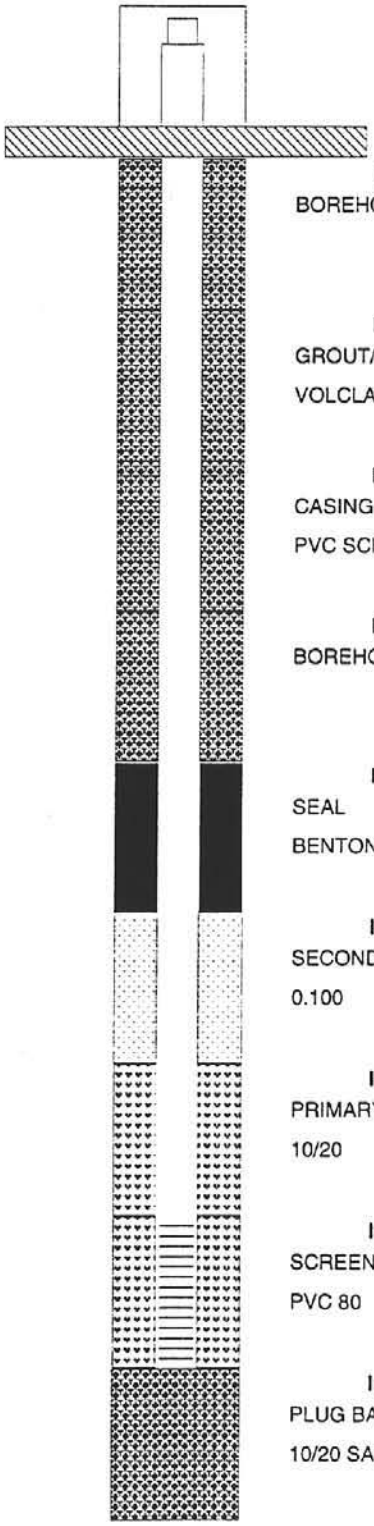
Initial Water Elevation: (FAMSL)	4935.34
Initial Depth To Water: (FBGS)	499.8

Last measured water level was **FASL**

measured on

Date Updated: 17-JUL-1995 13:46:46

Date Printed: 25-MAR-98



Completion Data Measured Depths (FBGS)

Casing Stickup: 3.7

Interval	Start	Stop		
BOREHOLE	0'	200'	O.D.	11.75"
Interval	**Start**	**Stop**		
GROUT/BACKFILL	0'	463'		
VOLCLAY GROUT				
Interval	**Start**	**Stop**		
CASING	0'	509.5'		
PVC SCH 80	I.D. 5"		O.D.	5.2"
Interval	**Start**	**Stop**		
BOREHOLE	200'	520'		
			O.D.	10.5"
Interval	**Start**	**Stop**		
SEAL	463'	474'		
BENTONITE POWDER				
Interval	**Start**	**Stop**		
SECONDARY PACK	474'	483.5'		
0.100				
Interval	**Start**	**Stop**		
PRIMARY PACK	483.5'	512.5'		
10/20				
Interval	**Start**	**Stop**		
SCREEN	489.5'	509.5'		
PVC 80				
			Slot Size	.02"
Interval	**Start**	**Stop**		
PLUG BACK	509.5'	520'		
10/20 SAND				

ANNEX 2-F
Target Analyte List (TAL) Metal Analytical Results
Borehole TAV-BH-01

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9 94)

PAGE 1 OF 1

AR/COC- 02598

Dept. No./Mail Stop: 7582/
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE PLUME
Record Center Code:
Logbook Ref No: N/A
SMO Reference No.: N/A

Date Samples Shipped: 2/3/95
Carrier/Waybill No.: A44832
Lab Contact: Ellen Le Riviere
Lab Destination: Quantera
SMO Contact/Phone: Pam Prissant
Send Report to SMO: Debra Constant

Contract No. 67-9736B
3617-300
Case No. ~~3824-300~~
SMO Authorization
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location — Tech Area V — Building 6588 — Room —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	TAL METALS (6010/7000)	SVOCS - 8270	VOCS - 8240						Lab Sample ID
✓ 021706-00	TA5-BH-01-21.00	21.00	NONE	1/31/95 12:01	soil	Steel Liner	250 ml	NONE	G	FSA			X					40440	01
✓ 021703-00	TA5-BH-01-20.50	20.50		12:01			500 ml				X	X							02
✓ 021708-00	TA5-BH-01-31.00	31.00		14:15			250 ml						X						03
✓ 021709-00	TA5-BH-01-30.50	30.50		14:15			500 ml				X	X							04
✓ 021715-00	TA5-BH-01-42.0	42.0		15:54			250 ml						X						05
✓ 021714-00	TA5-BH-01-41.5	41.5		15:54			500 ml				X	X							06
							~~[illegible]~~												
							~~[illegible]~~												

Parameter & Method Requested

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Sample Tracking: Date Entered (mm/dd/yy): Entered by:

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Turnaround Time ☒ Normal ☐ Rush Required Report Date QC inits.

Sample Team Members	Name	Signature	Init.	Company/Organization
	Michael WADE	Michael Wade	MW	Quantera/7582
	DON SCHOFIELD	Don Schofield	DOS	SNL/7584

1. Relinquished by	Michael Wade	Org. 7582	Date 1/31/95	Time 16:21	4. Relinquished by	John Rose	Org. 7576	Date 2/3/95	Time 1400
1. Received by	[illegible]	Org. 7584	Date 1/31/95	Time 16:21	4. Received by	[illegible]	Org.	Date 2/4/95	Time 800
2. Relinquished by	[illegible]	Org. 7584	Date 1/31/95	Time 17:00	5. Relinquished by		Org.	Date	Time
2. Received by	Don Schofield	Org. 7584	Date 2/1/95	Time 12:55	5. Received by		Org.	Date	Time
3. Relinquished by	Don Schofield	Org. 7584	Date 2/1/95	Time 13:28	6. Relinquished by		Org.	Date	Time
3. Received by	John Rose	Org. 7576	Date 2/1/95	Time 1328	6. Received by		Org.	Date	Time

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021703-00/TA5-BH-01-20.50
Lab ID: 040440-0002-SA
Matrix: SOIL Sampled: 31 JAN 95 Received: 04 FEB 95
Authorized: 05 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	5310	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	6.0	6010	07 FEB 95	08 FEB 95	
Arsenic	2.5	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Barium	46.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Beryllium	0.26	mg/kg	0.20	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	07 FEB 95	08 FEB 95	
Calcium	11400	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Chromium	6.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Cobalt	3.2	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Copper	4.9	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Iron	8580	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Lead	3.4	mg/kg	5.0	6010	07 FEB 95	08 FEB 95	J
Magnesium	2480	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Manganese	136	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Mercury	ND	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	
Nickel	6.0	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Potassium	1020	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Selenium	ND	mg/kg	0.85	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Sodium	ND	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Thallium	ND	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Vanadium	14.8	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Zinc	21.6	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021709-00/TA5-BH-01-30.50
Lab ID: 040440-0004-SA
Matrix: SOIL Sampled: 31 JAN 95 Received: 04 FEB 95
Authorized: 05 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	2800	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	12.0	6010	07 FEB 95	08 FEB 95	
Arsenic	1.5	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Barium	23.0	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Beryllium	ND	mg/kg	0.40	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Calcium	105000	mg/kg	40.0	6010	07 FEB 95	08 FEB 95	
Chromium	12.5	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Cobalt	2.4	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Copper	10.1	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Iron	7140	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Lead	ND	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Magnesium	2420	mg/kg	40.0	6010	07 FEB 95	08 FEB 95	
Manganese	183	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Mercury	0.048	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	J
Nickel	10.9	mg/kg	8.0	6010	07 FEB 95	08 FEB 95	
Potassium	421	mg/kg	1000	6010	07 FEB 95	08 FEB 95	J
Selenium	ND	mg/kg	0.50	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Sodium	ND	mg/kg	1000	6010	07 FEB 95	08 FEB 95	
Thallium	ND	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Vanadium	9.5	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Zinc	30.9	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory.
Client ID: 021714-00/TA5-BH-01-41.5
Lab ID: 040440-0006-SA
Matrix: SOIL Sampled: 31 JAN 95 Received: 04 FEB 95
Authorized: 05 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	3420	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	12.0	6010	07 FEB 95	08 FEB 95	
Arsenic	1.6	mg/kg	2.0	6010	07 FEB 95	07 FEB 95	J
Barium	59.0	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Beryllium	ND	mg/kg	0.40	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Calcium	113000	mg/kg	40.0	6010	07 FEB 95	08 FEB 95	
Chromium	15.5	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Cobalt	3.3	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Copper	5.2	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Iron	6610	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Lead	ND	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Magnesium	4080	mg/kg	40.0	6010	07 FEB 95	08 FEB 95	
Manganese	206	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Mercury	0.065	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	J
Nickel	10.7	mg/kg	8.0	6010	07 FEB 95	08 FEB 95	
Potassium	311	mg/kg	1000	6010	07 FEB 95	08 FEB 95	J
Selenium	ND	mg/kg	1.6	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Sodium	ND	mg/kg	1000	6010	07 FEB 95	08 FEB 95	
Thallium	ND	mg/kg	2.0	6010	07 FEB 95	07 FEB 95	
Vanadium	9.2	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Zinc	20.3	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9 94)

AR/COC- 02602

Dept. No./Mail Stop: 7582/
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-2-95
Carrier/Waybill No.: A4483
Lab Contact: Ellen LeRiviere
Lab Destination: Quanterra
SMO Contact/Phone: Pam Puissant
Send Report to SMO: Debra Constant

Contract No.: 67-9736-B
Case No.: 3617.300
SMO Authorization: [illegible]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area: V — Building: 6588 — Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	TAL Metals (6010/7000)	SVOCs (8270)	VOCs (8240)	MS/MSD							Lab Sample ID
✓ 02172 5 - 00	TA5-BH-01-61.0	61.0	—	2/1/95; 11:10	Soil	Steel Liner	250ml	none	G	SA	X										1
✓ 02172 0 - 00	TA5-BH-01-70.0	70.0	—	2/1/95; 11:51			500ml				X										2
✓ 02172 3 - 00	TA5-BH-01-81.0	81.0	—	2/1/95; 13:50			250ml						X	X							3 MS SD
✓ 02172 7 - 00	TA5-BH-01-80.50	80.50	—	2/1/95; 13:50			500ml				X	X		X							4 MS SD
✓ 02173 1 - 00	TA5-BH-01-91.75	91.75	—	2/1/95; 15:01			250ml						X								5
✓ 02173 2 - 00	TA5-BH-01-91.50	91.50	—	2/1/95; 15:00			250ml					X									6
✓ 02172 8 - 00	TA5-BH-01-90.50	90.50	—	2/1/95; 15:03			500ml				X										7
✓ 02173 3 - 00	TA5-BH-01-100.25	100.25	—	2/1/95; 16:31			250ml						X								8
✓ 02173 5 - 00	TA5-BH-01-101.00	101.00	—	2/1/95; 16:31			500ml				X	X									9

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy) — Entered by: — QC inits.

Special Instructions/QC Requirements: * FAX VOCs results to Lon Dawson @ 848-0417

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init.	Company/Organization
	MICHEAL WADE	[signature]	MW	Shulera 7582
	DON SCHOFIELD	[signature]	DS	SNL / 7584
	PAUL PRESHOWER	[signature]	PP	SNL / 7584

	Org.	Date	Time
1. Relinquished by	7584	2/2/95	11:45
1. Received by	SMO 7576	2/2/95	1145
2. Relinquished by	SMO 7576	2/2/95	1400
2. Received by Donna Lager	QESD	2/3/95	0830
3. Relinquished by			
3. Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021725-00/TA5-BH-01-61.0
Lab ID: 040417-0001-SA
Matrix: SOIL Sampled: 01 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	4600	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	6.0	6010	07 FEB 95	08 FEB 95	
Arsenic	2.6	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Barium	86.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Beryllium	0.26	mg/kg	0.20	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	07 FEB 95	08 FEB 95	
Calcium	40900	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Chromium	10.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Cobalt	3.7	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Copper	10.5	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Iron	9300	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Lead	46.2	mg/kg	5.0	6010	07 FEB 95	08 FEB 95	
Magnesium	2520	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Manganese	171	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Mercury	ND	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	
Nickel	7.2	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Potassium	715	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Selenium	ND	mg/kg	0.50	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Sodium	ND	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Thallium	0.66	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	J
Vanadium	15.0	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Zinc	32.9	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021720-00/TA5-BH-01-70.0
Lab ID: 040417-0002-SA
Matrix: SOIL Sampled: 01 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	4030	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	6.0	6010	07 FEB 95	08 FEB 95	
Arsenic	2.0	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Barium	75.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Beryllium	0.21	mg/kg	0.20	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	07 FEB 95	08 FEB 95	
Calcium	44600	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Chromium	6.8	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Cobalt	2.9	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Copper	5.4	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Iron	7160	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Lead	4.1	mg/kg	5.0	6010	07 FEB 95	08 FEB 95	J
Magnesium	2380	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Manganese	150	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Mercury	ND	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	
Nickel	6.7	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Potassium	629	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Selenium	ND	mg/kg	0.50	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Sodium	ND	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Thallium	0.76	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	J
Vanadium	11.6	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Zinc	22.8	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021727-00/TA5-BH-01-80.50
Lab ID: 040417-0004-SA
Matrix: SOIL Sampled: 01 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	6030	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	6.0	6010	07 FEB 95	08 FEB 95	
Arsenic	0.44	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	J
Barium	40.6	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Beryllium	0.39	mg/kg	0.20	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	07 FEB 95	08 FEB 95	
Calcium	6150	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Chromium	8.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Cobalt	5.5	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Copper	2.3	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Iron	7820	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Lead	ND	mg/kg	5.0	6010	07 FEB 95	08 FEB 95	
Magnesium	3720	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Manganese	209	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Mercury	ND	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	
Nickel	11.8	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Potassium	527	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Selenium	ND	mg/kg	0.92	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Sodium	ND	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Thallium	0.82	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	J
Vanadium	7.2	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Zinc	23.4	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021728-00/TA5-BH-01-90.50
Lab ID: 040417-0007-SA
Matrix: SOIL Sampled: 01 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	6710	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	6.0	6010	07 FEB 95	08 FEB 95	
Arsenic	3.5	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Barium	83.2	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Beryllium	0.43	mg/kg	0.20	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	07 FEB 95	08 FEB 95	
Calcium	38600	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Chromium	8.8	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Cobalt	4.5	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Copper	6.9	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Iron	10500	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Lead	7.1	mg/kg	5.0	6010	07 FEB 95	08 FEB 95	
Magnesium	3500	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Manganese	200	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Mercury	ND	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	
Nickel	8.1	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Potassium	791	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Selenium	ND	mg/kg	0.56	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Sodium	ND	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Thallium	0.84	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	J
Vanadium	18.8	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Zinc	27.9	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021735-00/TA5-BH-01-101.00
Lab ID: 040417-0009-SA
Matrix: SOIL Sampled: 01 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	6440	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Antimony	ND	mg/kg	6.0	6010	07 FEB 95	08 FEB 95	
Arsenic	2.3	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	
Barium	42.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Beryllium	0.38	mg/kg	0.20	6010	07 FEB 95	08 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	07 FEB 95	08 FEB 95	
Calcium	30000	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Chromium	7.0	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Cobalt	3.8	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Copper	5.1	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	
Iron	8290	mg/kg	10.0	6010	07 FEB 95	08 FEB 95	
Lead	4.9	mg/kg	5.0	6010	07 FEB 95	08 FEB 95	J
Magnesium	3250	mg/kg	20.0	6010	07 FEB 95	08 FEB 95	
Manganese	165	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Mercury	ND	mg/kg	0.10	7471	06 FEB 95	07 FEB 95	
Nickel	7.0	mg/kg	4.0	6010	07 FEB 95	08 FEB 95	
Potassium	820	mg/kg	500	6010	07 FEB 95	08 FEB 95	
Selenium	ND	mg/kg	0.50	6010	07 FEB 95	07 FEB 95	
Silver	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
dium	ND	mg/kg	500	6010	07 FEB 95	08 FEB 95	
allium	0.80	mg/kg	1.0	6010	07 FEB 95	07 FEB 95	J
Vanadium	14.7	mg/kg	1.0	6010	07 FEB 95	08 FEB 95	
Zinc	22.6	mg/kg	2.0	6010	07 FEB 95	08 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021739-00/TA5-BH-01-EB1
Lab ID: 040417-0011-EB
Matrix: AQUEOUS Sampled: 02 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	ND	mg/L	0.10	6010	14 FEB 95	15 FEB 95	
Antimony	ND	mg/L	0.060	6010	14 FEB 95	15 FEB 95	
Arsenic	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Barium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Beryllium	ND	mg/L	0.0020	6010	14 FEB 95	15 FEB 95	
Cadmium	ND	mg/L	0.0050	6010	14 FEB 95	15 FEB 95	
Calcium	0.15	mg/L	0.20	6010	14 FEB 95	15 FEB 95	J
Chromium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Cobalt	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Copper	0.015	mg/L	0.020	6010	14 FEB 95	15 FEB 95	J
Iron	ND	mg/L	0.10	6010	14 FEB 95	15 FEB 95	
Lead	0.0054	mg/L	0.0030	6010	14 FEB 95	15 FEB 95	
Magnesium	ND	mg/L	0.20	6010	14 FEB 95	15 FEB 95	
Manganese	0.019	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Nickel	ND	mg/L	0.040	6010	14 FEB 95	15 FEB 95	
Potassium	ND	mg/L	5.0	6010	14 FEB 95	15 FEB 95	
Selenium	ND	mg/L	0.0050	6010	14 FEB 95	15 FEB 95	
Silver	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Sodium	ND	mg/L	5.0	6010	14 FEB 95	15 FEB 95	
Thallium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Vanadium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Zinc	0.024	mg/L	0.020	6010	14 FEB 95	15 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Norma Baier Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

lient Name: Sandia National Laboratory
Client ID: 021759-00/TA5-BH-01-EB1
Lab ID: 040417-0012-EB
Matrix: AQUEOUS Sampled: 02 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Mercury	ND	mg/L	0.00020	7470	06 FEB 95	07 FEB 95

ND = Not detected
NA = Not applicable

Reported By: Matt Hall Approved By: Richard Persichitte

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

PAGE 1 OF 1

AR/COC- 02605

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No: N/A
SMO Reference No.: N/A

Date Samples Shipped:
Carrier/Waybill No.:
Lab Contact: Ellen LeRiviere
Lab Destination: Quantera
SMO Contact/Phone: Pam Puissant
Send Report to SMO: Debra Constant

Contract No.: 67-9736-B
Case No.: 36[illegible]-300
SMO Authorization:
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area: V; Building: 6588; Room:

Parameter & Method Requested

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	TAL Metals	8270 SVOCs						Lab Sample ID
021693-00	TA5-BH-01-120.5	120.5	—	2/2/95; 9:13	soil	steel liner	250ml	NONE	G	SA	X							4	01
021700-00	TA5-BH-01-140.25	140.25	—	; 10:25							X								02
021742-00	TA5-BH-01-160.75	160.75	—	; 11:50							X								03
021696-00	TA5-BH-01-160.00	160.00	—	; 11:50			500ml					X							04
021746-00	TA5-BH-01-181.25	181.25	—	; 14:08			250ml						X						05
021744-00	TA5-BH-01-181.00	181.00	—	; 14:08							X								06
021748-00	TA5-BH-01-200.25	200.25	—	; 15:20							X								

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy): Entered by: QC Inits.

Special Instructions/QC Requirements: FAX 8240 RESULTS TO LON DAWSON @ 848-0417

Abnormal Conditions on Receipt:

Sample Team Members	Name	Signature	Init.	Company/Organization
	Michael Wade	Michael Wade	MW	Quantera/7582
	Paul Freshour	[illegible]	PF	SNL/7584
	Don Bolofield	[illegible]	DB	SNL/7584

	Org.	Date	Time
1. Relinquished by	7584	2/3/95	9:35
1. Received by	7576	2/3/95	9:35
2. Relinquished by	7576	2/3/95	14[illegible]
2. Received by		2/[illegible]/95	9[illegible]
3. Relinquished by			
3. Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021696-00/TA5-BH-01-160.00
Lab ID: 040441-0004-SA
Matrix: SOIL Sampled: 02 FEB 95 Received: 04 FEB 95
Authorized: 05 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Aluminum	4510	mg/kg	10.0	6010	07 FEB 95	08 FEB 95
Antimony	ND	mg/kg	6.0	6010	07 FEB 95	08 FEB 95
Arsenic	2.1	mg/kg	1.0	6010	07 FEB 95	07 FEB 95
Barium	57.7	mg/kg	1.0	6010	07 FEB 95	08 FEB 95
Beryllium	0.38	mg/kg	0.20	6010	07 FEB 95	08 FEB 95
Cadmium	ND	mg/kg	0.50	6010	07 FEB 95	08 FEB 95
Calcium	43800	mg/kg	20.0	6010	07 FEB 95	08 FEB 95
Chromium	19.5	mg/kg	1.0	6010	07 FEB 95	08 FEB 95
Cobalt	3.4	mg/kg	1.0	6010	07 FEB 95	08 FEB 95
Copper	9.9	mg/kg	2.0	6010	07 FEB 95	08 FEB 95
Iron	10600	mg/kg	10.0	6010	07 FEB 95	08 FEB 95
Lead	9.7	mg/kg	5.0	6010	07 FEB 95	08 FEB 95
Magnesium	2740	mg/kg	20.0	6010	07 FEB 95	08 FEB 95
Manganese	236	mg/kg	1.0	6010	07 FEB 95	08 FEB 95
Mercury	ND	mg/kg	0.10	7471	06 FEB 95	07 FEB 95
Nickel	15.3	mg/kg	4.0	6010	07 FEB 95	08 FEB 95
Potassium	877	mg/kg	500	6010	07 FEB 95	08 FEB 95
Selenium	ND	mg/kg	0.51	6010	07 FEB 95	07 FEB 95
Silver	ND	mg/kg	1.0	6010	07 FEB 95	08 FEB 95
Sodium	ND	mg/kg	500	6010	07 FEB 95	08 FEB 95
Thallium	1.1	mg/kg	1.0	6010	07 FEB 95	07 FEB 95
Vanadium	14.8	mg/kg	1.0	6010	07 FEB 95	08 FEB 95
Zinc	27.9	mg/kg	2.0	6010	07 FEB 95	08 FEB 95

ND = Not detected
NA = Not applicable

Reported By: Doug Gomer Approved By: Richard Persichitte

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001 COC (9 94)

AR/COC- 02621

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TCE Plume- TA5
Record Center Code:
Logbook Ref No: N/A
SMO Reference No.: N/A

Date Samples Shipped: 2/7/95
Carrier/Waybill No.: A 44838
Lab Contact: Ellen LeRiviere
Lab Destination: Quanterra
SMO Contact/Phone: Pam Pluss ant
Send Report to SMO: Debra Constant

Contract No.: 67-9736B
Case No.: 3617.300
SMO Authorization:
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location — Tech Area: V — Building: 6588 — Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	[illegible]	TAL Metals							40465	Lab Sample ID
02 1 7 5 2 - 00	TA5-BH-01-221.0	221.0	NONE	2/6/95; 11:21	S	Sleeve liner	250ml	NONE	G	SA	X										1
02 1 7 5 4 - 00	TA5-BH-01-240.75	240.75	↓	; 13:35	↓	↓	↓	↓	↓	↓	X										2
02 1 7 5 5 - 00	TA5-BH-01-241.00	241.0	↓	; 13:35	↓	↓	↓	↓	↓	↓			X								3
02 1 7 5 6 - 00	TA5-BH-01-260.50	260.50	↓	↓ 14:50	↓	↓	↓	↓	↓	↓	X										4

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy): Entered by: QC inits:

Special Instructions/QC Requirements: * FAX Preliminary 8240 results to Lon Dawson at 505-848-0417. Please list as separate report.

Abnormal Conditions on Receipt

Sample Team Members

Name	Signature	Init.	Company/Organization
Michael Wade	Michael Wade	MW	Quanterra/7582

1. Relinquished by Michael Wade	Org. 7582	Date 2-7-95	Time 7:16	4. Relinquished by	Org.	Date	Time
1. Received by	Org. SMO 7576	Date 2-7-95	Time 7:16	4. Received by	Org.	Date	Time
2. Relinquished by	Org. 7576	Date 2-7-95	Time 14:00	5. Relinquished by	Org.	Date	Time
2. Received by Bonnie Hager	Org. QESLD	Date 2/9/95	Time 0830	5. Received by	Org.	Date	Time
3. Relinquished by	Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by	Org.	Date	Time	6. Received by	Org.	Date	Time

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021755-00/TA5-BH-01-241.00
Lab ID: 040469-0003-SA
Matrix: SOIL Sampled: 06 FEB 95 Received: 09 FEB 95
Authorized: 08 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	2980	mg/kg	10.0	6010	14 FEB 95	15 FEB 95	
Antimony	ND	mg/kg	6.0	6010	14 FEB 95	15 FEB 95	
Arsenic	2.3	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Barium	39.7	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Beryllium	0.24	mg/kg	0.20	6010	14 FEB 95	15 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	14 FEB 95	15 FEB 95	
Calcium	69100	mg/kg	20.0	6010	14 FEB 95	15 FEB 95	
Chromium	7.2	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Cobalt	3.3	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Copper	7.2	mg/kg	2.0	6010	14 FEB 95	15 FEB 95	
Iron	6110	mg/kg	10.0	6010	14 FEB 95	15 FEB 95	
Lead	3.7	mg/kg	5.0	6010	14 FEB 95	15 FEB 95	J
Magnesium	2370	mg/kg	20.0	6010	14 FEB 95	15 FEB 95	
Manganese	223	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Mercury	ND	mg/kg	0.10	7471	13 FEB 95	14 FEB 95	
Nickel	8.3	mg/kg	4.0	6010	14 FEB 95	15 FEB 95	
Potassium	414	mg/kg	500	6010	14 FEB 95	15 FEB 95	J
Selenium	ND	mg/kg	0.52	6010	14 FEB 95	15 FEB 95	
Silver	ND	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Sodium	ND	mg/kg	500	6010	14 FEB 95	15 FEB 95	
Thallium	1.1	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Vanadium	8.4	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Zinc	38.4	mg/kg	2.0	6010	14 FEB 95	15 FEB 95	B

Note J : Result is detected below the reporting limit or is an estimated concentration.

Note B : Compound is also detected in the blank.

ND = Not detected
NA = Not applicable

Reported By: Norma Baier Approved By: Richard Persichitte

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

PAGE 1 OF 1

AR/COC- 02626

Dept. No./Mail Stop: 7582/1347
Project/Task Manager: Lon Dawson
Project Name: TAS- TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/8/95
Carrier/Waybill No.: 444834
Lab Contact: Ellen LeRivere
Lab Destination: Quanteta
SMO Contact/Phone: Pam Puissant 848-0402
Send Report to SMO: Debra Constant

Contract No.: 67-9736B
Case No.: 3617-300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location Tech Area: V
Building: 6944 Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	8270	TAL Metals						Lab Sample ID
✓ 021697-00	TAS-BH-01-300.50	300.50	NONE	2/7/95, 9:52	S	liner	250ml	none	G	SA	X						40490		01
✓ 021719-00	TAS-BH-01-301.25	301.25	↓	; 9:54	↓	↓	↓	↓	↓	↓	[redacted]	X							02
✓ 021128-00	TAS-BH-01-320.75	320.75		; 12:15			↓				X								03
✓ 021142-00	TAS-BH-01-320.25	320.25		; 12:15			500ml						X						04
✓ 021131-00	TAS-BH-01-341.00	341.00		; 13:35			250ml				X								05
✓ 021134-00	TAS-BH-01-360.50	360.50		; 14:45			↓				X								06
✓ 021137-00	TAS-BH-01-380.25	380.25	↓	; 16:14	↓	↓	↓	↓	↓	↓	X							-07	07

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy): Entered by: QC Inits:

Special Instructions/QC Requirements: Please list as separate input!

Abnormal Conditions on Receipt

Sample Team Members ✓	Name	Signature	Init.	Company/Organization
	Michael Wade	Michael Wade	MW	Sandia/7582

	Org.	Date	Time
1. Relinquished by: Michael Wade	7582	2/8/95	6:54
1. Received by: [signature]	SMO 7576	2/8/95	6:54
2. Relinquished by: [signature]	SMO 2526	2/8/95	1600
2. Received by: [signature]		2/9/95	820
3. Relinquished by			
3. Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021142-00/TA5-BH-01-320.25
Lab ID: 040490-0004-SA
Matrix: SOIL Sampled: 07 FEB 95 Received: 09 FEB 95
Authorized: 09 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Aluminum	6800	mg/kg	10.0	6010	14 FEB 95	15 FEB 95
Antimony	ND	mg/kg	6.0	6010	14 FEB 95	15 FEB 95
Arsenic	3.5	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Barium	70.9	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Beryllium	0.66	mg/kg	0.20	6010	14 FEB 95	15 FEB 95
Cadmium	ND	mg/kg	0.50	6010	14 FEB 95	15 FEB 95
Calcium	31600	mg/kg	20.0	6010	14 FEB 95	15 FEB 95
Chromium	10.9	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Cobalt	5.6	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Copper	17.7	mg/kg	2.0	6010	14 FEB 95	15 FEB 95
Iron	12900	mg/kg	10.0	6010	14 FEB 95	15 FEB 95
Lead	64.6	mg/kg	5.0	6010	14 FEB 95	15 FEB 95
Magnesium	3850	mg/kg	20.0	6010	14 FEB 95	15 FEB 95
Manganese	382	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Mercury	ND	mg/kg	0.10	7471	13 FEB 95	14 FEB 95
Nickel	11.5	mg/kg	4.0	6010	14 FEB 95	15 FEB 95
Potassium	1510	mg/kg	500	6010	14 FEB 95	15 FEB 95
Selenium	ND	mg/kg	0.64	6010	14 FEB 95	15 FEB 95
Silver	ND	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Sodium	ND	mg/kg	500	6010	14 FEB 95	15 FEB 95
Thallium	1.2	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Vanadium	18.1	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Zinc	58.1	mg/kg	2.0	6010	14 FEB 95	15 FEB 95 B

Note B : Compound is also detected in the blank.

ND = Not detected
NA = Not applicable

Reported By: Norma Baier Approved By: Richard Persichitte

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02629

Dept. No./Mail Stop: 7582/1347
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No: NA
SMO Reference No.: N/A

Date Samples Shipped: 2/9/95
Carrier/Waybill No.: A44835
Lab Contact: Ellen Lerinters
Lab Destination: Quanterra
SMO Contact/Phone: Pam Pressent-848-0402
Send Report to SMO: Debra Constant

Contract No.: 67-4736B
Case No.: 3617.300
SMO Authorization:
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Parameter & Method Requested

Location — Tech Area: V; Building: 6594; Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240 (VOC)	TAL Metals	8270	MS/MSD	MERCURY					Lab Sample ID
02114 0-00	TA5-BH-01-400.50	400.50	NONE	2/8/95; 9:15	S	SL	500ml	NONE	G	MS MSD		X	X	X					40517	-01 MS/SD
02114 1-00	TA5-BH-01-400.75	400.75	↓	↓; 9:15	S	2	250ml	↓	↓	MS/MSD	X			X						-02 MS/SD
02114 3-00	TA5-BH-01-EB2	400		2/8/95; 16:13	W	G VOA	3X 40ml	HCL	G	EB	X									-03
02114 5-00	~~TA5-BH-01-EB2~~	~~400~~		; ~~16:13~~	~~W~~						X									
02114 6-00	~~TA5-BH-01-EB2~~	~~400~~		; ~~16:13~~	~~W~~						X									
02115 0-00	TA5-BH-01-EB2	400		; 16:21	W	P	1L 602	HNO3	G	EB		X								-04
02115 1-00	TA5-BH-01-EB2	400		; 16:18	W	G	1L 602	HNO3	G						X					-05
02114 9-00	TA5-BH-01-EB2	400		; 16:25	W	AG	64oz	NONE	G				X							-06
02165 7-00	TA5-BH-01-420.50	420.50		; 16:58	S	SL	250ml	NONE	G	SA	X									-07
02194 8-00	TA5 N/A	N/A	N/A	2/8/95/1700	S	G	250ml	None	G	TB	X									-08

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☑ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy); Entered by:

QC inits:

Special Instructions/QC Requirements: ~~Hold Samples~~ listing separate report. ~~02114 5, 02114 6~~ Backup VOAs for ~~02114 3 only~~. * FAX 8240 results to Lon Dawson 848-0158

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
✓	Michael Wade	Michael Wade	MW	Sandia/7582

1. Relinquished by	Michael Wade	Org. 7582	Date 2/9/95	Time 7:40	4. Relinquished by	Org.	Date	Time
1. Received by	[illegible]	Org. SMO 7576	Date 2/9/95	Time 7:40	4. Received by	Org.	Date	Time
2. Relinquished by	[illegible]	Org. SMO 7576	Date 2/9/95	Time 1400	5. Relinquished by	Org.	Date	Time
2. Received by	[illegible]	Org.	Date 2/10/95	Time 900	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021140-00/TA5-BH-01-400.50
Lab ID: 040517-0001-SA
Matrix: SOIL Sampled: 08 FEB 95 Received: 10 FEB 95
Authorized: 10 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	8320	mg/kg	10.0	6010	14 FEB 95	15 FEB 95	
Antimony	ND	mg/kg	6.0	6010	14 FEB 95	15 FEB 95	
Arsenic	4.7	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Barium	67.4	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Beryllium	0.65	mg/kg	0.20	6010	14 FEB 95	15 FEB 95	
Cadmium	ND	mg/kg	0.50	6010	14 FEB 95	15 FEB 95	
Calcium	43100	mg/kg	20.0	6010	14 FEB 95	15 FEB 95	
Chromium	9.8	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Cobalt	6.6	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Copper	11.3	mg/kg	2.0	6010	14 FEB 95	15 FEB 95	
Iron	11900	mg/kg	10.0	6010	14 FEB 95	15 FEB 95	
Lead	7.2	mg/kg	5.0	6010	14 FEB 95	15 FEB 95	
Magnesium	4270	mg/kg	20.0	6010	14 FEB 95	15 FEB 95	
Manganese	285	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Mercury	ND	mg/kg	0.10	7471	13 FEB 95	14 FEB 95	
Nickel	11.0	mg/kg	4.0	6010	14 FEB 95	15 FEB 95	
Potassium	1820	mg/kg	500	6010	14 FEB 95	15 FEB 95	
Selenium	ND	mg/kg	0.67	6010	14 FEB 95	15 FEB 95	
Silver	ND	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Sodium	ND	mg/kg	500	6010	14 FEB 95	15 FEB 95	
Thallium	0.75	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	J
Vanadium	20.7	mg/kg	1.0	6010	14 FEB 95	15 FEB 95	
Zinc	37.2	mg/kg	2.0	6010	14 FEB 95	15 FEB 95	B

Note J : Result is detected below the reporting limit or is an estimated concentration.

Note B : Compound is also detected in the blank.

ND = Not detected
NA = Not applicable

Reported By: Norma Baier Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021150-00/TA5-BH-01-EB2
Lab ID: 040517-0004-EB
Matrix: AQUEOUS Sampled: 08 FEB 95 Received: 10 FEB 95
Authorized: 10 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	0.056	mg/L	0.10	6010	14 FEB 95	15 FEB 95	J
Antimony	ND	mg/L	0.060	6010	14 FEB 95	15 FEB 95	
Arsenic	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Barium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Beryllium	ND	mg/L	0.0020	6010	14 FEB 95	15 FEB 95	
Cadmium	ND	mg/L	0.0050	6010	14 FEB 95	15 FEB 95	
Calcium	0.20	mg/L	0.20	6010	14 FEB 95	15 FEB 95	
Chromium	0.0065	mg/L	0.010	6010	14 FEB 95	15 FEB 95	J
Cobalt	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Copper	0.025	mg/L	0.020	6010	14 FEB 95	15 FEB 95	
Iron	ND	mg/L	0.10	6010	14 FEB 95	15 FEB 95	
Lead	0.0039	mg/L	0.0030	6010	14 FEB 95	15 FEB 95	
Magnesium	ND	mg/L	0.20	6010	14 FEB 95	15 FEB 95	
Manganese	0.0056	mg/L	0.010	6010	14 FEB 95	15 FEB 95	J
Nickel	ND	mg/L	0.040	6010	14 FEB 95	15 FEB 95	
Potassium	ND	mg/L	5.0	6010	14 FEB 95	15 FEB 95	
Selenium	ND	mg/L	0.0050	6010	14 FEB 95	15 FEB 95	
Silver	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Sodium	ND	mg/L	5.0	6010	14 FEB 95	15 FEB 95	
Thallium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Vanadium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Zinc	0.047	mg/L	0.020	6010	14 FEB 95	15 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Norma Baier Approved By: Richard Persichitte

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021151-00/TA5-BH-01-EB2
Lab ID: 040517-0005-EB
Matrix: AQUEOUS Sampled: 08 FEB 95 Received: 10 FEB 95
Authorized: 10 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Mercury	ND	mg/L	0.00020	7470	13 FEB 95	14 FEB 95

ND = Not detected
NA = Not applicable

Reported By: Matt Hall Approved By: Richard Persichitte

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

AR/COC- 02738

Dept. No./Mail Stop: 7582/1347
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code: N.A.
Logbook Ref No: N.A.
SMO Reference No.: N.A.

Date Samples Shipped: 2/10/95
Carrier/Waybill No.: A44275A448367
Lab Contact: Ellen LeRiviere
Lab Destination: Quantera
SMO Contact/Phone: Pam Pressent - 848-0402
Send Report to SMO: Debra Constant

Contract No. 297336B
Case No.: 3612300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area: V; Building: 6594; Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	TAL Metals	8270	418.1 (TPH)	8010/8020 (RUSH)	8015 (TPH + TEPH)				Lab Sample ID
021660-00	TA5-BH-01-440.50	440.5	NONE	2/9/95; 11:10	S	SL	250ml	NONE	G	SA	X									[illegible]
021661-00	TA5-BH-01-460.50	460.50	↓	; 12:50	↓	↓	↓	↓	G	SA	X									[illegible]
021665-00	TA5-BH-01-481.00	481.0	↓	; 14:40	↓	↓	↓	↓	↓	↓	X									[illegible]
021664-00	TA5-BH-01-480.50	480.5	↓	; 14:40	↓	↓	500ml	↓	↓	↓		X	X							[illegible]
021667-00	TA5-BH-01-491.00	491.0	↓	; 15:40	↓	↓	250ml	↓	↓	↓	X									[illegible]
021668-00	TA5-BH-01-490.50	490.50	↓	; 15:40	↓	↓	↓	↓	↓	↓				X						[illegible]
021669-00	TA5-BH-01-500.75	500.75	↓	; 16:25	↓	↓	↓	↓	↓	↓	X									[illegible]
021671-00	TA5-BH-01-BW	499	↓	2/10/95; 10:56	W	AG	64oz	NONE	G	SA			X							[illegible]
021672-00	TA5-BH-01-BW	499	↓	2/10/95; 10:56	W	VOA	3 40ml VOAs	HCL	↓	↓					X					[illegible]
021135-00	TA5-BH-01-381.00	381.0	↓	2/7/95; 16:11	S	SL	[illegible] ml	NONE	G	SA					X					[illegible]

RMMA ☐ Yes ☒ No Ref. No. ____

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush 8010/8020 Required Report Date ____

Sample Tracking: Date Entered (mm/dd/yy) ____ Entered by: ____ QC Inits: ____

LIST AS SEPERATE REPORT

Special Instructions/QC Requirements: * Rush analysis on 8010/8020 water samples (D24672 - TA5-BH-01-BW) - FAX results to Lon D. @ 848-0417 or call w/ results @ 505-250-7499.

Abnormal Conditions on Receipt: LAB USE

Sample Team Members

Name	Signature	Init	Company/Organization
Michael WADE	Michael Wade	MW	Quantera 7582
Paul FEESHOUE	[signature]	PF	SNL/7584

	Org.	Date	Time
1. Relinquished by	7584	2/10/95	12:20
1. Received by	7576	2/10/95	12:20
2. Relinquished by	7576	2/10/95	1400
2. Received by		2/11/95	930
3. Relinquished by			
3. Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021664-00/TA5-BH-01-480.50
Lab ID: 040534-0004-SA
Matrix: SOIL Sampled: 09 FEB 95 Received: 11 FEB 95
Authorized: 11 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Aluminum	4520	mg/kg	10.0	6010	14 FEB 95	15 FEB 95
Antimony	ND	mg/kg	6.0	6010	14 FEB 95	15 FEB 95
Arsenic	3.4	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Barium	120	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Beryllium	0.44	mg/kg	0.20	6010	14 FEB 95	15 FEB 95
Cadmium	ND	mg/kg	0.50	6010	14 FEB 95	15 FEB 95
Calcium	36200	mg/kg	20.0	6010	14 FEB 95	15 FEB 95
Chromium	6.4	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Cobalt	4.1	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Copper	5.8	mg/kg	2.0	6010	14 FEB 95	15 FEB 95
Iron	8100	mg/kg	10.0	6010	14 FEB 95	15 FEB 95
Lead	6.2	mg/kg	5.0	6010	14 FEB 95	15 FEB 95
Magnesium	2840	mg/kg	20.0	6010	14 FEB 95	15 FEB 95
Manganese	222	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Mercury	ND	mg/kg	0.10	7471	13 FEB 95	14 FEB 95
Nickel	7.1	mg/kg	4.0	6010	14 FEB 95	15 FEB 95
Potassium	898	mg/kg	500	6010	14 FEB 95	15 FEB 95
Selenium	ND	mg/kg	0.80	6010	14 FEB 95	15 FEB 95
Silver	ND	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Sodium	ND	mg/kg	500	6010	14 FEB 95	15 FEB 95
Thallium	1.0	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Vanadium	14.8	mg/kg	1.0	6010	14 FEB 95	15 FEB 95
Zinc	24.1	mg/kg	2.0	6010	14 FEB 95	15 FEB 95 B

Note B : Compound is also detected in the blank.

ND = Not detected
NA = Not applicable

Reported By: Norma Baier Approved By: Richard Persichitte

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02613

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-2-95
Carrier/Waybill No.: A 44831
Lab Contact: Ellen LeRiviere
Lab Destination: Quantera
SMO Contact/Phone: Pam Pissoat
Send Report to SMO: Debra Constant

Contract No.: 67-973678
Case No.: 3617.300
SMO Authorization: [illegible]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location Tech Area V
Building 6588 Room —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240 - VOCs	Mercury	Metals - TAL	SVOC's - 8270							Lab Sample ID
021737-00	TA5-BH-01-EB1	100	—	2/2/95; 8:26	WATER	VOA	40ml	HCL	G	EB	X										10
021736-00	TA5-BH-01-EB1	100	—	; 8:26							X										10
021738-00	TA5-BH-01-EB1	100	—	; 8:25							X										10
021739-00	TA5-BH-01-EB1	100	—	; 8:30		Plastic	16oz	HNO3					X								11
021759-00	TA5-BH-01-EB1	100	—	; 8:31		Class	16oz					X									12
021701-00	TA5-BH-01-EB1	100	—	; 8:28		AG	64oz	None						X							13

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Sample Tracking
Date Entered (mm/dd/yy)
Entered by:

Turnaround Time ☒ Normal ☐ Rush Required Report Date QC Inits.

Special Instructions/QC Requirements
37, 36, 38 are one VOA
* Note short holding time for mercury
* Samples collected at TD = 100 ft deep over split-spoon

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	[illegible]	MW	Quanta 7582
	Paul Freshour	[illegible]	PF	SNL/7584
	Don Schofield	[illegible]	DS	" "

1. Relinquished by	Org. 7584	Date 2/2/95	Time 11:52	4. Relinquished by	Org.	Date	Time
1. Received by	Org. SM 07576	Date 2/2/95	Time 1152	4. Received by	Org.	Date	Time
2. Relinquished by	Org. SM 07576	Date 2/2/95	Time 1400	5. Relinquished by	Org.	Date	Time
2. Received by Brian Mago	Org. QES,P	Date 2/3/95	Time 0830	5. Received by	Org.	Date	Time
3. Relinquished by	Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by	Org.	Date	Time	6. Received by	Org.	Date	Time

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

Quanterra Environmental Services

Metals

Total Metals

Client Name: Sandia National Laboratory
Client ID: 021739-00/TA5-BH-01-EB1
Lab ID: 040417-0011-EB
Matrix: AQUEOUS Sampled: 02 FEB 95 Received: 03 FEB 95
Authorized: 03 FEB 95 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Aluminum	ND	mg/L	0.10	6010	14 FEB 95	15 FEB 95	
Antimony	ND	mg/L	0.060	6010	14 FEB 95	15 FEB 95	
Arsenic	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Barium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Beryllium	ND	mg/L	0.0020	6010	14 FEB 95	15 FEB 95	
Cadmium	ND	mg/L	0.0050	6010	14 FEB 95	15 FEB 95	
Calcium	0.15	mg/L	0.20	6010	14 FEB 95	15 FEB 95	J
Chromium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Cobalt	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Copper	0.015	mg/L	0.020	6010	14 FEB 95	15 FEB 95	J
Iron	ND	mg/L	0.10	6010	14 FEB 95	15 FEB 95	
Lead	0.0054	mg/L	0.0030	6010	14 FEB 95	15 FEB 95	
Magnesium	ND	mg/L	0.20	6010	14 FEB 95	15 FEB 95	
Manganese	0.019	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Nickel	ND	mg/L	0.040	6010	14 FEB 95	15 FEB 95	
Potassium	ND	mg/L	5.0	6010	14 FEB 95	15 FEB 95	
Selenium	ND	mg/L	0.0050	6010	14 FEB 95	15 FEB 95	
Silver	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Sodium	ND	mg/L	5.0	6010	14 FEB 95	15 FEB 95	
Thallium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Vanadium	ND	mg/L	0.010	6010	14 FEB 95	15 FEB 95	
Zinc	0.024	mg/L	0.020	6010	14 FEB 95	15 FEB 95	

Note J : Result is detected below the reporting limit or is an estimated concentration.

ND = Not detected
NA = Not applicable

Reported By: Norma Baier Approved By: Richard Persichitte

ANNEX 2-G
Gamma Spectroscopy Results
Borehole TAV-BH-01

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

F 2001-COC (9-94)

AR/COC- 02599

Dept. No./Mail Stop: 7582/
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-1-95
Carrier/Waybill No.: HO
Lab Contact: Amir Mohagheti
Lab Destination: 7715
SMO Contact/Phone: Mike Gonzales/848-0404
Send Report to SMO: Debra Constant

Contract No.: N/A
Case No.: 3624.300
SMO Authorization:
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Parameter & Method Requested: GAMMA SPEC

Location — Tech Area: V — Building: 6588 — Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Lab Sample ID
021705-00	TA5-BH-01-10.0	10.0	NONE	1/31/95; 10:31	S	P	500ml	NONE	G	~~FS~~ A	
021707-00	TA5-BH-01-20.0	20.0		; 12:01							
021710-00	TA5-BH-01-30.0	30.0		; 14:15							
021713-00	TA5-BH-01-41.0	41.0		; 15:54							

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☐ Disposal by lab

Turnaround Time ☐ Normal ☒ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy): Entered by: QC Inits:

Special Instructions/QC Requirements

Abnormal Conditions on Receipt:

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael WADE	Michael Wade	MW	Enviro/7582
	DON SCHOFIELD	Don Schofield	DPS	SNL/7584

	Org.	Date	Time		Org.	Date	Time
Relinquished by Michael Wade	7582	1/31/95	16:23	4. Relinquished by			
Received by	7584	1/31/95	16:23	4. Received by			
Relinquished by	7584	1/31/95	17:00	5. Relinquished by			
Received by Don Schofield	7584	2/1/95	9:55	5. Received by			
Relinquished by Don Schofield	7584	2/1/95	13:28	6. Relinquished by			
Received by				6. Received by			

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

TAV-KH-01

Post
Mac and screening data
for

```
*****************************************************************
*                Sandia National Laboratories                   *
*   Radiation Protection Sample Diagnostics Program [881 Laboratory]
*                   2-02-95 11:28:09 AM                         *
*****************************************************************
*
* Analyzed by:  2/6/95      Reviewed by:  2/6/95                *
*****************************************************************
```

Customer : L.DAWSON/E.RANKIN (7582/SMO)
Customer Sample ID : 021705-00
Lab Sample ID : 50009401

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 607.000 Gram
Sample Date/Time : 1-31-95 10:31:00 AM
Acquire Start Date : 2-02-95 10:55:18 AM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1801 seconds

Comments:

Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	2.22
TH-234	6.36E-01	3.37E-01	5.50E-01
U-234	Not Detected	--------	8.11
RA-226	7.34E-01	3.41E-01	5.41E-01
PB-214	4.83E-01	1.40E-01	5.09E-02
BI-214	5.09E-01	1.05E-01	5.97E-02
PB-210	Not Detected	--------	5.51E+02
TH-232	2.48E-01	1.18E-01	1.44E-01
RA-228	3.23E-01	1.53E-01	2.19E-01
AC-228	Not Detected	--------	3.09E-01
TH-228	Not Detected	--------	1.05
RA-224	Not Detected	--------	4.25E-01
PB-212	3.41E-01	1.11E-01	4.01E-02
BI-212	Not Detected	--------	8.19E-01
TL-208	3.69E-01	9.83E-02	8.73E-02
U-235	Not Detected	--------	3.05E-01
TH-231	Not Detected	--------	8.25E-01
PA-231	Not Detected	--------	1.45
AC-227	Not Detected	------	2.31
TH-227	Not Detected	--------	4.01E-01
RA-223	Not Detected	--------	2.78E-01
RN-219	Not Detected	--------	3.52E-01
PB-211	Not Detected	--------	8.65E-01
TL-207	Not Detected	--------	2.52E+01
AM-241	Not Detected	--------	3.10E-01
PU-239	Not Detected	--------	3.71E+02
~~NP-237~~	~~5.91E-01~~	~~1.91E-01~~	~~2.67E-01~~ not detected 2/6/95
PA-233	Not Detected	--------	7.44E-02
TH-229	Not Detected	--------	3.82E-01

FAX TRANSMITTAL MEMO
TO: Lon Dawson
DEPT: FAX #: 848-0417
FROM: M. Cole PHONE: 844-6127
CO: FAX #:
Post-it "brand fax transmittal memo 7671
NO. OF PAGES 8

[Summary Report] - Sample ID: 50009401

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	5.48E-02
AR-41	Not Detected	--------	8.24E+06
BA-133	Not Detected	--------	7.80E-02
BA-140	Not Detected	--------	1.82E-01
CD-109	Not Detected	--------	1.79
CD-115	Not Detected	--------	1.41E-01
CE-139	Not Detected	--------	3.80E-02
CE-141	Not Detected	--------	7.35E-02
CE-144	Not Detected	--------	3.11E-01
CO-56	Not Detected	--------	6.52E-02
CO-57	Not Detected	--------	4.39E-02
CO-58	Not Detected	--------	5.84E-02
CO-60	Not Detected	--------	7.72E-02
CR-51	Not Detected	--------	3.10E-01
CS-134	Not Detected	--------	6.23E-02
CS-137	Not Detected	--------	6.49E-02
CU-64	Not Detected	--------	2.13E+02
EU-152	Not Detected	--------	4.36E-01
EU-154	Not Detected	--------	2.71E-01
EU-155	Not Detected	--------	1.92E-01
FE-59	Not Detected	--------	1.23E-01
GD-153	Not Detected	--------	1.41E-01
HG-203	Not Detected	--------	3.71E-02
HO-166	Not Detected	--------	4.55E-02
I-131	Not Detected	--------	4.75E-02
IN-115m	Not Detected	--------	1.39E+02
IR-192	Not Detected	-----	3.49E-02
K-40	9.69	1.61	4.34E-01
LA-140	Not Detected	--------	1.92E-01
MN-54	Not Detected	--------	6.26E-02
MN-56	Not Detected	--------	3.09E+04
MO-99	Not Detected	--------	7.32E-01
NA-22	Not Detected	--------	8.34E-02
NA-24	Not Detected	--------	7.33E-01
NB-95	Not Detected	--------	2.69E-01
ND-147	Not Detected	--------	3.55E-01
NI-57	Not Detected	--------	2.62E-01
BE-7	Not Detected	--------	3.64E-01
RU-103	Not Detected	--------	4.32E-02
RU-106	Not Detected	--------	4.58E-01
SB-122	Not Detected	--------	1.03E-01
SB-124	Not Detected	--------	5.04E-02
SB-125	Not Detected	--------	1.15E-01
SC-46	Not Detected	--------	8.92E-02
SR-85	Not Detected	--------	5.66E-02
TA 182	Not Detected	--------	2.61E-01
TA-183	Not Detected	--------	3.52E-01
TE-132	Not Detected	--------	5.15E-02
TL-201	Not Detected	--------	2.31E-01
XE-133	Not Detected	--------	2.94E-01
Y-88	Not Detected	--------	8.09E-02
ZN-65	Not Detected	--------	1.78E-01
ZR-95	Not Detected	--------	1.06E-01

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [801 Laboratory]       *
*                        2-02-95 12:09:45 PM                                *
*****************************************************************************
*                                                                           *
* Analyzed by:                2/6/95  Reviewed by:                2/6/95  *
*****************************************************************************
```

Customer : L.DAWSON/E.RANKIN (7582/SMO)
Customer Sample ID : 021707-00
Lab Sample ID : 50009402

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 406.000 Gram
Sample Date/Time : 1-31-95 12:01:00 PM
Acquire Start Date : 2-02-95 11:36:50 AM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1801 seconds

Comments:

Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	3.25
TH-234	1.02	5.09E-01	8.00E-01
U-234	Not Detected	--------	1.19E+01
RA-226	9.47E-01	4.70E 01	7.16E-01
PB-214	5.19E-01	1.59E-01	7.34E-02
BI-214	4.60E-01	1.14E-01	9.20E-02
PB-210	Not Detected	--------	8.54E+02
TH-232	4.38E-01	1.92E-01	2.28E-01
RA-228	6.68E-01	2.62E-01	2.83E-01
AC-228	Not Detected	--------	4.85E-01
TH-228	Not Detected	--------	1.42
RA-224	1.07	4.70E-01	5.68E-01
PB-212	5.51E-01	1.77E-01	5.43E-02
BI-212	Not Detected	--------	1.38
TL-208	6.42E-01	1.60E-01	1.27E-01
U-235	Not Detected	--------	4.34E-01
TH-231	Not Detected	-----	1.22
PA-231	Not Detected	--------	1.97
AC-227	Not Detected	--------	3.11
TH-227	Not Detected	--------	5.96E-01
RA-223	Not Detected	--------	4.14E-01
RN-219	Not Detected	--------	4.81E-01
PB 211	Not Detected	--------	1.31
TL-207	Not Detected	--------	3.55E+01
AM-241	Not Detected	--------	4.43E-01
PU-239	Not Detected	--------	5.38E+02
~~NP-237~~	~~5.80E-01~~	~~2.49E-01~~	~~3.93E-01~~ not detected 2/6/95
PA-233	Not Detected	--------	1.11E-01
TH-229	Not Detected	----	5.56E-01

[Summary Report] - Sample ID: 50009402

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	7.54E-02
AR-41	Not Detected	--------	9.02E+06
BA-133	Not Detected	--------	1.05E-01
BA-140	Not Detected	--------	2.72E-01
CD-109	Not Detected	--------	1.36
CD-115	Not Detected	--------	2.18E-01
CE-139	Not Detected	--------	5.30E-02
CE-141	Not Detected	--------	1.04E-01
CE-144	Not Detected	--------	4.66E-01
CO 56	Not Detected	--------	1.01E-01
CO-57	Not Detected	--------	6.41E-02
CO-58	Not Detected	--------	7.68E-02
CO-60	Not Detected	--------	1.12E-01
CR-51	Not Detected	--------	4.28E-01
CS-134	Not Detected	--------	8.78E-02
CS-137	Not Detected	--------	8.88E-02
CU-64	Not Detected	--------	3.25E+02
EU-152	Not Detected	--------	6.19E-01
EU-154	Not Detected	--------	4.56E-01
EU-155	Not Detected	--------	2.67E-01
FE-59	Not Detected	--------	1.95E-01
GD-153	Not Detected	--------	2.11E-01
HG-203	Not Detected	--------	5.16E-02
HO-166	Not Detected	--------	6.50E-02
I-131	Not Detected	--------	6.49E-02
IN-115m	Not Detected	--------	1.91E+02
IR-192	Not Detected	--------	4.86E-02
K-40	1.59E+01	2.59	6.38E-01
LA-140	Not Detected	--------	2.68E-01
MN-54	Not Detected	--------	8.75E-02
MN-56	Not Detected	--------	3.85E+04
MO-99	Not Detected	--------	1.13
NA-22	Not Detected	--------	1.24E-01
NA-24	Not Detected	--------	1.00
NB-95	Not Detected	--------	3.99E-01
ND-147	Not Detected	--------	5.04E-01
NI-57	Not Detected	--------	3.84E-01
BE-7	Not Detected	--------	5.58E-01
RU-103	Not Detected	--------	6.13E-02
RU-106	Not Detected	--------	6.51E-01
SB-122	Not Detected	--------	1.43E-01
SB-124	Not Detected	--------	7.11E-02
SB-125	Not Detected	--------	1.71E-01
SC-46	Not Detected	--------	1.35E-01
SR-85	Not Detected	--------	8.41E-02
TA-182	Not Detected	--------	4.07E-01
TA-183	Not Detected	--------	5.00E-01
TE-132	Not Detected	--------	7.15E-02
TL-201	Not Detected	--------	3.19E-01
XE-133	Not Detected	--------	4.21E-01
Y-88	Not Detected	--------	1.25E-01
ZN-65	Not Detected	--------	2.62E-01
ZR-95	Not Detected	--------	1.45E-01

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]       *
*                      2-02-95 10:30:09 AM                                  *
*****************************************************************************
*                                                                           *
* Analyzed by:  2/6/95  Reviewed by:  2/6/95                                *
*****************************************************************************
```

Customer : L.DAWSON/E.RANKIN (7582/SMO)
Customer Sample ID : 021710-00
Lab Sample ID : 50009403

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 201.000 Gram
Sample Date/Time : 1-31-95 2:15:00 PM
Acquire Start Date : 2-02-95 9:57:28 AM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1800 seconds

Comments:

*****

Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	4.75
TH-234	7.77E-01	6.31E-01	1.26
U-234	Not Detected	--------	2.12E+01
RA-226	Not Detected	--------	2.09
PB-214	4.73E-01	1.65E-01	1.22E-01
BI-214	Not Detected	--------	3.86E-01
PB-210	Not Detected	--------	1.29E+03
TH-232	4.07E-01	2.46E-01	3.71E-01
RA-228	Not Detected	--------	1.16
AC-228	Not Detected	--------	7.39E-01
TH-228	Not Detected	--------	2.27
RA-224	Not Detected	--------	2.37
PB-212	2.59E-01	1.10E-01	9.62E-02
BI-212	Not Detected	--------	2.05
TL-208	Not Detected	--------	4.37E-01
U-235	Not Detected	--------	7.08E-01
TH-231	Not Detected	--------	2.08
PA-231	Not Detected	--------	3.15
AC-227	Not Detected	--------	4.91
TH-227	Not Detected	--------	7.82E-01
RA-223	Not Detected	--------	7.07E-01
RN-219	Not Detected	--------	7.58E-01
PB-211	Not Detected	--------	2.24
TL-207	Not Detected	--------	6.62E+01
AM-241	Not Detected	--------	7.17E-01
PU-239	Not Detected	--------	8.18E+02
~~NP-237~~	~~9.65E-01~~	~~4.25E-01~~	~~6.32E-01~~ not detected 2/6/95
PA-233	Not Detected	--------	1.77E-01
TH-229	Not Detected	--------	9.01E-01

[Summary Report] - Sample ID: 50009403

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	1.21E-01
AR-41	Not Detected	--------	3.85E+06
BA-133	Not Detected	--------	1.58E-01
BA-140	Not Detected	--------	4.19E-01
CD-109	Not Detected	--------	4.05
CD-115	Not Detected	--------	3.23E-01
CE-139	Not Detected	--------	8.38E-02
CE-141	Not Detected	--------	1.65E-01
CE-144	Not Detected	--------	7.39E-01
~~CO-56~~	~~6.06E-03~~	~~5.85E-02~~	~~1.09E-01~~ Not detected 2/6/95
CO-57	Not Detected	--------	9.80E-02
CO-58	Not Detected	--------	1.47E-01
CO-60	Not Detected	--------	1.87E-01
CR-51	Not Detected	--------	7.13E-01
CS-134	Not Detected	--------	1.54E-01
CS-137	Not Detected	--------	1.45E-01
CU-64	Not Detected	--------	4.77E+02
EU-152	Not Detected	--------	1.15
EU-154	Not Detected	--------	7.01E-01
EU-155	Not Detected	--	4.61E-01
FE-59	Not Detected	--------	3.19E-01
GD-153	Not Detected	--------	3.36E-01
HG-203	Not Detected	--------	8.31E-02
HO-166	Not Detected	--------	1.05E-01
I-131	Not Detected	--------	1.06E-01
IN-115m	Not Detected	--------	1.63E+02
IR-192	Not Detected	--------	8.31E-02
K-40	1.01E+01	2.19	1.31
LA-140	Not Detected	--------	4.79E-01
MN-54	Not Detected	--------	1.51E-01
MN-56	Not Detected	--------	2.57E+04
MO-99	Not Detected	--------	1.72
NA-22	Not Detected	--------	1.99E-01
NA-24	Not Detected	--------	1.47
NB-95	Not Detected	-	5.16E-01
ND-147	Not Detected	--------	8.56E-01
NI-57	Not Detected	--------	5.64E-01
BE-7	Not Detected	--------	8.95E-01
RU-103	Not Detected	--------	1.12E-01
RU-106	Not Detected	---	1.12
SB-122	Not Detected	--------	2.35E-01
SB-124	Not Detected	--------	1.30E-01
SB-125	Not Detected	--------	3.09E-01
SC-46	Not Detected	--------	2.13E-01
SR-85	Not Detected	-	1.46E-01
TA-182	Not Detected	--------	6.17E-01
TA 183	Not Detected	--------	7.91E-01
TE-132	Not Detected	--------	1.14E 01
TL-201	Not Detected	--------	5.16E-01
XE-133	Not Detected	--------	6.69E-01
Y-88	Not Detected	--------	2.34E-01
ZN-65	Not Detected	--------	4.02E-01
ZR-95	Not Detected	-	2.45E-01

```
*****************************************************************************
*                      Sandia National Laboratories                         *
*    Radiation Protection Sample Diagnostics Program [981 Laboratory]        *
*                          2-02-95  1:06:00 PM                              *
*****************************************************************************
*                                                                           *
* Analyzed by:                 2/6/95  Reviewed by:              2/6/95    *
*****************************************************************************
```

Customer : L.DAWSON/E.RANKIN (7582/SMO)
Customer Sample ID : 021713-00
Lab Sample ID : 50009404

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 537.000 Gram
Sample Date/Time : 1-31-95 3:54:00 PM
Acquire Start Date : 2-02-95 12:33:11 PM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1800 seconds

Comments:

****

Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	2.28
TH-234	7.21E-01	3.56E-01	5.65E-01
U-234	Not Detected	--------	9.02
RA-226	1.09	4.31E-01	5.57E-01
PB-214	4.38E-01	1.30E-01	5.32E-02
BI-214	5.33E-01	1.13E-01	6.32E-02
PB-210	Not Detected	--------	5.88E+02
TH-232	2.40E-01	1.18E-01	1.62E-01
RA-228	Not Detected	--------	5.16E-01
AC-228	Not Detected	--------	2.86E-01
TH-228	Not Detected	--------	1.01
RA-224	9.02E-01	3.91E-01	4.01E-01
PB-212	2.02E-01	7.11E-02	4.47E-02
BI-212	Not Detected	--------	9.00E-01
TL-208	Not Detected	--------	1.95E-01
U-235	Not Detected	--------	3.40E-01
TH-231	Not Detected	--------	8.79E-01
PA-231	Not Detected	--------	1.41
AC-227	Not Detected	--------	2.41
TH-227	Not Detected	--------	3.82E-01
RA-223	Not Detected	--------	2.96E-01
RN-219	Not Detected	--------	3.55E-01
PB-211	Not Detected	--------	9.61E-01
TL-207	Not Detected	--------	2.58E+01
AM-241	Not Detected	------	3.25E-01
PU-239	Not Detected	--------	3.68E+02
~~NP-237~~	~~4.11E-01~~	~~1.70E-01~~	~~2.79E-01~~ not detected 2/6/95
PA-233	Not Detected	--------	7.90E-02
TH-229	Not Detected	--------	3.76E-01

[Summary Report] - Sample ID: 50009404

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	5.56E-02
AR-41	Not Detected	--------	2.06E+06
BA-133	Not Detected	--------	8.14E-02
BA 140	Not Detected	--------	1.85E-01
CD-109	Not Detected	--------	1.81
CD-115	Not Detected	--------	1.42E-01
CE-139	Not Detected	--------	4.18E-02
CE-141	Not Detected	-----	7.73E-02
CE-144	Not Detected	--------	3.27E-01
CO-56	Not Detected	--------	4.28E 02
CO-57	Not Detected	--------	4.72E-02
CO-58	Not Detected	--------	6.78E-02
CO-60	Not Detected	--------	7.82E-02
CR-51	Not Detected	--------	3.28E-01
CS-134	Not Detected	--------	6.99E-02
CS-137	Not Detected	--------	6.60E-02
CU-64	Not Detected	--------	1.83E+02
EU-152	Not Detected	--------	4.45E-01
EU 154	Not Detected	--------	2.91E-01
EU-155	Not Detected	--------	1.98E-01
FE-59	Not Detected	--------	1.32E-01
GD-153	Not Detected	--------	1.42E-01
HG-203	Not Detected	--------	3.67E-02
HO-166	Not Detected	--------	4.89E-02
I-131	Not Detected	--------	4.60E-02
IN-115m	Not Detected	--------	8.22E+01
IR-192	Not Detected	--------	3.82E-02
K-40	6.42	1.19	4.98E-01
LA-140	Not Detected	--------	1.93E-01
MN-54	Not Detected	--------	6.58E-02
MN-56	Not Detected	--------	1.21E+04
MO-99	Not Detected	--------	7.44E-01
NA-22	Not Detected	--------	8.50E-02
NA-24	Not Detected	--------	6.53E-01
NB-95	Not Detected	--------	2.48E-01
ND-147	Not Detected	--------	3.54E-01
NI-57	Not Detected	--------	2.71E-01
BE-7	Not Detected	--------	3.68E 01
RU-103	Not Detected	--------	4.41E-02
RU-106	Not Detected	--------	4.82E-01
SB-122	Not Detected	--------	1.10E-01
SB-124	Not Detected	--------	5.21E-02
SB-125	Not Detected	--------	1.31E-01
SC-46	Not Detected	--------	1.05E-01
SR-85	Not Detected	--------	5.52E-02
TA-182	Not Detected	--------	3.03E-01
TA-183	Not Detected	--------	3.61E-01
TE-132	Not Detected	--------	4.82E-02
TL-201	Not Detected	--------	2.26E-01
XE-133	Not Detected	--------	2.89E-01
Y-88	Not Detected	--------	9.04E-02
ZN-65	Not Detected	--------	1.93E-01
ZR-95	Not Detected	--------	1.07E-01

ANALYSIS REQUEST AND CHAIN OF CUSTODY 500090

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02603

Dept. No./Mail Stop: 7582/
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-2-95
Carrier/Waybill No.: HC
Lab Contact: Amir Mohagheti
Lab Destination: 7715
SMO Contact/Phone: Mike Gonzales/848-0404
Send Report to SMO: Debra Constant

Contract No.: N/A
Case No.: 3617.300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location Tech Area V
Building 6588 Room —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Parameter & Method Requested: Gamma Spec	Lab Sample ID
✓ 021721-00	TA5-BH-01-61.5	61.5	—	2/1/95, 11:10	Soil	P	500ml	none	G	EA	X	
✓ 021716-00	TA5-BH-01-70.5	70.5	—	11:50								
✓ 021717-00	TA5-BH-01-80.0	80.0	—	13:50								
✓ 021730-00	TA5-BH-01-90.0	90.0	—	15:00								
✓ 021740-00	TA5-BH-01-101.50	101.50	—	16:31								
-												
-												
-												
-												
-												

RMMA ☐ Yes ☒ No Ref. No.
Sample Disposal ☐ Return to Client ☒ Disposal by lab
Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2-9-95
Entered by: [signature]
QC inits.

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Team Members

Name	Signature	Init	Company/Organization
Michael Wade	[signature]	MW	Cleanal 7582
DON SCHOFIELD	[signature]	DS	SNL/7584
PAUL FRESHOFF	[signature]	PF	" "

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by [signature]	7584	2/2/95	11:37	4. Relinquished by			
1. Received by [signature]	SNL 7584	2/2/95	1137	4. Received by			
2. Relinquished by [signature]	SNL 7584	2/2/95	1215	5. Relinquished by			
2. Received by Rose J. Preston	7715	2/2/95	12 15	5. Received by			
3. Relinquished by [signature] for RTP	SNL 7715	2/6/95	1647	6. Relinquished by			
3. Received by [signature]	SNL 7584	2/6/95	1647	6. Received by			

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

```
*********************************************************************
*                    Sandia National Laboratories                   *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]*
*                      2-03-95  8:56:50 AM                          *
*********************************************************************
*                                                                   *
* Analyzed by:  2/6/95  Reviewed by:  2/6/95                        *
*********************************************************************
```

Customer : L.DAWSON/E. RANKIN (7582/SMO)
Customer Sample ID : 021721-00
Lab Sample ID : 50009601

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 705.000 Gram
Sample Date/Time : 2-01-95 11:10:00 AM
Acquire Start Date : 2-03-95 8:23:54 AM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1801 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

****

Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	2.16
TH-234	6.10E-01	3.01E-01	5.17E-01
U-234	Not Detected	--------	7.52
RA-226	8.90E-01	3.53E-01	4.81E-01
PB-214	5.05E-01	1.43E-01	4.41E-02
BI-214	4.99E-01	1.01E-01	5.40E-02
PB-210	Not Detected	--------	5.16E+02
TH-232	3.68E-01	1.43E-01	1.39E-01
RA-228	5.51E-01	1.82E-01	1.84E-01
AC-228	Not Detected	--------	2.89E-01
TH-228	5.78E-01	2.99E-01	4.33E-01
RA-224	9.13E-01	3.72E-01	3.96E-01
PB-212	3.83E-01	1.22E-01	3.68E-02
BI-212	Not Detected	--------	8.37E-01
TL-208	5.24E-01	1.18E-01	7.68E-02
U-235	Not Detected	--------	2.92E-01
TH-231	Not Detected	--------	7.43E-01
PA-231	Not Detected	--------	1.30
AC-227	Not Detected	--------	1.93
TH-227	Not Detected	--------	3.83E-01
RA-223	Not Detected	--------	2.50E-01
RN-219	Not Detected	--------	3.21E-01
PB-211	Not Detected	--------	8.12E-01
TL-207	Not Detected	--------	2.13E+01
AM-241	Not Detected	--------	2.96E-01
PU-239	Not Detected	--------	3.48E+02
~~NP-237~~	~~5.16E-01~~	~~1.68E-01~~	~~2.54E-01~~ not detected 2/6
PA-233	Not Detected	--------	6.64E-02
TH-229	Not Detected	--------	3.53E-01

[Summary Report] - Sample ID: 50009601

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	4.72E-02
AR-41	Not Detected	--------	2.30E+06
BA-133	Not Detected	--------	6.85E-02
BA-140	Not Detected	--------	1.58E-01
CD-109	Not Detected	--------	8.74E-01
CD-115	Not Detected	--------	1.33E-01
CE-139	Not Detected	--------	3.46E-02
CE-141	Not Detected	--------	6.74E-02
CE-144	Not Detected	--------	3.04E-01
CO-56	Not Detected	--------	5.72E-02
CO-57	Not Detected	--------	3.93E-02
CO-58	Not Detected	--------	4.76E-02
CO-60	Not Detected	--------	6.51E-02
CR-51	Not Detected	--------	2.85E-01
CS-134	Not Detected	--------	5.72E-02
CS-137	Not Detected	--------	5.16E-02
CU-64	Not Detected	--------	1.72E+02
EU-152	Not Detected	--------	3.99E-01
EU-154	Not Detected	--------	2.66E-01
EU-155	Not Detected	--------	1.81E-01
FE-59	Not Detected	--------	1.25E-01
GD-153	Not Detected	--------	1.32E-01
HG-203	Not Detected	--------	3.29E-02
HO-166	Not Detected	--------	4.18E-02
I-131	Not Detected	--------	4.22E-02
IN-115m	Not Detected	--------	8.31E+01
IR-192	Not Detected	--------	3.26E-02
K-40	1.21E+01	1.90	3.67E-01
LA-140	Not Detected	--------	1.60E-01
MN-54	Not Detected	--------	5.31E-02
MN-56	Not Detected	--------	1.16E+04
MO-99	Not Detected	--------	6.10E-01
NA-22	Not Detected	--------	7.72E-02
NA-24	Not Detected	--------	5.30E-01
NB-95	Not Detected	--------	2.50E-01
ND-147	Not Detected	--------	3.14E-01
NI-57	Not Detected	--------	2.07E-01
BE-7	Not Detected	--------	3.34E-01
RU-103	Not Detected	--------	3.95E-02
RU-106	Not Detected	--------	4.22E-01
SB-122	Not Detected	--------	9.40E-02
SB-124	Not Detected	--------	4.30E-02
SB-125	Not Detected	--------	1.11E-01
SC-46	Not Detected	--------	8.75E-02
SR-85	Not Detected	--------	4.78E-02
TA-182	Not Detected	--------	2.60E-01
TA-183	Not Detected	--------	3.30E-01
TE-132	Not Detected	--------	4.62E-02
TL-201	Not Detected	--------	1.97E-01
XE-133	Not Detected	--------	2.65E-01
Y-88	Not Detected	--------	7.35E-02
ZN-65	Not Detected	--------	1.63E-01
ZR-95	Not Detected	--------	9.60E-02

```
*************************************************************************
*                    Sandia National Laboratories                       *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]   *
*                        2-03-95  9:36:59 AM                            *
*************************************************************************
*                                                                       *
* Analyzed by: 2/6/95    Reviewed by: 2/6/95                            *
*************************************************************************
```

Customer : L.DAWSON/E. RANKIN (7582/SMO)
Customer Sample ID : 021716-00
Lab Sample ID : 50009602

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 798.000 Gram
Sample Date/Time : 2-01-95 11:50:00 AM
Acquire Start Date : 2-03-95 9:03:56 AM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1801 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

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Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	1.95
TH-234	8.83E-01	3.43E-01	4.37E-01
U-234	Not Detected	--------	6.27
RA-226	6.14E-01	2.88E-01	4.59E-01
PB-214	4.34E-01	1.24E-01	3.92E-02
BI-214	4.81E-01	9.50E-02	5.05E-02
PB-210	Not Detected	--------	4.89E+02
TH-232	4.39E-01	1.58E-01	1.19E-01
RA-228	6.51E-01	1.89E-01	1.62E-01
AC-228	Not Detected	--------	2.93E-01
TH-228	3.98E-01	2.49E-01	4.13E-01
RA-224	4.21E-01	2.54E-01	3.64E-01
PB-212	4.32E-01	1.37E-01	3.39E-02
BI-212	6.33E-01	2.66E-01	3.77E-01
TL-208	4.38E-01	1.01E-01	7.47E-02
U-235	Not Detected	--------	2.67E-01
TH-231	Not Detected	--------	7.10E-01
PA-231	Not Detected	--------	1.22
AC-227	Not Detected	--------	1.94
TH-227	Not Detected	--------	3.72E-01
RA-223	Not Detected	--------	2.39E-01
RN-219	Not Detected	--------	2.89E-01
PB-211	Not Detected	--------	7.20E-01
TL-207	Not Detected	--------	2.03E+01
AM-241	Not Detected	--------	2.68E-01
PU-239	Not Detected	--------	3.20E+02
~~NP-237~~	~~4.93E-01~~	~~1.78E-01~~	~~2.22E-01~~ not detected 2/6
PA-233	Not Detected	--------	6.09E-02
TH-229	Not Detected	--------	3.21E-01

[Summary Report] - Sample ID: 50009602

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	4.52E-02
AR-41	Not Detected	--------	2.06E+06
BA-133	Not Detected	--------	6.28E-02
BA-140	Not Detected	--------	1.51E-01
CD-109	Not Detected	--------	7.64E-01
CD-115	Not Detected	--------	1.30E-01
CE-139	Not Detected	--------	3.23E-02
CE-141	Not Detected	--------	6.17E-02
CE-144	Not Detected	--------	2.71E-01
CO-56	Not Detected	--------	5.28E-02
CO-57	Not Detected	--------	3.79E-02
CO-58	Not Detected	--------	4.78E-02
CO-60	Not Detected	--------	6.27E-02
CR-51	Not Detected	--------	2.70E-01
CS-134	Not Detected	--------	5.24E-02
CS-137	Not Detected	--------	4.90E-02
CU-64	Not Detected	--------	1.47E+02
EU-152	Not Detected	--------	3.60E-01
EU-154	Not Detected	--------	2.47E-01
EU-155	Not Detected	--------	1.63E-01
FE-59	Not Detected	--------	1.08E-01
GD-153	Not Detected	--------	1.17E-01
HG-203	Not Detected	--------	3.04E-02
HO-166	Not Detected	--------	3.83E-02
I-131	Not Detected	--------	3.79E-02
IN-115m	Not Detected	--------	8.14E+01
IR-192	Not Detected	--------	3.15E-02
K-40	1.07E+01	1.67	3.41E-01
LA-140	Not Detected	--------	1.32E-01
MN-54	Not Detected	--------	4.76E-02
MN-56	Not Detected	--------	1.07E+04
MO-99	Not Detected	--------	5.64E-01
NA-22	Not Detected	--------	6.31E-02
NA-24	Not Detected	--------	4.78E-01
NB-95	Not Detected	--------	2.44E-01
ND-147	Not Detected	--------	2.86E-01
NI-57	Not Detected	--------	1.97E-01
BE-7	Not Detected	--------	2.97E-01
RU-103	Not Detected	--------	3.47E-02
RU-106	Not Detected	--------	4.13E-01
SB-122	Not Detected	--------	8.09E-02
SB-124	Not Detected	--------	3.66E-02
SB-125	Not Detected	--------	9.85E-02
SC-46	Not Detected	--------	8.17E-02
SR-85	Not Detected	--------	4.67E-02
TA-182	Not Detected	--------	2.41E-01
TA-183	Not Detected	--------	2.98E-01
TE-132	Not Detected	--------	4.10E-02
TL-201	Not Detected	--------	1.92E-01
XE-133	Not Detected	--------	2.44E-01
Y-88	Not Detected	--------	6.38E-02
ZN-65	Not Detected	--------	1.56E-01
ZR-95	Not Detected	--------	8.78E-02

```
*************************************************************************
*                    Sandia National Laboratories                       *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]   *
*                        2-03-95  1:41:46 PM                            *
*************************************************************************
*                                                                       *
* Analyzed by:  2/6/95  Reviewed by:  2/6/95                            *
*************************************************************************
```

Customer : L.DAWSON/E. RANKIN (7582/SMO)
Customer Sample ID : 021717-00
Lab Sample ID : 50009603

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 571.000 Gram
Sample Date/Time : 2-01-95 1:50:00 PM
Acquire Start Date : 2-03-95 1:08:44 PM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1801 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

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Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	2.23
TH-234	8.25E-01	4.04E-01	5.02E-01
U-234	Not Detected	--------	7.81
RA-226	1.23	4.59E-01	5.79E-01
PB-214	5.03E-01	1.45E-01	6.09E-02
BI-214	4.63E-01	1.00E-01	6.54E-02
PB-210	Not Detected	--------	1.78E+01
TH-232	5.88E-01	2.14E-01	1.87E-01
RA-228	6.35E-01	2.10E-01	2.20E-01
AC-228	Not Detected	--------	3.44E-01
TH-228	7.97E-01	4.06E-01	6.12E-01
RA-224	9.71E-01	4.31E-01	5.53E-01
PB-212	5.61E-01	1.73E-01	5.19E-02
BI-212	7.05E-01	3.07E-01	4.49E-01
TL-208	4.61E-01	1.15E-01	9.69E-02
U-235	Not Detected	--------	3.35E-01
TH-231	Not Detected	--------	7.92E-01
PA-231	Not Detected	--------	1.69
AC-227	Not Detected	--------	2.33
TH-227	Not Detected	--------	5.39E-01
RA-223	Not Detected	--------	2.66E-01
RN-219	Not Detected	--------	4.26E-01
PB-211	Not Detected	--------	9.64E-01
TL-207	Not Detected	--------	2.39E+01
AM-241	Not Detected	--------	2.70E-01
PU-239	Not Detected	--------	3.61E+02
~~NP-237~~	~~6.39E-01~~	~~2.09E-01~~	~~2.51E-01~~ not detected 2/6
PA-233	Not Detected	--------	9.78E-02
TH-229	Not Detected	--------	3.49E-01

[Summary Report] - Sample ID: 50009603

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	5.16E-02
AR-41	Not Detected	--------	5.50E+06
BA-133	Not Detected	--------	8.97E-02
BA-140	Not Detected	--------	1.91E-01
CD-109	Not Detected	--------	1.64
CD-115	Not Detected	--------	1.86E-01
CE-139	Not Detected	--------	4.23E-02
CE-141	Not Detected	--------	7.61E-02
CE-144	Not Detected	--------	3.23E-01
CO-56	Not Detected	--------	6.66E-02
CO-57	Not Detected	--------	4.00E-02
CO-58	Not Detected	--------	6.27E-02
CO-60	Not Detected	--------	7.68E-02
CR-51	Not Detected	--------	3.78E-01
CS-134	Not Detected	--------	6.19E-02
CS-137	Not Detected	--------	6.13E-02
CU-64	Not Detected	--------	2.20E+02
EU-152	Not Detected	--------	4.46E-01
EU-154	Not Detected	--------	2.93E-01
EU-155	Not Detected	--------	1.72E-01
FE-59	Not Detected	--------	1.42E-01
GD-153	Not Detected	--------	1.32E-01
HG-203	Not Detected	--------	4.36E-02
HO-166	Not Detected	--------	5.15E-02
I-131	Not Detected	--------	5.32E-02
IN-115m	Not Detected	--------	1.56E+02
IR-192	Not Detected	--------	4.63E-02
K-40	1.32E+01	2.11	4.54E-01
LA-140	Not Detected	--------	1.99E-01
MN-54	Not Detected	--------	6.33E-02
MN-56	Not Detected	--------	2.36E+04
MO-99	Not Detected	--------	7.29E-01
NA-22	Not Detected	--------	8.53E-02
NA-24	Not Detected	--------	6.58E-01
NB-95	Not Detected	--------	3.56E-01
ND-147	Not Detected	--------	3.61E-01
NI-57	Not Detected	--------	2.64E-01
BE-7	Not Detected	--------	4.07E-01
RU-103	Not Detected	--------	4.80E-02
RU-106	Not Detected	--------	4.66E-01
SB-122	Not Detected	--------	1.14E-01
SB-124	Not Detected	--------	4.83E-02
SB-125	Not Detected	--------	1.39E-01
SC-46	Not Detected	--------	8.95E-02
SR-85	Not Detected	--------	5.99E-02
TA-182	Not Detected	--------	2.64E-01
TA-183	Not Detected	--------	3.00E-01
TE-132	Not Detected	--------	5.91E-02
TL-201	Not Detected	--------	2.26E-01
XE-133	Not Detected	--------	2.86E-01
Y-88	Not Detected	--------	9.22E-02
ZN-65	Not Detected	--------	1.78E-01
ZR-95	Not Detected	--------	1.07E-01

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]       *
*                      2-03-95  4:38:43 PM                                  *
*****************************************************************************
*                                                                           *
* Analyzed by: 2/6/95   Reviewed by: 2/6/95                                 *
*****************************************************************************
```

Customer : L. DAWSON/E. RANKIN (7582/SMO)
Customer Sample ID : 021730-00
Lab Sample ID : 50009604

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 578.000 Gram
Sample Date/Time : 2-01-95 3:00:00 PM
Acquire Start Date : 2-03-95 4:05:40 PM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1801 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

*****

Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	2.67
TH-234	8.62E-01	4.15E-01	6.33E-01
U-234	Not Detected	--------	9.00
RA-226	8.80E-01	3.85E-01	5.76E-01
PB-214	5.15E-01	1.49E-01	5.84E-02
BI-214	5.68E-01	1.17E-01	6.91E-02
PB-210	Not Detected	--------	6.50E+02
TH-232	6.11E-01	2.18E-01	1.77E-01
RA-228	4.70E-01	2.19E-01	2.36E-01
AC-228	7.00E-01	1.78E-01	1.46E-01
TH-228	7.28E-01	3.77E-01	5.64E-01
RA-224	6.90E-01	3.54E-01	4.87E-01
PB-212	5.80E-01	1.86E-01	4.54E-02
BI-212	6.69E-01	3.18E-01	4.57E-01
TL-208	5.18E-01	1.25E-01	1.00E-01
U-235	Not Detected	--------	3.46E-01
~~TH-231~~	~~4.16E-01~~	~~2.54E-01~~	~~4.87E-01~~ not detected 2/6/
PA-231	Not Detected	--------	1.61
AC-227	Not Detected	--------	2.43
TH-227	Not Detected	--------	4.96E-01
RA-223	Not Detected	--------	3.14E-01
RN-219	Not Detected	--------	3.74E-01
PB-211	Not Detected	--------	9.30E-01
TL-207	Not Detected	--------	2.85E+01
AM-241	Not Detected	--------	3.66E-01
PU-239	Not Detected	--------	4.16E+02
~~NP-237~~	~~6.69E-01~~	~~2.13E-01~~	~~3.10E-01~~ Not detected 2/6/
PA-233	Not Detected	--------	8.34E-02
TH-229	Not Detected	--------	4.33E-01

[Summary Report] - Sample ID: 50009604

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	5.52E-02
AR-41	Not Detected	--------	1.24E+07
BA-133	Not Detected	--------	8.23E-02
BA-140	Not Detected	--------	2.01E-01
CD-109	Not Detected	--------	1.07
CD-115	Not Detected	--------	1.76E-01
CE-139	Not Detected	--------	4.22E-02
CE-141	Not Detected	--------	8.10E-02
CE-144	Not Detected	--------	3.49E-01
CO-56	Not Detected	--------	7.19E-02
CO-57	Not Detected	--------	4.93E-02
CO-58	Not Detected	--------	6.22E-02
CO-60	Not Detected	--------	8.16E-02
CR-51	Not Detected	--------	3.47E-01
CS-134	Not Detected	--------	6.95E-02
CS-137	Not Detected	--------	6.45E-02
CU-64	Not Detected	--------	2.44E+02
EU-152	Not Detected	--------	4.67E-01
EU-154	Not Detected	--------	3.36E-01
EU-155	Not Detected	--------	2.15E-01
FE-59	Not Detected	--------	1.44E-01
GD-153	Not Detected	--------	1.58E-01
HG-203	Not Detected	--------	3.90E-02
HO-166	Not Detected	--------	4.85E-02
I-131	Not Detected	--------	4.98E-02
IN-115m	Not Detected	--------	1.91E+02
IR-192	Not Detected	--------	3.95E-02
K-40	1.44E+01	2.26	4.40E-01
LA-140	Not Detected	--------	1.99E-01
MN-54	Not Detected	--------	6.33E-02
MN-56	Not Detected	--------	4.11E+04
MO-99	Not Detected	--------	8.04E-01
NA-22	Not Detected	--------	8.58E-02
NA-24	Not Detected	--------	8.20E-01
NB-95	Not Detected	--------	3.31E-01
ND-147	Not Detected	--------	3.72E-01
NI-57	Not Detected	--------	2.96E-01
BE-7	Not Detected	--------	4.12E-01
RU-103	Not Detected	--------	4.76E-02
RU-106	Not Detected	--------	4.55E-01
SB-122	Not Detected	--------	1.17E-01
SB-124	Not Detected	--------	5.33E-02
SB-125	Not Detected	--------	1.33E-01
SC-46	Not Detected	--------	1.08E-01
SR-85	Not Detected	--------	6.34E-02
TA-182	Not Detected	--------	3.17E-01
TA-183	Not Detected	--------	4.17E-01
TE-132	Not Detected	--------	5.73E-02
TL-201	Not Detected	--------	2.62E-01
XE-133	Not Detected	--------	3.41E-01
Y-88	Not Detected	--------	8.81E-02
ZN-65	Not Detected	--------	1.96E-01
ZR-95	Not Detected	--------	1.17E-01

```
*********************************************************************
*                    Sandia National Laboratories                   *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]*
*                      2-06-95  8:11:41 AM                          *
*********************************************************************
*                                                                   *
* Analyzed by:                2/6/95  Reviewed by:          2/6/95 *
*********************************************************************
```

Customer : L. DAWSON/E. RANKIN (7582/SMO)
Customer Sample ID : 021740-00
Lab Sample ID : 50009605

Sample Description : MARINELLI SOLID SAMPLE
Sample Type : Solid
Sample Geometry : 1SMAR
Sample Quantity : 469.000 Gram
Sample Date/Time : 2-01-95 4:31:00 PM
Acquire Start Date : 2-06-95 7:38:26 AM
Detector Name : LAB01
Elapsed Live Time : 1800 seconds
Elapsed Real Time : 1801 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

****

Nuclide	Activity (pCi/Gram)	2S Error	MDA
U-238	Not Detected	--------	3.07
TH-234	1.05	4.74E-01	7.30E-01
U-234	Not Detected	--------	1.01E+01
RA-226	1.56	5.78E-01	7.26E-01
PB-214	5.93E-01	1.72E-01	6.68E-02
BI-214	6.68E-01	1.38E-01	7.75E-02
PB-210	Not Detected	--------	7.68E+02
TH-232	4.97E-01	2.02E-01	2.14E-01
RA-228	5.76E-01	2.37E-01	2.95E-01
AC-228	8.53E-01	2.17E-01	1.75E-01
TH-228	6.36E-01	3.81E-01	6.79E-01
RA-224	6.66E-01	4.03E-01	5.86E-01
PB-212	5.92E-01	1.91E-01	5.40E-02
BI-212	8.25E-01	3.89E-01	6.01E-01
TL-208	5.17E-01	1.34E-01	1.21E-01
U-235	Not Detected	--------	4.08E-01
TH-231	Not Detected	--------	1.12
PA-231	Not Detected	--------	1.73
AC-227	Not Detected	--------	2.81
TH-227	Not Detected	--------	5.75E-01
RA-223	Not Detected	--------	4.51E-01
RN-219	Not Detected	--------	4.58E-01
PB-211	Not Detected	--------	1.15
TL-207	Not Detected	--------	3.35E+01
AM-241	Not Detected	--------	4.20E-01
~~PU-239~~	~~2.11E+02~~	~~1.33E+02~~	~~2.91E+02~~
~~NP-237~~	~~7.66E-01~~	~~2.48E-01~~	~~3.56E-01~~
PA-233	Not Detected	--------	9.88E-02
TH-229	Not Detected	--------	5.08E-01

not detected 2/6

[Summary Report] - Sample ID: 50009605

Nuclide	Activity (pCi/Gram)	2S Error	MDA
AG-110m	Not Detected	--------	6.88E-02
AR-41	Not Detected	--------	2.54E+17
BA-133	Not Detected	--------	9.51E-02
BA-140	Not Detected	--------	2.71E-01
CD-109	Not Detected	--------	2.36
CD-115	Not Detected	--------	4.75E-01
CE-139	Not Detected	--------	5.27E-02
CE-141	Not Detected	--------	1.01E-01
CE-144	Not Detected	--------	4.14E-01
CO-56	Not Detected	--------	4.87E-02
CO-57	Not Detected	--------	5.60E-02
CO-58	Not Detected	--------	7.71E-02
CO-60	Not Detected	--------	9.60E-02
CR-51	Not Detected	--------	4.64E-01
CS-134	Not Detected	--------	8.52E-02
CS-137	Not Detected	--------	7.72E-02
CU-64	Not Detected	--------	9.09E+03
EU-152	Not Detected	--------	5.78E-01
EU-154	Not Detected	--------	3.89E-01
EU-155	Not Detected	--------	2.45E-01
FE-59	Not Detected	--------	1.79E-01
GD-153	Not Detected	--------	1.93E-01
HG-203	Not Detected	--------	4.90E-02
HO-166	Not Detected	--------	6.17E-02
I-131	Not Detected	--------	7.65E-02
IN-115m	Not Detected	--------	3.34E+06
IR-192	Not Detected	--------	5.09E-02
K-40	1.38E+01	2.25	5.65E-01
LA-140	Not Detected	--------	7.69E-01
MN-54	Not Detected	--------	8.32E-02
MN-56	Not Detected	--------	8.45E+11
MO-99	Not Detected	--------	1.89
NA-22	Not Detected	--------	1.06E-01
NA-24	Not Detected	--------	1.67E+01
NB-95	Not Detected	--------	6.42E-01
ND-147	Not Detected	--------	5.18E-01
NI-57	Not Detected	--------	1.11
BE-7	Not Detected	--------	5.43E-01
RU-103	Not Detected	--------	5.69E-02
RU-106	Not Detected	--------	5.70E-01
SB-122	Not Detected	--------	2.66E-01
SB-124	Not Detected	--------	6.69E-02
SB-125	Not Detected	--------	1.50E-01
SC-46	Not Detected	--------	1.28E-01
SR-85	Not Detected	--------	7.76E-02
TA-182	Not Detected	--------	3.70E-01
TA-183	Not Detected	--------	6.78E-01
TE-132	Not Detected	--------	1.10E-01
TL-201	Not Detected	--------	5.52E-01
XE-133	Not Detected	--------	9.07E-01
Y-88	Not Detected	--------	1.10E-01
ZN-65	Not Detected	--------	2.43E-01
ZR-95	Not Detected	--------	1.37E-01

```
*****************************************************************************
*                      Sandia National Laboratories                         *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]        *
*                        2-02-95  6:38:35 PM                                *
*****************************************************************************
*                                                                           *
* Analyzed by: 2/6/95   Reviewed by: 2/6/95                                 *
*****************************************************************************
```

Customer : L.DAWSON/E.RANKIN (7582/SMO)
Customer Sample ID : 021692-00
Lab Sample ID : 50009606

this sample is on COC 2609 MB

Sample Description : MARINELLI LIQUID SAMPLE
Sample Type : Liquid
Sample Geometry : 1WMAR
Sample Quantity : 500.000 mL
Sample Date/Time : 2-02-95 8:36:00 AM
Acquire Start Date : 2-02-95 4:50:58 PM
Detector Name : LAB01
Elapsed Live Time : 6000 seconds
Elapsed Real Time : 6001 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

*****

Nuclide	Activity (pCi/mL)	2S Error	MDA
U-238	Not Detected	--------	8.46E-01
TH-234	Not Detected	--------	1.99E-01
U-234	Not Detected	--------	2.60
RA-226	Not Detected	--------	3.92E-01
PB-214	Not Detected	--------	4.48E-02
BI-214	Not Detected	--------	5.15E-02
PB-210	Not Detected	--------	7.00
TH-232	Not Detected	--------	1.23E-01
RA-228	Not Detected	--------	1.39E-01
AC-228	Not Detected	--------	8.02E-02
TH-228	Not Detected	--------	4.25E-01
RA-224	Not Detected	--------	3.83E-01
PB-212	1.10E-02	1.06E-02	2.11E-02
BI-212	Not Detected	--------	3.02E-01
TL-208	Not Detected	--------	6.14E-02
U-235	Not Detected	--------	1.32E-01
TH-231	Not Detected	--------	3.50E-01
PA-231	Not Detected	--------	5.91E-01
AC-227	Not Detected	--------	9.97E-01
TH-227	Not Detected	--------	1.35E-01
RA-223	Not Detected	--------	1.08E-01
RN-219	Not Detected	--------	1.48E-01
PB-211	Not Detected	--------	4.00E-01
TL-207	Not Detected	--------	9.16
AM-241	Not Detected	--------	1.05E-01
PU-239	Not Detected	--------	1.38E+02
~~NP-237~~	~~3.83E-01~~	~~9.97E-02~~	~~1.12E-01~~ Not detected 2/6/95
PA-233	Not Detected	--------	3.66E-02
TH-229	Not Detected	--------	1.36E-01

[Summary Report] - Sample ID: 50009606

Nuclide	Activity (pCi/mL)	2S Error	MDA
AG-110m	Not Detected	--------	1.95E-02
AR-41	Not Detected	--------	8.22E-01
BA-133	Not Detected	--------	2.50E-02
BA-140	Not Detected	--------	6.84E-02
CD-109	Not Detected	--------	6.47E-01
CD-115	Not Detected	--------	3.54E-02
CE-139	Not Detected	--------	1.67E-02
CE-141	Not Detected	--------	2.98E-02
CE-144	Not Detected	--------	1.24E-01
~~CO-56~~	~~3.59E-03~~	~~1.10E-02~~	~~2.01E-02~~ not detected
CO-57	Not Detected	--------	1.72E-02
CO-58	Not Detected	--------	2.03E-02
CO-60	Not Detected	--------	2.75E-02
CR-51	Not Detected	--------	1.45E-01
CS-134	Not Detected	--------	2.22E-02
CS-137	Not Detected	--------	2.13E-02
CU-64	Not Detected	--------	9.15
EU-152	Not Detected	--------	1.79E-01
EU-154	Not Detected	--------	1.02E-01
EU-155	Not Detected	--------	6.65E-02
FE-59	Not Detected	--------	4.34E-02
GD-153	Not Detected	--------	4.69E-02
HG-203	Not Detected	--------	1.72E-02
HO-166	Not Detected	--------	1.94E-02
I-131	Not Detected	--------	1.92E-02
IN-115m	Not Detected	--------	1.28E-01
IR-192	Not Detected	--------	1.75E-02
K-40	Not Detected	--------	3.09E-01
LA-140	Not Detected	--------	3.86E-02
MN-54	Not Detected	--------	2.08E-02
MN-56	Not Detected	--------	2.30E-01
MO-99	Not Detected	--------	1.84E-01
NA-22	Not Detected	--------	2.60E-02
NA-24	Not Detected	--------	4.46E-02
NB-95	Not Detected	--------	6.70E-02
ND-147	Not Detected	--------	1.25E-01
NI-57	Not Detected	--------	4.53E-02
BE-7	Not Detected	--------	1.59E-01
RU-103	Not Detected	--------	1.93E-02
RU-106	Not Detected	--------	1.88E-01
SB-122	Not Detected	--------	2.83E-02
SB-124	Not Detected	--------	2.15E-02
SB-125	Not Detected	--------	5.66E-02
SC-46	Not Detected	--------	2.61E-02
SR-85	Not Detected	--------	2.54E-02
TA-182	Not Detected	--------	7.71E-02
TA-183	Not Detected	--------	9.42E-02
TE-132	Not Detected	--------	1.64E-02
TL-201	Not Detected	--------	6.05E-02
XE-133	Not Detected	--------	7.13E-02
Y-88	Not Detected	--------	3.80E-02
ZN-65	Not Detected	--------	4.93E-02
ZR-95	Not Detected	--------	3.63E-02

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]       *
*                      2-06-95  8:59:28 AM                                  *
*****************************************************************************
*                                                                           *
* Analyzed by:  2/6/95   Reviewed by:  2/6/95                               *
*****************************************************************************
```

Customer : L. DAWSON/E. RANKIN (7582/SMO)
Customer Sample ID : LCS ANALYSIS FOR SOURCE #CG-134
Lab Sample ID : 50009607

Sample Description : MIXED GAMMA SOURCE
Sample Type : Liquid
Sample Geometry : WMAR
Sample Quantity : 1.000 Each
Sample Date/Time : 11-01-90 12:00:00 PM
Acquire Start Date : 2-06-95 8:46:41 AM
Detector Name : LAB01
Elapsed Live Time : 600 seconds
Elapsed Real Time : 609 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

*****

Nuclide	Activity (pCi/Each)	2S Error	MDA
U-238	Not Detected	--------	8.28E+03
TH-234	Not Detected	--------	3.19E+03
U-234	Not Detected	--------	5.35E+04
RA-226	Not Detected	--------	4.88E+03
PB-214	Not Detected	--------	6.19E+02
BI-214	Not Detected	--------	5.72E+02
PB-210	Not Detected	--------	1.29E+05
TH-232	Not Detected	--------	1.94E+03
RA-228	Not Detected	--------	2.73E+03
AC-228	Not Detected	--------	1.66E+03
TH-228	Not Detected	--------	2.89E+04
RA-224	Not Detected	--------	2.27E+04
PB-212	Not Detected	--------	2.06E+03
BI-212	Not Detected	--------	2.02E+04
TL-208	Not Detected	--------	3.89E+03
U-235	Not Detected	--------	1.39E+03
TH-231	Not Detected	--------	2.58E+03
PA-231	Not Detected	--------	8.57E+03
AC-227	Not Detected	--------	1.24E+04
TH-227	Not Detected	--------	1.95E+03
RA-223	Not Detected	--------	1.00E+26
RN-219	Not Detected	--------	2.40E+03
PB-211	Not Detected	--------	7.54E+03
TL-207	Not Detected	--------	2.03E+05
AM-241	8.34E+04	1.20E+04	7.98E+02
PU-239	Not Detected	--------	1.56E+06
NP-237	Not Detected	--------	1.99E+03
PA-233	Not Detected	--------	5.39E+02
TH-229	Not Detected	--------	1.54E+03

[Summary Report] - Sample ID: 50009607

Nuclide	Activity (pCi/Each)	2S Error	MDA
AG-110m	Not Detected	--------	1.14E+05
AR-41	Not Detected	--------	1.00E+26
BA-133	Not Detected	--------	4.74E+02
BA-140	Not Detected	--------	1.00E+26
CD-109	3.55E+05	5.97E+04	3.45E+04
CD-115	Not Detected	--------	1.00E+26
CE-139	Not Detected	--------	4.85E+05
CE-141	Not Detected	--------	8.55E+16
CE-144	Not Detected	--------	6.28E+04
CO-56	Not Detected	--------	4.42E+08
CO-57	1.30E+04	3.49E+03	6.45E+03
CO-58	Not Detected	--------	1.43E+09
CO-60	8.01E+04	1.07E+04	2.31E+02
CR-51	Not Detected	--------	1.77E+20
CS-134	Not Detected	--------	1.10E+03
CS-137	7.11E+04	9.88E+03	2.27E+02
CU-64	Not Detected	--------	1.00E+26
EU-152	Not Detected	--------	3.15E+03
EU-154	Not Detected	--------	1.99E+03
EU-155	Not Detected	--------	1.46E+03
FE-59	Not Detected	--------	2.90E+13
GD-153	Not Detected	--------	4.76E+04
HG-203	Not Detected	--------	2.71E+12
HO-166	Not Detected	--------	2.30E+02
I-131	Not Detected	--------	1.00E+26
IN-115m	Not Detected	--------	1.00E+26
IR-192	Not Detected	--------	5.63E+08
K-40	Not Detected	--------	2.00E+03
LA-140	Not Detected	--------	1.00E+26
MN-54	Not Detected	--------	1.18E+04
MN-56	Not Detected	--------	1.00E+26
MO-99	Not Detected	--------	1.00E+26
NA-22	Not Detected	--------	7.69E+02
NA-24	Not Detected	--------	1.00E+26
NB-95	Not Detected	--------	1.00E+26
ND-147	Not Detected	--------	1.00E+26
NI-57	Not Detected	--------	1.00E+26
BE-7	Not Detected	--------	1.84E+12
RU-103	Not Detected	--------	2.62E+14
RU-106	Not Detected	--------	4.96E+04
SB-122	Not Detected	--------	1.00E+26
SB-124	Not Detected	--------	1.61E+10
SB-125	Not Detected	--------	2.82E+03
SC-46	Not Detected	--------	1.64E+08
SR-85	Not Detected	--------	5.27E+09
TA-182	Not Detected	--------	1.44E+07
TA-183	Not Detected	--------	1.00E+26
TE-132	Not Detected	--------	1.00E+26
TL-201	Not Detected	--------	1.00E+26
XE-133	Not Detected	--------	1.00E+26
Y-88	Not Detected	--------	6.17E+06
ZN-65	Not Detected	--------	7.23E+04
ZR-95	Not Detected	--------	1.20E+10

```
*************************************************************************
*                    Sandia National Laboratories                       *
*              Radiation Protection Sample Diagnostics Program          *
*                      Quality Assurance Report                         *
*************************************************************************
```

Report Date	:	2-06-95 9:02:09 AM
QA File	:	C:\GENIEPC\CAMFILES\LCS1.QAF
Analyst	:	FCD
Sample ID	:	50009607
Sample Quantity	:	1.00 Each
Sample Date	:	11-01-90 12:00:00 PM
Measurement Date	:	2-06-95 8:46:41 AM
Elapsed Live Time	:	600 seconds
Elapsed Real Time	:	609 seconds

Parameter	Mean	1S Error	New Value	< LU	: SD	: UD	: BS >
AM-241 Activity	8.546E-02	2.257E-03	8.339E-02	<	:	:	: >
CS-137 Activity	7.072E-02	1.604E-03	7.112E-02	<	:	:	: >
CO-60 Activity	7.936E-02	1.588E-03	7.954E-02	<	:	:	: >

Flags Key:		
	LU = Boundary Test	(Ab = Above , Be = Below)
	SD = Sample Driven N-Sigma Test	(In = Investigate, Ac = Action)
	UD = User Driven N-Sigma Test	(In = Investigate, Ac = Action)
	BS = Measurement Bias Test	(In = Investigate, Ac = Action)

Reviewed by: 2/6/95

ANALYSIS REQUEST AND CHAIN OF CUSTODY 500096

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02609

Dept. No./Mail Stop: 7582
Project/Task Manager: LON DAWSON
Project Name: TAB TCE PLUMS
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-2-95
Carrier/Waybill No.: HC
Lab Contact: AMIR MOHAGHEGHI
Lab Destination: 7715
SMO Contact/Phone: MIKE GONZALES/818-0404
Send Report to SMO: DEBRA CONSTANT

Contract No.: N/A
Case No.: 367,300
SMO Authorization:
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Parameter & Method Requested

Location — Tech Area V — Building 6588 — Room —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	GAMMA SPEC	Lab Sample ID
V02169 2 - 00	TA5-B4-01-EB1	100	NONE	2/2/95 8:36	W	P	500ml	NONE	G	EB	X	

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☐ Normal ☒ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy) 2-6-95; Entered By: DCC; QC Init.

Special Instructions/QC Requirements: * Collected at TD=100 ft deep over split-spoon samplers.

Abnormal Conditions on Receipt:

Sample Team Members	Name	Signature	Init.	Company/Organization
	MICHAEL WADE			Duteg/7582
	PAUL FRESHOUR			SNL/7584
	DAN Schofield			

1. Relinquished by		Org. 7584	Date 2/2/95	Time 11:37	4. Relinquished by	Org.	Date	Time
1. Received by		Org. SNL7576	Date 2/2/95	Time 11:35	4. Received by	Org.	Date	Time
2. Relinquished by		Org. SNL7576	Date 2/2/95	Time 1215	5. Relinquished by	Org.	Date	Time
2. Received by	Rose J. Prunton	Org. 7715	Date 2/2/95	Time 1215	5. Received by	Org.	Date	Time
3. Relinquished by		Org. SNL7715	Date 2/6/95	Time 1647	6. Relinquished by	Org.	Date	Time
3. Received by		Org. SNL7576	Date 2/6/95	Time 1647	6. Received by	Org.	Date	Time

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

```
*********************************************************************
*                    Sandia National Laboratories                   *
*    Radiation Protection Sample Diagnostics Program [881 Laboratory]*
*                      2-02-95  6:38:35 PM                          *
*********************************************************************
*                                                                   *
* Analyzed by: 2/6/95   Reviewed by: 2/6/95                         *
*********************************************************************
```

Customer : L.DAWSON/E.RANKIN (7582/SMO)
Customer Sample ID : 021692-00
Lab Sample ID : 50009606

Sample Description : MARINELLI LIQUID SAMPLE
Sample Type : Liquid
Sample Geometry : 1WMAR
Sample Quantity : 500.000 mL
Sample Date/Time : 2-02-95 8:36:00 AM
Acquire Start Date : 2-02-95 4:50:58 PM
Detector Name : LAB01
Elapsed Live Time : 6000 seconds
Elapsed Real Time : 6001 seconds

RECEIVED
FEB 06 1995
SNL/SMO

Comments:

****

Nuclide	Activity (pCi/mL)	2S Error	MDA
U-238	Not Detected	--------	8.46E-01
TH-234	Not Detected	--------	1.99E-01
U-234	Not Detected	--------	2.60
RA-226	Not Detected	--------	3.92E-01
PB-214	Not Detected	--------	4.48E-02
BI-214	Not Detected	--------	5.15E-02
PB-210	Not Detected	--------	7.00
TH-232	Not Detected	--------	1.23E-01
RA-228	Not Detected	--------	1.39E-01
AC-228	Not Detected	--------	8.02E-02
TH-228	Not Detected	--------	4.25E-01
RA-224	Not Detected	--------	3.83E-01
PB-212	1.10E-02	1.06E-02	2.11E-02
BI-212	Not Detected	--------	3.02E-01
TL-208	Not Detected	--------	6.14E-02
U-235	Not Detected	--------	1.32E-01
TH-231	Not Detected	--------	3.50E-01
PA-231	Not Detected	--------	5.91E-01
AC-227	Not Detected	--------	9.97E-01
TH-227	Not Detected	--------	1.35E-01
RA-223	Not Detected	--------	1.08E-01
RN-219	Not Detected	--------	1.48E-01
PB-211	Not Detected	--------	4.00E-01
TL-207	Not Detected	--------	9.16
AM-241	Not Detected	--------	1.05E-01
PU-239	Not Detected	--------	1.38E+02
~~NP-237~~	~~3.83E-01~~	~~9.97E-02~~	~~1.12E-01~~ Not detected 2/6/95
PA-233	Not Detected	--------	3.66E-02
TH-229	Not Detected	--------	1.36E-01

[Summary Report] - Sample ID: 50009606

Nuclide	Activity (pCi/mL)	2S Error	MDA
AG-110m	Not Detected	--------	1.95E-02
AR-41	Not Detected	--------	8.22E-01
BA-133	Not Detected	--------	2.50E-02
BA-140	Not Detected	--------	6.84E-02
CD-109	Not Detected	--------	6.47E-01
CD-115	Not Detected	--------	3.54E-02
CE-139	Not Detected	--------	1.67E-02
CE-141	Not Detected	--------	2.98E-02
CE-144	Not Detected	--------	1.24E-01
~~CO-56~~	~~3.59E-03~~	~~1.10E-02~~	~~2.01E-02~~ not detected
CO-57	Not Detected	--------	1.72E-02
CO-58	Not Detected	--------	2.03E-02
CO-60	Not Detected	--------	2.75E-02
CR-51	Not Detected	--------	1.45E-01
CS-134	Not Detected	--------	2.22E-02
CS-137	Not Detected	--------	2.13E-02
CU-64	Not Detected	--------	9.15
EU-152	Not Detected	--------	1.79E-01
EU-154	Not Detected	--------	1.02E-01
EU-155	Not Detected	--------	6.65E-02
FE-59	Not Detected	--------	4.34E-02
GD-153	Not Detected	--------	4.69E-02
HG-203	Not Detected	--------	1.72E-02
HO-166	Not Detected	--------	1.94E-02
I-131	Not Detected	--------	1.92E-02
IN-115m	Not Detected	--------	1.28E-01
IR-192	Not Detected	--------	1.75E-02
K-40	Not Detected	--------	3.09E-01
LA-140	Not Detected	--------	3.86E-02
MN-54	Not Detected	--------	2.08E-02
MN-56	Not Detected	--------	2.30E-01
MO-99	Not Detected	--------	1.84E-01
NA-22	Not Detected	--------	2.60E-02
NA-24	Not Detected	--------	4.46E-02
NB-95	Not Detected	--------	6.70E-02
ND-147	Not Detected	--------	1.25E-01
NI-57	Not Detected	--------	4.53E-02
BE-7	Not Detected	--------	1.59E-01
RU-103	Not Detected	--------	1.93E-02
RU-106	Not Detected	--------	1.88E-01
SB-122	Not Detected	--------	2.83E-02
SB-124	Not Detected	--------	2.15E-02
SB-125	Not Detected	--------	5.66E-02
SC-46	Not Detected	--------	2.61E-02
SR-85	Not Detected	--------	2.54E-02
TA-182	Not Detected	--------	7.71E-02
TA-183	Not Detected	--------	9.42E-02
TE-132	Not Detected	--------	1.64E-02
TL-201	Not Detected	--------	6.05E-02
XE-133	Not Detected	--------	7.13E-02
Y-88	Not Detected	--------	3.80E-02
ZN-65	Not Detected	--------	4.93E-02
ZR-95	Not Detected	--------	3.63E-02

ANNEX 2-H
Calculation Brief for Tritium Concentration in Soil Samples
Borehole TAV-BH-01

INTERNATIONAL TECHNOLOGY CORPORATION

ly D. Bowen **Date** 12/8/97 **Subject** Rad Soil Concentration (Water-to-Soil) **Sheet No.** 1 **of** 2

Chkd. By M. Nagy **Date** 12/9/97 **Proj. No.** 301462.186.020

Purpose:
The purpose of this calculation brief is to derive a relationship that allows radionuclide concentrations with units of pCi/L_{water} to be converted to pCi/g_{soil}. This conversion is sometimes necessary because tritium sample data is frequently reported with units of pCi/L_{water} instead of the preferred pCi/g_{soil}, for example.

Derivation:
Assume the following definitions:

x	=	Percent soil moisture (unitless),
V	=	Soil sample volume (cm^3),
ρ_{soil}	=	Soil bulk density (g_{soil}/cm^3), (assume dry bulk density)
ρ_{water}	=	Water or moisture density (g_{water}/cm^3),
w_{soil}	=	Soil mass (g_{soil}),
w_{water}	=	Water or moisture mass (g_{water}),
R	=	Ratio of water or moisture mass in the soil to the soil mass (unitless),
L_{water}	=	Liters of water or moisture equal to 100 cm^3 of water or moisture at unit density (1 g_{water}/cm^3).

First, assume that a soil sample contains X percent soil moisture and the results are reported as Z pCi/L_{water}. Using the last definition listed above, the reported concentration can be converted to the following:

$Z\ pCi/L_{water}=(Z\ pCi/L_{water}) \times (L_{water}/1000\ cm^3) \times (\rho_{water})^{-1}$
$Z\ pCi/L_{water}=(Z\ pCi/L_{water}) \times (L_{water}/1000\ cm^3) \times (cm^3/1.0\ g_{water})=\mathbf{(1x10^{-3})\ Z\ pCi/g_{water}}$. (1)

Next, a ratio of water (moisture) mass to that of the sample soil mass must be calculated to determine the fraction of the sample that actually contains moisture. The next equation defines the masses for the water (moisture) and the soil in a fixed-volume sample size.

$$w_{water} = X \bullet \rho_{water} \bullet V$$

Water or moisture mass in grams:

(2)

$$w_{soil} = (1 - X) \bullet \rho_{soil} \bullet V$$

Soil mass in grams:
(3)

Note: Where the sample mass (grams soil) is reported instead of the sample volume (cm^3 soil), the sample mass is converted to sample volume by dividing by the soil bulk density (mass (grams) / unit volume (cm^3)):
i.e. mass (grams) / soil bulk density (mass (grams) / volume (cm^3) = Volume (cm^3)

Now that we know the masses of water (moisture) and soil in a fixed sample size, a ratio of the water (moisture) mass in the sample to the soil mass can be calculated. This ratio is the fraction of water (moisture) that is contained in the fixed-volume sample. The ratio is provided by the following equation.

$$R = \frac{w_{water}}{w_{soil}} = \frac{X \bullet \rho_{water} \bullet V}{(1-X) \bullet \rho_{soil} \bullet V} = \frac{X \bullet \rho_{water}}{(1-X) \bullet \rho_{soil}} \qquad (g_{water}/g_{soil}) \qquad (4)$$

Now that a ratio of water (moisture) to soil in the fixed sample size is known, the concentration of the radionuclide based on soil mass can

$$Z\frac{pCi}{g_{soil}} = [(1.0x\,10^{-3}) \bullet Z(\frac{pCi}{L_{water}})\frac{(\frac{pCi}{g_{water}})}{(\frac{pCi}{L_{water}})}] \bullet (\frac{X \bullet \rho_{water}(g_{water}/cm^3)}{(1-X) \bullet \rho_{soil}(g_{soil}/cm^3)})$$

be determined taking the product of equation 1 and 4.

(5)

This results in a general relationship that can be determined from the soil and water density, sample result in pCi/L and soil moisture percentage.

Example:

Assume that tritium has been detected in a sample at a concentration of 450 pCi/L_{water}. Assume that there is 10% (unitless) moisture in the soil sample. Assume a soil density of 1.5 g/cm^3 and a water density of 1 g/cm^3. The following variable assignments can be made.

Z	=	450 pCi/L_{water} =	0.450 pCi/g_{water}
X	=	10 %	
1-X	=	100%-10%=90%	
r_{water}	=	1.0 g/cm^3	
r_{soil}	=	1.5 g/cm^3	

Substitute these values into equation 5 to arrive at the following sample result concentration based on the soil mass.

Z pCi/g_{soil} = (1.0x10^{-3}) x (450) x [(0.1 x 1)/(0.9 x 1.5)] = **3.33 x 10^{-2} pCi/g_{soil}.**

Tritium Data Conversion from pCi/L_{water} to pCi/g_{soil}

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Sample Attributes			Activity (pCi/L)													
2																	
3																	
4				Tritium (EPA-600 906.0)		Lw	Density Water	Z		Bulk Density Soil	V	x	Density Water	Wwater	Wsoil	R	Z
5	Record	ER Sample ID	Sample	Z		1L/1000 $cm^3_{(water)}$	$1cm^3/1.0\ g_{(water)}$	pCi/g(water)	Sample Mass (g)	(Assume 1.5 g/cm^3)	Sample Volume (cm^3)	Moisture Fraction	$1cm^3/1.0\ g_{(water)}$	(g water)	(g soil)	Wwater/Wsoil	pCi/g (soil)
6	Number[a]	(Figure ---)	Depth (ft)	pCi/L(water)	Error[b]			=D6*F6*G6	(determined in lab)		=I6/J6	(determined in lab)		=L6*M6*K	(1-L6)*J6*K	=N6/O6	=H6*P6
7	02600	TA5-BH-01-21.5	21.5	400	320	0.001	1.00	0.40	490.00	1.50	326.67	0.052	1.00	16.99	464.52	0.04	0.01
8	02600	TA5-BH-01-31.25	31.25	ND (3,200) [c]	2000	0.001	1.00	3.20	342.00	1.50	228.00	0.019	1.00	4.33	335.50	0.01	0.04
9	02600	TA5-BH-01-42.5	42.5	ND (3,200) [c]	2000	0.001	1.00	3.20	397.00	1.50	264.67	0.054	1.00	14.29	375.56	0.04	0.12
10	02604	TA5-BH-01-60.5	60.5	ND (3,200) [c]	2100	0.001	1.00	3.20	413.00	1.50	275.33	0.011	1.00	3.03	408.46	0.01	0.02
11	02604	TA5-BH-01-71	71	ND (3,200) [c]	1900	0.001	1.00	3.20	690.00	1.50	460.00	0.127	1.00	58.42	602.37	0.10	0.31
12	02604	TA5-BH-01-81.5	81.5	ND (3,200) [c]	2000	0.001	1.00	3.20	534.00	1.50	356.00	0.059	1.00	21.00	502.49	0.04	0.13
13	02604	TA5-BH-01-91	91	ND (320)	200	0.001	1.00	0.32	540.00	1.50	360.00	0.083	1.00	29.88	495.18	0.06	0.02
14	02604	TA5-BH-01-100.5	100.5	ND (320)	190	0.001	1.00	0.32	547.00	1.50	364.67	0.125	1.00	45.58	478.63	0.10	0.03
15	02606	TA5-BH-01-120	120	ND (320)	200	0.001	1.00	0.32	649.00	1.50	432.67	0.039	1.00	16.87	623.69	0.03	0.01
16	02606	TA5-BH-01-140	140	360	200	0.001	1.00	0.36	261.00	1.50	174.00	0.053	1.00	9.22	247.17	0.04	0.01
17	02606	TA5-BH-01-160.5	160.5	ND (320)	200	0.001	1.00	0.32	398.00	1.50	265.33	0.087	1.00	23.08	363.37	0.06	0.02
18	02606	TA5-BH-01-180.5	180.5	320	200	0.001	1.00	0.32	527.00	1.50	351.33	0.096	1.00	33.73	476.41	0.07	0.02
19	02606	TA5-BH-01-200.5	200.5	420	210	0.001	1.00	0.42	576.00	1.50	384.00	0.078	1.00	29.95	531.07	0.06	0.02
20	02624	TA5-BH-01-220.5	220.5	ND (320)	190	0.001	1.00	0.32	494.00	1.50	329.33	0.063	1.00	20.75	462.88	0.04	0.01
21	02624	TA5-BH-01-240.25	240.25	4,600	2100	0.001	1.00	4.60	509.00	1.50	339.33	0.022	1.00	7.47	497.80	0.01	0.07
22	02624	TA5-BH-01-260	260	ND (320)	200	0.001	1.00	0.32	376.00	1.50	250.67	0.037	1.00	9.27	362.09	0.03	0.01
23	02623	TA5-BH-01-300	300	440	210	0.001	1.00	0.44	452.00	1.50	301.33	0.045	1.00	13.56	431.66	0.03	0.01
24	02623	TA5-BH-01-321	321	420	210	0.001	1.00	0.42	472.00	1.50	314.67	0.111	1.00	34.93	419.61	0.08	0.03
25	02623	TA5-BH-01-340.5	340.5	430	210	0.001	1.00	0.43	518.00	1.50	345.33	0.06	1.00	20.72	486.92	0.04	0.02
26	02623	TA5-BH-01-360	360	ND (320)	200	0.001	1.00	0.32	470.00	1.50	313.33	0.132	1.00	41.36	407.96	0.10	0.03
27	02623	TA5-BH-01-380.25	380.25	ND (320)	190	0.001	1.00	0.32	587.00	1.50	391.33	0.153	1.00	59.87	497.19	0.12	0.04
28	02630	TA5-BH-01-400	400	ND (320)	200	0.001	1.00	0.32	609.00	1.50	406.00	0.082	1.00	33.29	559.06	0.06	0.02
29	02630	TA5-BH-01-420	420	390	210	0.001	1.00	0.39	562.00	1.50	374.67	0.113	1.00	42.34	498.49	0.08	0.03
30	02737	TA5-BH-01-440	440	ND (350)	210	0.001	1.00	0.35	374.00	1.50	249.33	0.102	1.00	25.43	335.85	0.08	0.03
31	02737	TA5-BH-01-460	460	ND (360)	210	0.001	1.00	0.36	512.00	1.50	341.33	0.077	1.00	26.28	472.58	0.06	0.02
32	02737	TA5-BH-01-480	480	ND (360	210	0.001	1.00	0.36	596.00	1.50	397.33	0.108	1.00	42.91	531.63	0.08	0.03
33	02737	TA5-BH-01-490	490	ND (3,500)	2100	0.001	1.00	3.50	542.00	1.50	361.33	0.087	1.00	31.44	494.85	0.06	0.22
34	02737	TA5-BH-01-500	500	ND (3,500)	2100	0.001	1.00	3.50	667.00	1.50	444.67	0.082	1.00	36.46	612.31	0.06	0.21

35

36 [a] Analysis request/chain of custody

37 [b] Two standard deviations about the mean detected activity

38 [c] Laboratory reported that the distillation of samples TA5-BH-01-31.25, TA5-BH-01-42.5, TA5-BH-01-60.5, TA5-BH-01-71, TA5-BH-01-81.5, and

39 TA5-BH-01-240.25 yeilded low soil moisture volumes suitable for tritium analysis, resulting in 1 ml. aliquots. The relatively high tritium activity level

40 or minimum detected activity (MDA) reported for these samples was due entirely to the analysis of such small aliquots.

41

42 ft = Foot (feet)

43 ER = Environmental Restoration

44 ID = Identification

45 NA - Not applicable.

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

47 pCi/g - Picocuries per gram

48 pCi/L - Picocuries per liter

49 BH = borehole

50 SWMU = Solid waste management unit

51

52 Calc brief performed by: [signature] 9/1/98 Calc Brief QA'd by: [signature] 9/1/98

53

ANNEX 2-I
Data Verification/Validation Level 2-DV2
TAV-BH-01 Soil Sample Off-Site Analytical Results
March 1995

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-23-95

to: Lon Dawson

from: Mary Beth Garcia, 7576

project: TA 5 TCE Plume Bldg 6594

COC: 2745

Lab: Quantum

Lab #: 40735

Date Sampled: 2-24-95

Enclosed are/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0036, or 848-0338

It is your responsibility to file this report in the Record Center.

SAMPLE MANAGEMENT OFFICE

Mary Beth Garcia

Mary Beth Garcia

MBG:7576:pp

Distribution:
7500 Record Center

C: P. Puissant
M. Garcia
E. Vinsant
D. Stocker

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

Project Name TA5 TCE Plume

Case Number 3617.300

Sample Numbers 021673-00

AR/COC No. 2745 Analytical laboratory Quantera SDG No. 40735

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓	—	

Reviewed by: MB Garcia

Date: 3-23-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: MB Garcia

Date: 3-23-95

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

2.0 COMMENTS CONTINUATION SHEET

MBG

Reviewed by: MB Garcia

Date: 3-23-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: MBGarcia

Date: 3-23-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: MB Garcia Approved by:* _____

Date: 3-23-95 Date: _____

*Task/Project Leader must approve data package.

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

Project Name TA 5 TCE Plume
Case Number 3617.300
Sample Numbers 021673-00

AR/COC No. 2745 Analytical laboratory Quantera SDG No. 40735
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

MBG

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: MB Garcia

Date: 3-23-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information		✓		
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	←			→
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project-specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: MB Garcia Date: 3-23-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log NA

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☑

If any boxes have been checked no, describe problem and resolution:
The COC was not signed "Relinquished By", a Notification of error + a non conformance was issued.
"NOTIFICATION OF ERROR" form attached

Reviewed by: MB Garcia
Date: 3-28-95

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

5.3 Document Comparison NA

	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.4 Analytical Laboratory Report

	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: MB Garcia Approved by:* _____
Date: 3-23-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: the "Record Center Code" was not documented on the COC.

NOTIFICATION OF ERROR

CHAIN OF CUSTODY #: 02745 SHIP DATE: 2/24/95

LAB DESTINATION: Quanterra SHIPPER #: A44840

PROJECT MANAGER: Dawson DIVISION: 7582

SAMPLE TEAM MEMBER(S): Mike Wade

RELINQUISHED BY: Mike Wade RECEIVED BY: David Biswell

THE FOLLOWING ERROR WAS NOTED BY THE DATA MANAGEMENT OFFICE,
BY: Mary Beth Garcia DATE: 3/23/95

Line 2, relinquished by, was not signed, Samples were not relinquished correctly.

CORRECTIVE ACTION:

Nonconformance to be completed by Deborah McLaughlin.

DISTRIBUTION:

David Biswell

Mack McLaughlin

file

TAN-MW1 GROUNDWATER (CW)

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 5-8-95

to: Lon Dawson ✓

from: Mary Beth Garcia, 7513

project: TAN TCE Plume COC: 03318

Lab: Quantera

Lab #: ~~41535~~ 41535

Date Sampled: 4-14-95

Enclosed are/is 1 data package(s) for your project. The package(s) include a copy of the sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data and the original report(s) have been forwarded to the record center. The data is being sent to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0036 or 848-0338

SAMPLE MANAGEMENT OFFICE

Mary Beth Garcia

Mary Beth Garcia

MBG:7513:pp

Distribution:
7500 Record Center

C: M. GARCIA
E. VINSANT
D. Stockham
P. Pussant

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

Project Name TAII TCE Plume
Case Number 3617.300
Sample Numbers 022171, 022175

AR/COC No. 03318 Analytical laboratory Quattro SDG No. 41535
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log NA

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: MBGarcia

Date: 5-8-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	←			→
Lab sample number See Section 5.2	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project-specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: MB Garcia Date: 5-8-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log NA

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:
Record Center Codes needs to be completed

Reviewed by: MB Garcia
Date: 5-8-95

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

5.3 Document Comparison NA

	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.4 Analytical Laboratory Report

	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: MB Garcia Approved by:* _____
Date: 5-8-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TA I TCE Plume

Case Number 3617.300

Sample Numbers 022171, 022175

AR/COC No. 03318 Analytical laboratory Quanterra SDG No. 41535

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓	—	

Reviewed by: MB Garcia

Date: 5-8-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	✓		
8) Narrative included, correct, and complete?	✓		

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

Lab ID # on the blue COC is 411535, the # is actually 411535

Reviewed by: MBGarcia

Date: 5-8-95

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

2.0 COMMENTS CONTINUATION SHEET

MB 6

Reviewed by: MBGarcia

Date: 5-8-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
	NB 6		

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: NB Garcia

Date: 5-8-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: MBGarcia Approved by: _____

Date: 5-8-95 Date: _____

Task/Project Leader must approve data package.

Denver

04/15/95

SAMPLE DESCRIPTION INFORMATION

for

Sandia National Laboratory

Sample No.	Sample Description	Sample Type	Date Sampled	Time Sampled	Date Received
041535-0001-SA	022171-00/TA5-MW-02-BW	AQUEOUS	04/14/95	07:15	04/15/95
041535-0002-TB	022175-00/TA5-MW-02-TB	AQUEOUS	04/14/95	07:15	04/15/95

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 03318

Dept. No./Mail Stop: 7582/1347
Project/Task Manager: Lon Dawson
Project Name: TAV TCE PLUME
Record Center Code:
Logbook Ref No: N/A
SMO Reference No.: N/A

Date Samples Shipped: 4/14/95
Carrier/Waybill No.: A43974
Lab Contact: LILLEN LeRIVERE
Lab Destination: QUANTERRA
SMO Contact/Phone: PAM P / 848-0402
Send Report to SMO: Debra McLaughlin

Contract No.: 67-9736B
Case No.: 3697300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area: V; Building: —; Room: —

Parameter & Method Requested: 8010/8020 - Rush

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8010/8020 - Rush									Lab Sample ID
0 0 2 2 1 7 1 - 0 0	TAS-MW-02-BW	40	—	4-14-95, 7:15	water	G	3 40ml VOAS	HCL	G	SA	X							4115	35	-01
0 0 2 2 1 7 5 - 0 0	TAS-MW-02-TB	40	—	4-14-95, 7:15	water	G	1 40ml VOA	HCL	G	TB	X									-02

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☐ Normal ☒ Rush Required Report Date 3 DAY/RUSH QC inits.

Sample Tracking: Date Entered (mm/dd/yy): Entered by:

Special Instructions/QC Requirements: 3-DAY Rush - ALL SAMPLES
FAX results to Lon Dawson / Mike Wade @ 848-0417

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Quanterra / 7582

1. Relinquished by	Michael Wade	Org. 7582	Date 4-14-95	Time 0900	4. Relinquished by	Org.	Date	Time
1. Received by	[signature]	Org. 7513	Date 4-14-95	Time 0900	4. Received by	Org.	Date	Time
2. Relinquished by	[signature]	Org. 7513	Date 4-14-95	Time 1400	5. Relinquished by	Org.	Date	Time
2. Received by	[signature]	Org. [illegible]	Date 4-15-95	Time 1145	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

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

TAV-BH-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-16-95

to: Lon Dawson

TAV-BH-01 Equipment Blank

from: Mary Beth Garcia, 7576

project: TCE Plume COC: 2608

Lab: TMA

Lab #: 95.02.145

Date Sampled: 2-2-95

Enclosed are/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0036 or 848-0338

SAMPLE MANAGEMENT OFFICE

Mary Beth Garcia

Mary Beth Garcia

MBG:7576:pp

Distribution:
7500 Record Center
c: M. Garcia
E. Vinsant
D. Stockham
R Puissant

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

Project Name TA5 TCE Plume
Case Number 3617.300
Sample Numbers 021691-00

AR/COC No. 02608 Analytical laboratory TMA SDG No. 95.02.145
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

NA

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: MB Garcia

Date: 3-16-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages		✓		
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	←			→
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

N A

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: MB Garcia Date: 3-16-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log NA

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☑	☐

If any boxes have been checked no, describe problem and resolution:
The page # does not impact data quality. I filled in the page # [illegible]

eviewed by: R. Garcia
Date: 3-16-95

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

5.3 Document Comparison NA

	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.4 Analytical Laboratory Report

	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: [signature] Approved by:* _____
Date: 3-16-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: Record Center Code is not filled in on the COC

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

Project Name TA5 TCE Plume

Case Number 3617.300

Sample Numbers 021691.00

AR/COC No. 02608 Analytical laboratory TMA SDG No. 95 02 145

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA	—	

Reviewed by: [signature]

Date: 3-16-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		The method blank shows H3 present at 240 +/- 140 pCi/l the narrative explains this
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	✓		
8) Narrative included, correct, and complete?	✓		

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

7a) + indicates acceptance of the result

Reviewed by: [signature]

Date: 3-16-95

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

2.0 COMMENTS CONTINUATION SHEET

MB 3/6

Reviewed by: MB Garcia

Date: 3-16-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: [signature]

Date: 3-16-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: MB Garcia

Approved by: _____

Date: 3-16-95

Date: _____

Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE ____ OF ____

SF 2001-COC (9-94)

AR/COC- 02608

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-7-95
Carrier/Waybill No.: 441180
Lab Contact: B. Trichung
Lab Destination: TMA Eberline
SMO Contact/Phone: M. Gonzales
Send Report to SMO: Debra Constant

Contract No.: 12-0641-B
Case No.: 3617.300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location Tech Area V
Building 6588 Room —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Parameter & Method Requested: Tritium								Lab Sample ID
0 2 1 6 9 1 - 0 0	TA5-B11-U1-EB1	100	—	2/2/95 8:24	water	Glass	32 oz	none	G	EB	X								
-																			
-																			
-																			
-																			
-																			
-																			
-																			
-																			
-																			

RMMA ☐ Yes ☒ No Ref. No. ____

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date ____

Sample Tracking
Date Entered (mm/dd/yy): 2-9-95
Entered by: [signature]
QC inits.

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Team Members

Name	Signature	Init	Company/Organization
Michael Wade	[signature]	MW	Eberline / 7582
Paul Freshour	[signature]	PF	SNL / 7584
Dan Schofield	[signature]	DS	" "

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by [signature]	7584	2/2/95	11:41	4. Relinquished by			
1. Received by [signature]	7582	2/2/95	1141	4. Received by			
2. Relinquished by [signature]	7582	2/2/95	16:05	5. Relinquished by			
2. Received by [signature]	TMA	2/2/95	16:05	5. Received by			
3. Relinquished by				6. Relinquished by			
3. Received by				6. Received by			

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

SF 2001 COC (8 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample T[illegible] Members: Record the names and affiliations of all members of the sample [illegible]n team.

Relinqui[illegible] Received by: Sign full name, and enter organization, date, and time when [illegible]uishing custody of the samples. *The first person relinquishing the samples m[illegible]e a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into cust[illegible]

TAV-BH-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-28-95

to: L. DAWSON

from: Howard Seeley, 7576

project: TCE Plume (H3) COC: 02604

Lab: TMA

Lab #: 95-02-146

Date Sampled: 2-1-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: D. Stockham
E. Vansant

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

Project Name TCE Plume

Page 1 of 4

Case Number 3617.300

Sample Numbers 021724, 021718, 021726, 021729, 021734

AR/COC No. 02604 Analytical laboratory TMA SDG No. 95-02-146
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Not Used

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

HS 3/24/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 7-28-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 3-28-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley
Date: 3-28-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: H. Seeley Approved by:* _____
Date: 3-28-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3617,300

Sample Numbers 021724, 021718, 021726, 021729, 021734

AR/COC No. 02604 Analytical laboratory TMA SDG No. 95-02-146

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?		✓	021724, 021718, 021726 - Tritium see comments
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		

Reviewed by: Howard Seeley

Date: 3-28-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-28-95

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

2.0 COMMENTS CONTINUATION SHEET

1) Quant limits: Requested DA of 195 pCi/L exceeded for
021724 = 1833 pCi/L (MDA = 3300 pCi/L)
021718 = 1793 pCi/L (MDA = 3200 pCi/L)
021726 = 1809 pCi/L (MDA = 3200 pCi/L)
Per case narrative, due to low distillation volume.

Reviewed by: H. Seeley

Date: 3-28-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021724	H-3	Q	DA = 1833 pCi/L MDA = 3300 pCi/L
021718	↓	↓	DA = 1793 ↓ MDA = 3200 ↓
021726	↓	↓	DA = 1809 ↓ MDA = 3200 ↓

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 3-28-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments
			HS 3/28/95

Reviewed by: H. Seeley

Approved by:* _____

Date: 3-28-95

Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

12-0341-B

AR/COC- 02604

Dept. No./Mail Stop: 7582
Project/Task Manager: Lou Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-1-95
Carrier/Waybill No.: A44180
Lab Contact: Jim Lozito
Lab Destination: TMA Eberline
SMO Contact/Phone: Mike Gonzales/848-0464
Send Report to SMO: Debra Constant

Contract No.:
Case No.: 2617300
SMO Authorization:
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Parameter & Method Requested

Location Tech Area V
Building 6588 Room —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Tritium	Lab Sample ID
02172 4 - 00	TA5-BH-01-60.5	61.5	—	2/1/95; 11:10	Soil	G	500ml	none	G	SA	X	
02171 8 - 00	TA5-BH-01-71.0	71.0	—	2/1/95; 11:53								
02172 6 - 00	TA5-BH-01-81.50	81.50	—	; 13:50								
02172 9 - 00	TA5-BH-01-91.0	91.0	—	; 15:03								
02173 4 - 00	TA5-BH-01-100.50	100.5	—	; 16:31								
											X	

RMMA ☐ Yes ☒ No Ref. No.
Sample Disposal ☐ Return to Client ☒ Disposal by lab
Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2-9-95
Entered by:
QC Inits.

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Team Members

Name	Signature	Init	Company/Organization
Michael WADE	Michael Wade	MW	Sandia / 7582
DON SCHOFIELD	[illegible]	[illegible]	SNL / 7524
[illegible]	[illegible]	[illegible]	SNL / 7524

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by	7584	2/2/95	11:41	4. Relinquished by			
1. Received by	7584	2/2/95	11:41	4. Received by			
2. Relinquished by	7584	2/2/95	15:05	5. Relinquished by			
2. Received by	TMA	2/2/95	15:05	5. Received by			
3. Relinquished by				6. Relinquished by			
3. Received by				6. Received by			

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

SF 2001 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Tea— Members: Record the names and affiliations of all members of the sample co" n team.

Relinquis' ceived by: Sign full name, and enter organization, date, and time when shing custody of the samples. *The first person relinquishing the samples m. a member of ng team.* Similarly, upon receipt and verification sign full name, and enter o_ ization, date, and time that samples are taken into custody.

TAV-BH-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-28-95

to: L. DAWSON

from: Howard Seeley, 7576

project: TCE Plume (H-3) COC: 02600

Lab: TMA

Lab #: 95-02-148

Date Sampled: 1-31-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: D. Stockham
E. Vinsant

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

Project Name TCE Plume

Page 1 of 4

Case Number 3624.300

Sample Numbers 021704, 021711, 021712

AR/COC No. 02600 Analytical laboratory TMA SDG No. 95-02-148
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

NOT USED

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

HJS 3/28/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 3-28-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H Seeley Date: 3-28-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley

Date: 7-28-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 3-28-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3624.300

Sample Numbers 021704, 021711, 021712

AR/COC No. 02600 Analytical laboratory TMA SDG No. 95-02-148

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?		✓	021711, 021712 - Tritium See comments.
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		

Reviewed by: Howard Seeley

Date: 3-28-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		—
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-28-95

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

2.0 COMMENTS CONTINUATION SHEET

1) Quant limits - requested DA exceeded for 021711 (1801 pCi/L vs. 195 pCi/L requested) and 021712 (1809 pCi/L). Per case narrative, due to low distillation volume, MDA is 3200 pCi/L for both samples.

Reviewed by: H. Seeley

Date: 3-28-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021711	H-3	Q	MDA=3200 pCi/L ; DA=1800 pCi/L
021712	↓	↓	↓

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 3-28-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments
			HS 3/28/95

Reviewed by: H. Seeley Approved by:* _____

Date: 3-28-95 Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02600

Dept. No./Mail Stop: [illegible]
Project/Task Manager: [illegible]
Project Name: [illegible]
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/7/95
Carrier/Waybill No.: [illegible]
Lab Contact: [illegible]
Lab Destination: TA-5 Chemistry
SMO Contact/Phone: A. Gonzales
Send Report to SMO: Debra Constant

Contract No.: 12-0811-B
Case No.: 36 21.300
SMO Authorization: [illegible]
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Parameter & Method Requested

Location — Tech Area V — Building 6505 — Room —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Tritium										Lab Sample ID
1 02 1 7 6 4 - 00	TA5-B11-01-21.50	21.50		1/31/95 12:01	S	G	1 gal	none	G	ASA	X										
2 02 1 7 1 1 - 00	TA5-B11-01-31.25	31.25		11:12	↓	↓	↓	↓	↓	↓	↓										
3 02 1 7 1 2 - 00	TA5-B11-01-42.5	42.5		11:54	↓	↓	↓	↓	↓	↓	↓										
-																					
-																					
-																					
-																					
-																					
-																					
-																					

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy)
Entered by:
QC inits.

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	[signature]	[illegible]	Cutler 7582
	Dan Schofield			[illegible]

1. Relinquished by	[signature]	Org. 7582	Date 1/31/95	Time 16:22	4. Relinquished by	Org.	Date	Time
1. Received by	[signature]	Org. 7011	Date 1/31/95	Time 16:22	4. Received by	[signature] Org. TMH	Date 2/2/95	Time 15:00
2. Relinquished by	[signature]	Org. 7011	Date 1/31/95	Time 17:00	5. Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

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

SF 2061 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Te[illegible] Members: Record the names and affiliations of all members of the sample co[illegible]on team.

Relinqui[illegible]eceived by: Sign full name, and enter organization, date, and time when [illegible]ishing custody of the samples. *The first person relinquishing the samples m[illegible] member o[illegible]ling team.* Similarly, upon receipt and verification sign full name, and enter [illegible]ization, date, and time that samples are taken into cus[illegible]

TAV-BH-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-28-95

to: L. Dawson

from: Howard Seeley, 7576

project: TCE Plume (43) COC: 02624

Lab: TMA

Lab #: 95-02-147

Date Sampled: 2-6-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: A Stockham
E. Vinsant

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

Project Name TCE Plume
Case Number 3617,300
Sample Numbers 021751, 021753, 021758

AR/COC No. 02624 Analytical laboratory TMA SDG No. 95-02-147
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

NOT USED

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

KS 3/28/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Spalley

Date: 3-28-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project-specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 3-28-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley
Date: 7-28-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: H. Seeley Approved by:* _____
Date: 3-28-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3617.300

Sample Numbers 021751, 021753, 021758

AR/COC No. 02624 Analytical laboratory TMA SDG No. 95-02-147

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?		✓	021753-H3 (see comments)
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		

Reviewed by: Howard Seeley

Date: 3-28-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-28-95

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

2.0 COMMENTS CONTINUATION SHEET

1) Quant limits: Sample 021753 for tritium -
DA = 1801 pCi/L, requested 195 pCi/L
MDA = 3200 pCi/L
Per case narrative, due to low distillation volume.

Reviewed by: H. Seeley

Date: 3-28-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021753	H-3	Q	MDA=3200 pCi/L

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 3-28-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: H. Seeley

Approved by:* _____

Date: 3-28-95

Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02624

Dept. No./Mail Stop: 7582 / 1247
Project/Task Manager: Lon Dawson
Project Name: TCL Hole TA5
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-7-95
Carrier/Waybill No.: A 214180
Lab Contact: Jim Lazlo/Bob Fulbing
Lab Destination: TMA
SMO Contact/Phone: Mike Gonzales 848-0401
Send Report to SMO: Debra Constant

Contract No.: 12-C2418
Case No.: 3617300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Parameter & Method Requested

Location Tech Area V
Building 6598 Room —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Tritium								Lab Sample ID
021751-00	TA5-BH-4-220.50	220.5	NONE	2/6/95; 11:20	S	G	16oz.	NONE	G	SA	X								
021753-00	TA5-BH-01-240.00	240.5	↓	↓ 13:35	S	G	16oz	NONE	G	SA	X								
021758-00	TA5-BH-01-260.00	260.0	↓	↓ 14:50	S	G	16oz.	none	G	SA	X								

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy)
Entered by:
QC inits.

Special Instructions/QC Requirements
Please List as Separate Report

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Sulfera / 7582

1. Relinquished by	Michael Wade	Org. 7582	Date 2-7-95	Time 7:16	4. Relinquished by	Org.	Date	Time
1. Received by	D Mayl	Org. SMO 7576	Date 2/7/95	Time 7:16	4. Received by	Org.	Date	Time
2. Relinquished by	[signature]	Org. 7576	Date 2/7/95	Time 15:10	5. Relinquished by	Org.	Date	Time
2. Received by	[signature]	Org. TMA	Date 2/7/95	Time 15:10	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

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

SF 2001 COC (8 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required. **Only one turnaround time type is allowed for each AR/COC.**

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample T[illegible]embers: Record the names and affiliations of all members of the sample [illegible]on team.

Relinqui[illegible]eceived by: Sign full name, and enter organization, date, and time when [illegible]quishing custody of the samples. *The first person relinqu[illegible]he samples must be a member of sampling team* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into [illegible]

TAN-13H-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-22-95

to: L. Dawson

from: Howard Seeley, 7576

project: TCE Plume (H3) COC: 02606

Lab: TMA

Lab #: 95-02-149

Date Sampled: 2-2-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: D. Stockham
E. Vinsant

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

Project Name TCE Plume

Page 1 of 4

Case Number 3617.300

Sample Numbers 021694, 021695, 021741, 021745, 021749

AR/COC No. 02606 Analytical laboratory TMA SDG No. 95-02-149
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Not Used

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

HS 3-22-95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 3-22-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages		✓	✓	
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records		✓		✓
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log. AS				
Project information on Sample Collection Log and AR/COC agree. 3/22/95				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 3-22-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☐	☐ ✓
Some boxes have been checked no; all problems are resolved.	☐	☐ ✓

If any boxes have been checked no, describe problem and resolution:
1) Page number not completed - Yellow and blue copy corrected.
2) Sample team member signature and initials missing. Actually missed in w/ relinquishment information on copies.

Reviewed by: H. Seeley
Date: 3-22-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☐ Yes ☑ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 7-22-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Page 1 of 5

Case Number 3617.300

Sample Numbers 021694, 021695, 021741, 021745, 021749

AR/COC No. 02606 Analytical laboratory TMA SDG No. 95-02-149

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		

Reviewed by: Howard Seeley

Date: 3-22-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-22-95

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

2.0 COMMENTS CONTINUATION SHEET

None

3/22/95

Reviewed by: H. Seeley

Date: 3-22-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 3-22-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: Howard Seeley Approved by:* _____

Date: 3-22-95 Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

PAGE 1 OF 1

AR/COC- 02606

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/9/95
Carrier/Waybill No.: 1417181
Lab Contact: Bob Trieberg
Lab Destination: TMA
SMO Contact/Phone: M. Gonzales
Send Report to SMO: Debra Constant

Contract No.: 12-0641 B
Case No.: 301.300
SMO Authorization:
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location — Tech Area V — Building 6688 — Room —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Tritium	Lab Sample ID
021694-00	TA5-BH-01-120.0	120.0	—	2/7/95; 9:13	Soil	G	16 oz	none	G	SA	X	
021695-00	TA5-BH-01-140.00	140.0	—	; 10:25		Stainless	250ml	none				
021741-00	TA5-BH-01-160.50	160.50	—	; 11:50		G	16 oz					
021745-00	TA5-BH-01-180.50	180.50	—	; 14:08								
021749-00	TA5-BH-01-200.50	200.50	—	; 15:20								

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☑ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2-13-95
Entered by:
QC Inits.

Special Instructions/QC Requirements
No Release Screening Required!
Not an RMMA - No Radiological Contaminants Present on Site

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade			Sandia / 7582
	Paul Freshour			SNL / 7584
	Don Schofield			SNL / 7584

	Org.	Date	Time
1. Relinquished by	7584	2/9/95	9:50
1. Received by	7596	2/9/95	9:50
2. Relinquished by	7596	2/9/95	11:15
2. Received by	TMA	2/9/95	11:15
3. Relinquished by			
Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

SF 2001 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample T[illegible]embers: Record the names and affiliations of all members of the sample [illegible]n team.

Relinqui[illegible]eceived by: Sign full name, and enter organization, date, and time when [illegible]quishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, d[illegible], and time that samples are taken into cu[illegible]

TAV-B4-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-22-95

to: L. Dawson

from: Howard Seeley, 7576

project: TCE Plume COC: 02737

Lab: TTA

Lab #: 95-02-162

Date Sampled: 2-9-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: D. Stockham
E. Vinsant

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

Project Name TCE Plume
Case Number 3617.300
Sample Numbers 021148, 021662, 021663, 021666, 021670

AR/COC No. 02737 Analytical laboratory TMA SDG No. 95-02-162
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

NOT USED

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

NS 3/22/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 3-22-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log. HS 3/22/95				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 3-22-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley
Date: 3-22-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 3-22-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3617.300

Sample Numbers 021648, 021662, 021663, 021666, 021670

AR/COC No. 02737 Analytical laboratory TMA SDG No. 95-02-162

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		~~See comments~~
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?		✓	021666, 021670 - tritium see comments
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		

Reviewed by: Howard Seeley

Date: 3-22-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		Not reported but acceptable.
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-22-95

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

2.0 COMMENTS CONTINUATION SHEET

1) Quant limits: RA's high for tritium in 021666-00 (1740 pCi/L) and 021670-00 (1732 pCi/L). Requested RA is 195 pCi/L. Per case narrative, due to low distillation yield.

Reviewed by: H. Seeley

Date: 3-22-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021666-00	Tritium	Q	DA=1740 pCi/L
021670-00	Tritium	Q	DA=1732 pCi/L

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 7-22-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: Howard Seeley Approved by:* _____

Date: 3-22-95 Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02737

Dept. No./Mail Stop: 7582/B47
Project/Task Manager: Lea Dawson
Project Name: TAS-11 Plume
Record Center Code:
Logbook Ref No: NA
SMO Reference No.: N.A.

Date Samples Shipped: 2-10-95
Carrier/Waybill No.: P 441201
Lab Contact: Lindsay/Toledo
Lab Destination: TNA
SMO Contact/Phone:
Send Report to SMO: Laura Pendleton

Contract No.:
Case No.:
SMO Authorization:
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Parameter & Method Requested

Location Tech Area V
Building 6001 Room —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Tritium									Lab Sample ID
02114 8 - 00	TAS-B11-460.00	460.00		1/15 11:00	S	G	16 oz	NONE	G	SA	X								X	
02166 2 - 00	TAS-B11-01-460.00	460.00		12:56		SL														
02166 3 - 00	TAS-B11-01-480.00	480.00		14:16		SL														
02166 6 - 00	TAS-B11-01-490.00	490.00		15:16		SL														
02167 0 - 00	TAS-B11-01-500.00	500.00		16:25																

RMMA ☐ Yes ☐ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy)
Entered by:

QC inits.

Special Instructions/QC Requirements
LIST AS SEPARATE REPORT
NF

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Sandia/7582
	Paul Freshour	[illegible]	PF	SNL/7584

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by	7584	2/10/95	12:10	4. Relinquished by			
1. Received by				4. Received by			
2. Relinquished by			14:00	5. Relinquished by			
2. Received by	7582			5. Received by			
3. Relinquished by				6. Relinquished by			
3. Received by				6. Received by			

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

SF 2001 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required. **Only one turnaround time type is allowed for each AR/COC.**

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Te[illegible]embers: Record the names and affiliations of all members of the sample c[illegible] team.

Relinquisl[illegible]ceived by: Sign full name, and enter organization, date, and time when [illegible]shing custody of the samples. *The first person relinquishing the samples mu[illegible] a member of s[illegible]ng team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into c[illegible]

TAV-BH-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-22-95

to: L. DAWSON

from: Howard Seeley, 7576

project: TCE Plume (H3) COC: 02623

Lab: TMA

Lab #: 95-02-152

Date Sampled: 2-7-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: D. Stockham
E. Vinsant

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

Project Name TCE Plume

Page 1 of 4

Case Number 3617.300

Sample Numbers 021698, 021127, 021130, 021133, 021136

AR/COC No. 02623 Analytical laboratory TMA SDG No. 95-02-152
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Not Used

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

HS 3/22/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 3-22-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

AJ 3/22/95

Reviewed by: H. Seeley Date: 3-22-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H Seeley
Date: 3-22-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 7-22-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3617.300

Sample Numbers 021698, 021127, 021130, 021133, 021136

AR/COC No. 02623 Analytical laboratory TMA SDG No. 95-02-152

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		

Reviewed by: Howard Seeley

Date: 3-22-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		Not reported as RPD, but acceptable
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-22-95

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

2.0 COMMENTS CONTINUATION SHEET

NONE

Reviewed by: H. Seeley

Date: 3-22-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments

NONE
HS 3/22/95

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 3-22-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: Howard Seeley Approved by:* _____

Date: 3-22-95 Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

AR/COC- 02623

Dept. No./Mail Stop: 7582 / 13417
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/9/95
Carrier/Waybill No.: A 44181
Lab Contact: Bobmbing/Jim Lazito
Lab Destination: TMA
SMO Contact/Phone: Mike Gonzales-818-0404
Send Report to SMO: Debra Constant

✓ Contract No.: 12-0641B
✓ Case No.: 3617, 300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location Tech Area VI
Building 6594 Room —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Tritium	Parameter & Method Requested	Lab Sample ID
✓ 02 1 6 9 8 - 00	TA5-B1-01-300.00	300.0	NONE	2/7/95 9:52	S	G	16oz.	NONE	G1	SA	X		
✓ 02 1 1 2 7 - 00	TA5-B1-01-321.00	321.00	↓	12:15	↓	↓	↓	↓	↓	↓	X		
✓ 02 1 1 3 0 - 00	TA5-B1-01-340.50	340.50	↓	13:35	↓	↓	↓	↓	↓	↓	X		
✓ 02 1 1 3 3 - 00	TA5-B1-01-360.00	360.0	↓	14:45	↓	↓	↓	↓	↓	↓	X		
✓ 02 1 1 3 6 - 00	TA5-B1-01-380.25	380.25	↓	16:14	↓	SLCET SL	↓	↓	↓	↓	X		

✓ **RMMA** ☐ Yes ☒ No Ref. No.
✓ **Sample Disposal** ☐ Return to Client ☒ Disposal by lab
Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2/13/95
Entered by: [signature]
QC inits.

Special Instructions/QC Requirements
Please list as Separate Report.

Abnormal Conditions on Receipt

Sample Team Members ✓

Name	Signature	Init	Company/Organization
Michael WADE	Michael Wade	MW	Sutera / 7582

1. Relinquished by Michael Wade	Org. 7582	Date 2/8/95	Time 6:49	4. Relinquished by	Org.	Date	Time
1. Received by [signature]	Org. SMO7576	Date 2/8/95	Time 6:49	4. Received by	Org.	Date	Time
2. Relinquished by [signature]	Org. SMO7576	Date 2/8/95	Time 11:15	5. Relinquished by	Org.	Date	Time
2. Received by [signature]	Org. TMA	Date 2/8/95	Time 11:15	5. Received by	Org.	Date	Time
3. Relinquished by	Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by	Org.	Date	Time	6. Received by	Org.	Date	Time

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

SF 2001 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required. **Only one turnaround time type is allowed for each AR/COC.**

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Tea[illegible]embers: Record the names and affiliations of all members of the sample co[illegible] team.

Relinquisl[illegible]ceived by: Sign full name, and enter organization, date, and time when r[illegible]shing custody of the samples. *The first person relinquishing the samples mu[illegible] a member of s[illegible]ng team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into [illegible]

TAV-BH-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-22-95

to: L. Dawson

from: Howard Seeley, 7576

project: TCE Plume (#3) COC: 02630

Lab: TMA

Lab #: 95-02-150/151

Date Sampled: 2-8-95

Enclosed are/~~is~~ 2 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: D. Stockham
E. Vinsant

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

Project Name TCE Plume

Page 1 of 4

Case Number 3617.300

Sample Numbers 021144, 021147, 021658

AR/COC No. 02630 Analytical laboratory TMA SDG No. 95-02-150
AR/COC No. 02630 Analytical laboratory TMA SDG No. 95-02-151
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Not Used

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

HS 3/22/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 3-22-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 3-22-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley
Date: 3-22-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 3-22-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3617.300

Sample Numbers 021144, 021147, 021658

AR/COC No. 02630 Analytical laboratory TMA SDG No. 95-02-150

AR/COC No. 02630 Analytical laboratory TMA SDG No. 95-02-151

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	NA		

Reviewed by: Howard Seeley

Date: 3-22-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?		✓	021147 – tritium (see comments)
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?		✓	see comments
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-22-95

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

2.0 COMMENTS CONTINUATION SHEET

1) Blank data: Reagent blank for tritium reported 240±140 pCi/L w/ MDA of 210 pCi/L. Sample result of 021147 is very comparable at 250 pCi/L. Result has been flagged in section 3.0.

2) Equipment blank 021147 - slightly positive result for tritium, comparable to blank. Project-specific criteria not available to determine acceptability. No qualifications have been assigned.

Reviewed by: H. Seeley

Date: 3-22-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021147	Tritium	B	Sample & blank result comparable

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 3-22-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments
			HS
			3/22/95

Reviewed by: Howard Seley

Date: 3-22-95

Approved by:* _____

Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

PAGE 1 OF 1

AR/COC- 02630

Dept. No./Mail Stop: 7582/1347
Project/Task Manager: Ian Dawson
Project Name: TAI 701 Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/9/95
Carrier/Waybill No.: A44181
Lab Contact: Bob Tinling - Jim Lazlo
Lab Destination: TMA
SMO Contact/Phone: Mike Gonzales 846-0104
Send Report to SMO: Debra Constant

Contract No.: 12-08416
Case No.: 3617-300
SMO Authorization: D M Doyle
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location — Tech Area: V — Building: 6594 — Room: —

Parameter & Method Requested

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	Tritium									Lab Sample ID
02114 4 - 00	TAS-BH-01-400.00	400.00	NONE	2/6/95 9:15	S	SLmw	16oz	NONE	G	SA	X									
02114 7 - 00	TAS BH-01-EB2	400	↓	↓ 16:15	W	AG	32oz	none	G	LB	X									
02165 8 - 00	TAS-BH-01-420.00	420.0	↓	↓ 16:58	S	G	16oz	none	G	SA	X									

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2-13-95
Entered by: Dyuzzie
QC Inits.

Special Instructions/QC Requirements
Please list as Separate Report!
NO Known Radioactive Constituents.

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael WADE	Michael Wade	MW	Geka / 7582

1. Relinquished by	Michael Wade	Org. 7582	Date 2/9/95	Time 7:41	4. Relinquished by	Org.	Date	Time
1. Received by	D M Doyle	Org. SMO 7576	Date 2/9/95	Time 7:41	4. Received by	Org.	Date	Time
2. Relinquished by	D M Doyle	Org. SMO 7576	Date 2/9/95	Time 11:15	5. Relinquished by	Org.	Date	Time
2. Received by	Jim Lilway	Org. TMA	Date 2/9/95	Time 11:15	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

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

SF 2001 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required. **Only one turnaround time type is allowed for each AR/COC.**

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Team Members: Record the names and affiliations of all members of the sample collection team.

Relinquished/Received by: Sign full name, and enter organization, date, and time when relinquishing custody of the samples. *The first person relinquishing the samples m[illegible] a member [illegible] sampling team.* Similarly, upon receipt and verification sign full name, and en[illegible]anization, date, and time that samples are taken into custody.

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 2-28-95

to: L. Dawson

from: Howard Seeley, 7576

project: TA5 TCE Plume (Chemical) COC: 02602, 02613

Lab: Quanterra

Lab #: 40417

Date Sampled: 2/1/95 and 2/2/95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

cc: D. Stockham
E. Vinsant

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

Project Name TA5 TCE Plume

Case Number 3617.300

Sample Numbers 021725, 720, 723, 727, 731, 732, 728, 733, 735, 737, 739, 759, 701

AR/COC No. 02602 Analytical laboratory Quanterra SDG No. 40417
AR/COC No. 02613 Analytical laboratory Quanterra SDG No. 40417
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Not Used

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 2-28-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree. HS				
The sample location on the Sample Collection Log agrees with the AR/COC and project-specific plan requirements or authorized changes to the plan(s). 3/29/95				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 2-28-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	✓			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley
Date: 2-28-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Segley Approved by:* _____
Date: 2-28-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: Note three aqueous samples listed separately as 021737, 021736, and 021738 were combined to form one sample 021737.

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

Project Name TAS TCE Plume

Case Number 3617.300

Sample Numbers 021725, 720, 723, 727, 731, 732, 728, 733, 735, 737, 739, 759, 701

AR/COC No. 02602 Analytical laboratory Quanterra SDG No. 40417

AR/COC No. 02613 Analytical laboratory Quanterra SDG No. 40417

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?		✓	021727, 021728 - Selenium
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓		

Reviewed by: Howard Seeley

Date: 2-28-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	✓		See comments
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	✓		See comments
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	✓		See comments.
8) Narrative included, correct, and complete?	✓		

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

1) Quant limit: Slightly high for selenium, per case narrative, for samples 021727 and 021728. For 021727 (0.92 mg/kg) and 021728 (0.56 mg/kg). Both results were non-detect.

Reviewed by: H. Seeley

Date: 2-28-95

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

2.0 COMMENTS CONTINUATION SHEET

2) Matrix Spike/Dups: Project-specific recovery criteria not available to verify compliance. All recoveries appear satisfactory except antimony. Average recovery was 44% in soil. All results were non-detect; possibility for false negative exists. The LCS recoveries were acceptable. Action has been left to the task leader.
The recovery for calcium and magnesium were high, however no criteria was applied to determine acceptability. It is not unusual for Ca and Mg to show high recovery. No action taken.

3) Equipment blanks: VOCs - positive result for acetone, greater than or comparable to acetone reported in sample results. ~~Project~~ Results have been flagged in section 3.0 to become non-detect. Metals - project-specific criteria not available - not unusual elements detected.

Reviewed by: H. Serley

Date: 2-28-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021727	Selenium	Q	Non-detect at 0.92 mg/kg
021728	Selenium	Q	Non-detect at 0.56 mg/kg
021723	Acetone	10 U-B	Result < CRQL ≈ 10x EB
021731	Acetone	13 U-B	Result < 10xEB
021733	Acetone	10 U-B	Result < CRQL ≈ 10xEB

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 2-28-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments
			HS 2/28/95

Reviewed by: Howard Seeley Approved by:* _____

Date: 2-28-95 Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02602

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TAS TCL Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-2-95
Carrier/Waybill No.: A44831
Lab Contact: Ellen LeRoux
Lab Destination: Quantera
SMO Contact/Phone: Pam Pussant
Send Report to SMO: Debra Constant

Contract No.: 67-9736-B
Case No.: 3617.300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area: V — Building: 6588 — Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	TAL Metals (6010/7000)	SVOCs (8270)	VOCs (8240)	MS/MSD						Lab Sample ID
02172 5 - 00	TAS-BH-01-61.0	61.0	—	2/1/95; 11:10	Soil	Steel Liner	250ml	None	G	SA	X									
02172 0 - 00	TAS-BH-01-70.0	70.0	—	2/1/95; 11:51			500ml				X									
02172 3 - 00	TAS-BH-01-81.0	81.0	—	2/1/95; 13:50			250ml						X	X						
02172 7 - 00	TAS-BH-01-80.50	80.50	—	2/1/95; 13:50			500ml				X	X		X						
02173 1 - 00	TAS-BH-01-91.75	91.75	—	2/1/95; 15:01			250ml						X							
02173 2 - 00	TAS-BH-01-91.50	91.50	—	2/1/95; 15:00	G		250ml					X								
02172 8 - 00	TAS-BH-01-90.50	90.50	—	2/1/95; 15:03			500ml				X									
02173 3 - 00	TAS-BH-01-100.25	100.25	—	2/1/95; 16:31			250ml						X							
02173 5 - 00	TAS-BH-01-101.00	101.00	—	2/1/95; 16:31			500ml				X	X								

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy): 2-6-95; Entered by: Dyazzie; QC Initials:

Special Instructions/QC Requirements: * TAX VOCs results to Lon Dawson @ 848-0417

Abnormal Conditions on Receipt

Sample Team Members

Name	Signature	Init	Company/Organization
MICHAEL WADE	[signature]	MW	Quanterra/7582
DON SCHOFIELD	[signature]	DS	SNL/7534
PAUL FRESHOUR	[signature]	PF	SNL/7534

	Org.	Date	Time
1. Relinquished by	7584	2/2/95	11:45
1. Received by	SMA 7516	2/2/95	1145
2. Relinquished by	SMA 7516	2/2/95	1400
2. Received by			
3. Relinquished by			
3. Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

SF 2041 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Team Members: Record the names and affiliations of all members of the sample collection team.

Relinquished/Received by: Sign full name, and enter organization, date, and time when relinquishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into custody.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02613

Dept. No./Mail Stop: 7582
Project/Task Manager: Len Dawson
Project Name: TA5 ICE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2-2-95
Carrier/Waybill No.: A 411831
Lab Contact: Ellen Kinnee
Lab Destination: Albuquerque
SMO Contact/Phone: Pam Pussant
Send Report to SMO: Debra Constant

Contract No.: 67-9136-15
Case No.: 317300
SMO Authorization: [signature]
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location — Tech Area: V — Building: 6588 — Room: —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240 - VOCs	Mercury	Metals - TAL	VOC's - 8270	Lab Sample ID
021737-00	TA5-BH-01-EB1	100	—	2/2/95 8:26	WATER	~~VOA~~ G	40ml	HCL	G	EB	X				
021736-00	TA5 BH 01-EB1	100	—	8:26							X				
021738-00	TA5-BH-01-EB1	100	—	8:25							X				
021739-00	TA5-BH-01-EB1	100	—	8:30		Plastic	16oz	HNO3					X		
021759-00	TA5-BH01-EB1	100	—	8:31		Glass	16oz					X			
021701-00	TA5-BH-01-EB1	100	—	8:28		AG	64oz	None						X	

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2-6-95
Entered by: [signature]
QC Initials:

Special Instructions/QC Requirements
37, 36, 38 are one VOA
* Note short holding time for mercury
* Samples collected at TD= 100 ft deep over split-spoon

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	[signature]	MW	Cultural/7582
	Paul Freshour	[signature]	PF	SNL/7584
	Don Schofield	[signature]	DS	" "

	Org.	Date	Time
1. Relinquished by	7584	2/2/95	11:52
1. Received by	7570	2/2/95	11:52
2. Relinquished by	7570	2/2/95	14:00
2. Received by			
3. Relinquished by			
3. Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

SF 2061 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type (e.g., TB, FS, DP, MS, etc.) from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Team Members: Record the names and affiliations of all members of the sample collection team.

Relinquished/Received by: Sign full name, and enter organization, date, and time when relinquishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into custody.

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 2-22-95

to: Lou Dawson

from: Howard Seeley, 7576

project: TCE Plume (Chemical) COC: 02605

Lab: Quanterra

Lab #: 40941

Date Sampled: 2-2-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center
D. Stockham
E. Vinsant

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

Project Name TCE Plume

Case Number 3617.300

Sample Numbers 021693, 021696, 021700, 021742, 021744, 021746, 021748

AR/COC No. 02605 Analytical laboratory Quanterra SDG No. 40441
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

NOT USED

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

HS 2/22/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 2-22-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree. HS				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).	2/22/95			
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 2-22-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley
Date: 2-22-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 2-22-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3617.300

Sample Numbers 021693, 021696, 021700, 021742, 021744, 021746, 021748

AR/COC No. 07605 Analytical laboratory Quanterra SDG No. 40441

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements? SAP not provided	✓		
4) Quantitation limit met for all samples?		✓	021696 - Selenium
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓		

Reviewed by: Howard Seeley

Date: 2-22-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		Sampling blanks not associated w/ batch.
8) Narrative included, correct, and complete?	✓		

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

1) 021696 - Per case narrative, reporting limit for selenium was slightly elevated (0.51 vs 0.50). Result flagged but not qualified.

Reviewed by: H. Seeley

Date: 2-2-95

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

2.0 COMMENTS CONTINUATION SHEET

2) Acetone and methylene chloride reported, below reporting limit, in all samples. Laboratory blank appears acceptable. No trip blanks or equipment blanks (identified), were submitted.

Reviewed by: H. Seeley

Date: 2-22-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021696	Selenium	Q	Per case narrative

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 2-22-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

HS 2/22/95

Reviewed by: Howard Seeley

Approved by:* _____

Date: 2-22-95

Date: _____

*Task/Project Leader must approve data package.

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-16-95

to: L. DAWSON

from: Howard Seeley, 7576

project: TAJ TCE Plume (Chem) COC: 02626

Lab: Quanterra

Lab #: 40490

Date Sampled: 2-7-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center

CC: D. Stockham
E. Vinsant

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

Project Name TA5 TCE Plume

Case Number 3617.300

Sample Numbers 021697, 021719, 021128, 021142, 021131, 021134, 021137

AR/COC No. 02626 Analytical laboratory Quanterra SDG No. 40490
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

NOT USED

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 3-16-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing * See section 5.2	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log. HS 3/16/95				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 3-16-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:
After samples shipped, project added 8270 to 021142-00. Lab change order attached to COC.

Reviewed by: H. Seeley
Date: 3-16-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 3-16-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TA5 TCE Plume

Case Number 3617.300

Sample Numbers 021697, 021719, 021128, 021142, 021131, 021134, 021137

AR/COC No. 02626 Analytical laboratory Quanterra SDG No. 40490

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?		✓	021142-00 - all SVOC (8270) 021142-00 - selenium (see comments)
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓		

Reviewed by: Howard Sorley

Date: 3-16-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?		✓	VOC - Acetone - all samples 021142 - Zinc (see comments)
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

Reviewed by: H. Seeley

Date: 3-16-95

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

2.0 COMMENTS CONTINUATION SHEET

1) Quant Limits: 021142 for semivolatiles was analyzed at dilution - reported non-detect limit is about 5x requested quantitation limit. Per case narrative, due to high amounts of target compounds.
021142 for selenium - reported detection limit of 0.64 mg/kg vs. requested limit of 0.50 mg/kg.

2) Blank data: 8240 - acetone reported in blank at 2.3 ug/kg. Using 10x rule for common lab contaminants, acetone detections reported for samples 021697, 021131, 021134 are qualified as non-detect. Positive result for 021128 stands as reported since value is >10x blank. Qualified results presented in section 3.0.
Metals: Zinc reported in blank at 2.1 mg/kg. Result is >> blank. Result flagged in section 3.0 but not qualified. Only 021142 analyzed for metals.

Reviewed by: H. Seeley

Date: 7-16-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021142	SVOC-All	Q	High detection limit due to dilution
↓	Selenium	Q	0.64 mg/kg reported as limit
↓	Zinc	B	Method blank - sample result >> blank
~~021697~~	~~Acetone~~ ~~3/14/95~~	~~U-B~~	
021697	Acetone	22 U-B	Raised to nondetect due to blank
021131	↓	11 U-B	↓
021134	↓	10 U-B	↓

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 3-16-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments
			HS 3/16/95

Reviewed by: Howard Seeley Approved by:* _____

Date: 3-16-95 Date: _____

*Task/Project Leader must approve data package.

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Quanterra Environmental Services

Volatile Organics
Target Compound List (TCL)
Method 8240

COC 2626

Client Name: Sandia National Laboratory
Client ID: 021697-00/TA5-BH-01-300.50
Lab ID: 040490-0001-SA
Matrix: SOIL Sampled: 07 FEB 95 Received: 09 FEB 95
Authorized: 09 FEB 95 Prepared: 10 FEB 95 Analyzed: 10 FEB 95

Parameter	Result	Wet wt. Units	Reporting Limit	
Acetone	22	ug/kg	10	B
Benzene	ND	ug/kg	5.0	
Bromodichloromethane	ND	ug/kg	5.0	
Bromoform	ND	ug/kg	5.0	
Bromomethane	ND	ug/kg	10	
2-Butanone (MEK)	ND	ug/kg	10	
Carbon disulfide	ND	ug/kg	5.0	
Carbon tetrachloride	ND	ug/kg	5.0	
Chlorobenzene	ND	ug/kg	5.0	
Chloroethane	ND	ug/kg	10	
Chloroform	ND	ug/kg	5.0	
Chloromethane	ND	ug/kg	10	
Dibromochloromethane	ND	ug/kg	5.0	
1,1-Dichloroethane	ND	ug/kg	5.0	
1,2-Dichloroethane	ND	ug/kg	5.0	
1,1-Dichloroethene	ND	ug/kg	5.0	
1,2-Dichloroethene (total)	ND	ug/kg	5.0	
1,2-Dichloropropane	ND	ug/kg	5.0	
cis-1,3-Dichloropropene	ND	ug/kg	5.0	
trans-1,3-Dichloropropene	ND	ug/kg	5.0	
Ethylbenzene	ND	ug/kg	5.0	
2-Hexanone	6.0	ug/kg	10	J
Methylene chloride	3.4	ug/kg	5.0	J
4-Methyl-2-pentanone (MIBK)	4.2	ug/kg	10	J
Styrene	ND	ug/kg	5.0	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.0	
Tetrachloroethene	ND	ug/kg	5.0	
Toluene	ND	ug/kg	5.0	
1,1,1-Trichloroethane	ND	ug/kg	5.0	
1,1,2-Trichloroethane	ND	ug/kg	5.0	
Trichloroethene	ND	ug/kg	5.0	
Vinyl acetate	ND	ug/kg	10	
Vinyl chloride	ND	ug/kg	10	
Xylenes (total)	ND	ug/kg	5.0	

Surrogate	Recovery	
Toluene-d8	105	%
4-Bromofluorobenzene	101	%

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones Approved By: Mark Pokorny

Quanterra Environmental Services

TCL Semivolatile Organics (CONT.)

Method 8270

COC 2626

Client Name: Sandia National Laboratory
Client ID: 021719-00/TA5-BH-01-301.25
Lab ID: 040490-0002-SA
Matrix: SOIL Sampled: 07 FEB 95 Received: 09 FEB 95
Authorized: 09 FEB 95 Prepared: 13 FEB 95 Analyzed: 16 FEB 95

Parameter	Result	Wet wt. Units	Reporting Limit	
2,6-Dinitrotoluene	ND	ug/kg	330	
Diethyl phthalate	ND	ug/kg	330	
4-Chlorophenyl phenyl ether	ND	ug/kg	330	
Fluorene	ND	ug/kg	330	
4-Nitroaniline	ND	ug/kg	1600	
4,6-Dinitro-2-methylphenol	ND	ug/kg	1600	
N-Nitrosodiphenylamine	570	ug/kg	330	
4-Bromophenyl phenyl ether	ND	ug/kg	330	
Hexachlorobenzene	ND	ug/kg	330	
Pentachlorophenol	ND	ug/kg	1600	
Phenanthrene	ND	ug/kg	330	
Anthracene	ND	ug/kg	330	
Carbazole	ND	ug/kg	330	
Di-n-butyl phthalate	ND	ug/kg	330	
Fluoranthene	ND	ug/kg	330	
Pyrene	ND	ug/kg	330	
Butyl benzyl phthalate	ND	ug/kg	330	
3,3'-Dichlorobenzidine	ND	ug/kg	660	
Benzo(a)anthracene	ND	ug/kg	330	
bis(2-Ethylhexyl) phthalate	66	ug/kg	330	J
Chrysene	ND	ug/kg	330	
Di-n-octyl phthalate	ND	ug/kg	330	
Benzo(b)fluoranthene	ND	ug/kg	330	
Benzo(k)fluoranthene	ND	ug/kg	330	
Benzo(a)pyrene	ND	ug/kg	330	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	330	
Dibenz(a,h)anthracene	ND	ug/kg	330	
Benzo(g,h,i)perylene	ND	ug/kg	330	

Surrogate	Recovery	
Nitrobenzene-d5	80	%
2-Fluorobiphenyl	97	%
Terphenyl-d14	87	%
Phenol-d5	83	%
2-Fluorophenol	85	%
2,4,6-Tribromophenol	73	%

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Dan Albritton Approved By: Audrey Verniero

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02605

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No: N/A
SMO Reference No.: N/A

Date Samples Shipped: 2/3/95
Carrier/Waybill No.: 044832
Lab Contact: Ellen LeRiche
Lab Destination: Quanterra
SMO Contact/Phone: Pam Puissant
Send Report to SMO: Debra Constant

Contract No.: 67-9736-B
Case No.: 3617.300
SMO Authorization: [illegible]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Parameter & Method Requested

Location — Tech Area: V; Building: 6588; Room: —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	TAL Metals	8270 SVOCs	Lab Sample ID
02 1693 - 00	TA5-BH-01-120.5	120.5	—	2/2/95, 9:13	Soil	steel liner	250ml	NONE	G	SA	X			
02 1700 - 00	TA5-BH-01-140.25	140.25	—	10:25							X			
02 1742 - 00	TA5-BH-01-160.75	160.75	—	11:50							X			
02 1696 - 00	TA5-BH-01-160.00	160.00	—	11:50			500ml					X		
02 1746 - 00	TA5-BH-01-181.25	181.25	—	14:08			250ml						X	
02 1744 - 00	TA5-BH-01-181.00	181.00	—	14:08							X			
02 1748 - 00	TA5-BH-01-200.25	200.25	—	15:20							X			

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy) 2-6-95; Entered by: D Gerg; QC inits.

Special Instructions/QC Requirements: FAX 8240 RESULTS TO LON DAWSON @ 848-0417

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Quanterra/7582
	Paul Freshour	[illegible]	PF	SNL/7584
	Dan Schofield	[illegible]	DS	SNL/7584

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by	7584	2/3/95	9:35	4. Relinquished by			
1. Received by	7526	2/3/95	9:35	4. Received by			
2. Relinquished by	7526	2/3/95	11:[illegible]	5. Relinquished by			
2. Received by				5. Received by			
3. Relinquished by				6. Relinquished by			
3. Received by				6. Received by			

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

SF 2001 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Tea[illegible] Members: Record the names and affiliations of all members of the sample co[illegible]n team.

Relinquisl [illegible] ceived by: Sign full name, and enter organization, date, and time when [illegible]shing custody of the samples. *The first person relinquishing the samples m[illegible] a member of [illegible]g team.* Similarly, upon receipt and verification sign full name, and enter o[illegible]ization, date, and time that samples are taken into custo[illegible]

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02626

Dept. No./Mail Stop: 7582 / 1347
Project/Task Manager: Len Dawson
Project Name: TA5 Tech Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/8/95
Carrier/Waybill No.: A44834
Lab Contact: Ellen LeRivere
Lab Destination: Quanterra
SMO Contact/Phone: Pam Durrant
Send Report to SMO: Debra Constant

Contract No.: 67-9736B
Case No.: 3617-3CD
SMO Authorization:
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location — Tech Area: 2 — Building: 6594 — Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	8270	TAL Metals	Lab Sample ID
✓ 021697-00	TA5-BH-01-300.50	300.50	NONE	2/7/95, 9:52	S	liner	250ml	NONE	G	SA	X			
✓ 021719-00	TA5 BH-01-301.25	301.25		9:54							[redacted]	X		
✓ 021128-00	TA5-BH-01-320.75	320.75		12:15			↓				X			
✓ 021192-00	TA5-BH-01-320.25	320.25		12:15			500ml						X	
✓ 021131-00	TA5-BH-01-341.00	341.00		13:35			250ml				X			
✓ 021134-00	TA5-BH-01-360.50	360.50		14:45							X			
✓ 021137-00	TA5 BH-01-380.75	380.75	↓	14:14	↓	↓	↓	↓	↓	↓	X			

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2-14-95
Entered by: D Garcia
QC inits.

Special Instructions/QC Requirements
(Please list as separate Lab!)

Abnormal Conditions on Receipt:

Sample Team Members ✓	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Sandia / 7582

1. Relinquished by Michael Wade	Org. 7582	Date 2/8/95	Time 6:54	4. Relinquished by	Org.	Date	Time
1. Received by D Mendell	Org. SMO 7576	Date 2/8/95	Time 6:54	4. Received by	Org.	Date	Time
2. Relinquished by D Mendell	Org. SMO 7576	Date 2/8/95	Time 6:00	5. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	5. Received by	Org.	Date	Time
3. Relinquished by	Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by	Org.	Date	Time	6. Received by	Org.	Date	Time

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

SF 2001 COC (8 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample T[illegible] [illegible]embers: Record the names and affiliations of all members of the sample [illegible]n team.

Relinqui[illegible] [illegible]eceived by: Sign full name, and enter organization, date, and time when [illegible]uishing custody of the samples. *The first person relinquishing the samples mu[illegible] be a member of s[illegible]pling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into custody.

SHIPPER

IF 6051-AE(1-93)

Sandia National Laboratories

1 [x] New Mexico [ ] California [ ] Other

SHIP TO: Typed or neatly printed

2 QUANTERRA
~~Enecco Rocky Mountain Analytical Laboratory~~
4955 Yarrow Street
Arvada, CO 80002
Attn: Ms. Ellen La Riviere
Contract No. 67-9736B

AR/COC # 02626

Date Exit Time & Date 3: | Highest Material Security Class. 4: U | Page 1 Of 1

Date to be Returned 5: [x] No Return | Document No. A 44834 | Shipping Code 6: C | Shipment Register No. 7: 58372

Date at Destination 8: 2/9/95 (Date) | [x] Firm (Premium transportation authorized) [ ] Flex (Most economical transportation)

Originator of Form 9: D.L. McLaughlin | Org. 7576 | Phone 4-0941 | Date Prepared 10: 2/8/95

FROM: 11 Site: TAI | Bldg.: 870B | Room: 1 | Org.: 7576

12 Requester's E No.: 03319 | Requester's Name (Write "Same" if also originator): same | Org. | Phone

13 Case No.: ~~6987.200~~ 6991.124000

Material Billing 14: [ ] Charge [x] No Charge

Freight Billing 15: [x] Prepaid [ ] Collect (If collect, carrier & acct no. (if known))

16 Reason for Shipment: Lab Analysis of Environmental Samples

17 Authority for Shipment: n/a

Item No. 18	Sec. Class. 19	Quantity 20	Unit 21	Haz. Mat'l. 22	Property Tag No. And/Or MID No. 23	Description 24	Unit Value 25	$ Total 26
1	U	1	EA	N/A	N/A	ENVIRONMENTAL SOIL SAMPLES (TCE PLUME)	N/A	N/A

LAST ITEM

IMPORTANT: SANDIA TRAFFIC ANALYST, PLEASE FAX COPY OF COMPLETED SHIPPER AND WAYBILL TO SMO FACILITY, FAX # 844-4976, IMMEDIATELY UPON SHIPMENT.

2/8/95 2:10

Grand Total 27 $

DOE Transportation Safeguards Div. Courier Required? 28 [ ] YES [x] NO

Service Clerk 29: | Property Mgmt. Rep. 30:

Date Shipped or Handed 31: | Routing: FEDERAL EX FEB 08 1995 | B/L No. 32: 205 2202 886 | No. of Boxes 33: 1 cooler | Weight 34: 22.6 lb | Total Cubic Feet/Dimensions 35: 20/23x15x12

Authorizing Signature 37: Jim D. Fish, 7576
Signature of manager above typed or printed name and Org.
I certify that the material being offered for shipment is nonhazardous unless noted as hazardous in block 22 and required information is being provided.

Special Approval 38: Name | Org.

Special Approval: Name | Org.

39: Bearer's Signature

40 Receipt Acknowledged: Recipient's Signature/Company | Date

Contract or PEL/MEL Rep. 41: [ ] External Loan: Name | Org.

Ply 1:
Corporate File - Retained by the Traffic Organization after shipper is complete and items are ready for shipment.

The listed material and accompanying information has been examined and the hazardous material designations and all preparations for shipment are certified correct.

42: Hazardous Material Consultant

43: Prepared by

FAX TRANSMITTAL	# of Pages 1 of 1
To Pam Pussant	From Ellen LeRiviere
Co. Sandia	Co. Quanterra
Fax# (505) 848-0535	Phone: 303-421-6611 Fax: 303-431-7171

QUANTERRA, DENVER LABORATORY
CHANGE ORDER

Client Name Sandia
Quanterra Project Number 040490
Date of Request 2/9/95
Change Order Submitted to Client
Date 2/9/95

Program Name/Lims Number 001429
TAS- TCE Plume COC # 26626
Contact Ellen LeRiviere
Authorized Client Representative
Pam Pussant

TYPE OF CHANGE

Method X Sample Del. Schedule ____ SDA Criteria ____ Matrix ____ QC Change ____
Bottles Received ____ Deliverable X C of C Discrepancies ____

PROGRAM CHANGE ____ **PROJECT CHANGE** X

DESCRIPTION OF MODIFICATION/CHANGE/DISCREPANCY/NOTIFICATION Mike Wade asked the laboratory to RUSH the 8240 analysis for Quanterra sample 040490-0007-SA. The laboratory will perform the analyses within 72 hours. Len Dawson added a Method 8270 analysis to Quanterra sample 040490-0004-SA.

Date change is to be implemented 2/9/95

APPROVED BY: CLIENT REP ____ QUANTERRA REP EMD

Follow-up required: N/A X Yes ____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

PAGE 1 OF 1

AR/COC- 02626

Dept. No./Mail Stop: 7582 / 1347
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/8/95
Carrier/Waybill No.: AY4834
Lab Contact: Ellen LeRivere
Lab Destination: Quanterra
SMO Contact/Phone: Pam Pierceant 844-0102
Send Report to SMO: Debra Constant

Contract No.: 67-7136B
Case No.: 3617-8500
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area: 2 — Building: 6594 — Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	8270	TAL Metals	Lab Sample ID
✓ 021697-00	TA5-B11-01-300.50	300.50	NONE	2/7/95, 9:52	S	liner	250ml	none	G	SA	X			
✓ 021719-00	TA5 B11-01-301.25	301.25		9:54								X		
✓ 021128-00	TA5-B11-01-320.75	320.75		12:15							X			
✓ 021192-00	TA5-B11-01-320.25	320.25		12:15			500ml						X	
✓ 021131-00	TA5-B11-01-341.00	341.00		13:35			250ml				X			
✓ 021134-00	TA5-B11-01-360.50	360.50		14:45							X			
✓ 021137-00	TA5 B11-01-380.75	380.75		14:14							X			

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy): Entered by: QC inits.

Special Instructions/QC Requirements: (Please list as separate copy)

Abnormal Conditions on Receipt:

Sample Team Members ✓	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Infra / 7582

1. Relinquished by	Michael Wade	Org. 7582	Date 2/8/95	Time 6:54	4. Relinquished by	Org.	Date	Time
1. Received by	D Morgan	Org. SMO 7576	Date 2/8/95	Time 6:54	4. Received by	Org.	Date	Time
2. Relinquished by	D Morgan	Org. SMO	Date	Time	5. Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

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

SHIPPER

SF 0051-AE(1-93)

Sandia National Laboratories

1 [x] New Mexico [ ] California [ ] Other

SHIP TO: Typed or neatly printed
2 QUANTERRA
~~Enseco Rocky Moutain Analytical Laboratory~~
4955 Yarrow Street
Arvada, CO 80002
Attn: Ms. Ellen La Riviere
Contract No. 67-9736B

AR/COC # 02626

Date Exit Time & Date 3 | Highest Material Security Class. 4: U | Page 1 of 1

Date to be Returned 5: [x] No Return | Document No.: A 44834 | Shipping Code 6: C | Shipment Register No. 7: 58372

Date at Destination 8: 2/9/95 (Date) | [x] Firm (Premium transportation authorized) [ ] Flex (Most economical transportation)

Originator of Form 9: D.L. McLaughlin | Org.: 7576 | Phone: 4-0941 | Date Prepared 10: 2/8/95

FROM: 11 Site: TAI | Bldg.: 870B | Room: 1 | Org.: 7576

Requester's E No. 12: 03319 | Requester's Name (Write "Same" if also originator): same | Org. | Phone

Case No. 13: ~~6987.200~~ 6991.124000

Material Billing 14: [ ] Charge [x] No Charge

Freight Billing 15: [x] Prepaid [ ] Collect (If collect, carrier & acct no. (if known))

Reason for Shipment 16: Lab Analysis of Environmental Samples

Authority for Shipment 17: n/a

Item No. 18	Sec. Class. 19	Quantity 20	Unit 21	Haz. Mat'l. 22	Property Tag No. And/Or MID No. 23	Description 24	Unit Value 25	Total 26
1	U	1	EA	N/A	N/A	ENVIRONMENTAL SOIL SAMPLES (TCE PLUME)	N/A	N/A

LAST ITEM

IMPORTANT: SANDIA TRAFFIC ANALYST, PLEASE FAX COPY OF COMPLETED SHIPPER AND WAYBILL TO SMO FACILITY, FAX # 844-4976, IMMEDIATELY UPON SHIPMENT.

2/8/95 2:10

Grand Total 27 $

DOE Transportation Safeguards Div. Courier Required? 28: [ ] YES [x] NO

Service Clerk 29: [illegible] | Property Mgmt. Rep. 30: [illegible]

Date Shipped or Hand Carried 31: FEDERAL EX | Routing: FEB 08 1995 | B/L No. 33: 205 2202 896 | No. of Boxes 34: 1 cooler | Weight 35: 22 LBS | Total Cubic Feet/Dimensions 36: 4.0/23x13x17

Authorizing Signature 37: Jim D. Fish, 7576
Signature of Manager above typed or printed name and Org.
I certify that the material being offered for shipment is nonhazardous unless noted as hazardous in block 22 and required information is being provided.

Special Approval 38: Name | Org.

Special Approval: Name | Org.

39: Bearer's Signature

40 Receipt Acknowledged: Recipient's Signature/Company | Date

Contract or PEL/MEL Rep. 41: Name | Org. [ ] External Loan

The listed material and accompanying information has been examined and the hazardous material designations and all preparations for shipment are certified correct. 42: Hazardous Material Consultant | 43: Prepared by

Copy 1:
Corporate File - Retained by the Traffic Organization after shipper is complete and items are ready for shipment.

FAX TRANSMITTAL	# of Pages 1 of 1
To Pam Pruissant	From Ellen LaRiviere
Co. Sandia	Co. Quanterra
Fax# (505) 848-0535	Phone: 303-421-6611 Fax: 303-431-7171

QUANTERRA, DENVER LABORATORY
CHANGE ORDER

Client Name Sandia
Quanterra Project Number 040490
Date of Request 2/9/95
Change Order Submitted to Client
Date 2/9/94

Program Name/Lims Number 000429
TAS- TCE Plume COC # 2626
Contact Ellen LaRiviere
Authorized Client Representative
Pam Pruissant

TYPE OF CHANGE

Method X Sample Del. Schedule ____ SDA Criteria ____ Matrix ____ QC Change ____
Bottles Received ____ Deliverable X C of C Discrepancies ____

PROGRAM CHANGE ____ **PROJECT CHANGE** X

DESCRIPTION OF MODIFICATION/CHANGE/DISCREPANCY/NOTIFICATION Mike Wade asked the laboratory to RUSH the 8240 analysis for Quanterra sample 040490-0007-SA. The laboratory will perform the analyses within 72 hours. Len Dawson added a Method 8270 analysis to Quanterra sample 040490-0004-SA.

Date change is to be implemented 2/9/95

APPROVED BY: CLIENT REP ____ QUANTERRA REP EMO

Follow-up required: N/A X Yes ____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

PAGE 1 of 1

AR/COC- 02626

Dept. No./Mail Stop: 7582 / 1347
Project/Task Manager: Lon Dawson
Project Name: TA5- TCE Plume
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/8/95
Carrier/Waybill No.: A44834
Lab Contact: Ellen LeRiviere
Lab Destination: Quantetta
SMO Contact/Phone: Pam Puissant 848-0402
Send Report to SMO: Debra Constant

Contract No.: 67-97368
Case No.: 3617.300
SMO Authorization:
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area: V; Building: 6594; Room: —

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	8270	TAL Metals						Lab Sample ID
02169 7-00	TA5-BH-01-300.50	300.50	NONE	2/7/95, 9:52	S	liner	250ml	none	G	SA	X							4C190	-01
02171 9-00	TA5 BH-01-301.25	301.25		9:54								X							-02
02112 8-00	TA5-BH-01-320.75	320.75		12:15							X								-03
02119 2-00	TA5-BH-01-320.25	320.25		12:15			500ml						X						-04
02113 1-00	TA5-BH-01-341.00	341.00		13:35			250ml				X								-05
02134 -00	TA5-BH-01-360.50	360.50		14:45							X								-06
02113 7-00	TA5 BH-01-380.75	380.75		16:14							X							-07	~~-075~~

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy); Entered by:

QC inits.

Special Instructions/QC Requirements: Please list as separate Lab!

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Sanfera / 7582

	Org.	Date	Time
1. Relinquished by Michael Wade	7582	2/8/95	6:54
1. Received by D Moseyle	SMO 7576	2/8/95	6:54
2. Relinquished by D Moseyle	SMO 7576	2/8/95	16:00
2. Received by		2/9/95	8:20
3. Relinquished by			
3. Received by			
4. Relinquished by			
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

SF 2001 COC (9 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required. **Only one turnaround time type is allowed for each AR/COC.**

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample T[illegible]embers: Record the names and affiliations of all members of the sample [illegible]n team.

Relinqui[illegible]eceived by: Sign full name, and enter organization, date, and time when [illegible]uishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into custody.

TAV-13#-01

CEW

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 5-10-95

to: Lou Dawson

from: Mary Beth Garcia, 7513

project: TAS TCE Plume COC: 02626

Re-analysis for method 8270 Lab: Quanterra

Lab #: 041263.01

Date Sampled: 2-7-95

Enclosed are/is 1 data package(s) for your project. The package(s) include a copy of the sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data and the original report(s) have been forwarded to the record center. The data is being sent to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0036 or 848-0338

SAMPLE MANAGEMENT OFFICE

Mary Beth Garcia

Mary Beth Garcia

MBG:7513:pp

Distribution:
7500 Record Center

C: M. GARCIA
E. VINSANT
D. Stockham
P. Puissant

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

Project Name TAS TCE Plume
Case Number 3617.300
Sample Numbers 021142 Reanalysis

AR/COC No. 02626 Analytical laboratory Quanterra SDG No. 41263
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log NA

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: MBGarcia

Date: 5-10-95

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

The original COC was reviewed + TRANSMITTED

2.0 Analysis Request and Chain of Custody Record under LAB ID 040490

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No*
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	←			→
Lab sample number	✓			
Condition upon receipt	✓			

* Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison NA

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No*
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project-specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

* Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: MB Garcia Date: 5-10-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log NA

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: MBGarcia

Date:

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

5.3 Document Comparison NA

	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.4 Analytical Laboratory Report

	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: MB Garcia Approved by:*
Date: 5-10-95 Date:

* Task/Project Leader must approve data package.

COMMENTS:

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

Project Name TA 5 TCE Plume

Case Number 3617.300

Sample Numbers 021142 Re-analysis

AR/COC No. 62626 Analytical laboratory ~~41263~~ Quanterra SDG No. 41263

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?		✓	This is a re-analysis; it was requested after holding time expired
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓	—	

Reviewed by: MB Garcia

Date: 5-9-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

This is a re-analysis of 8270, NITROSO-di-n-propylamine the lab contends in the narrative that this compound is present but it is no homogeneous in the sample.

Reviewed by: MBGarcia

Date: 5-10-95

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

2.0 COMMENTS CONTINUATION SHEET

MB 96

Reviewed by: MBGarcia

Date: 5-10-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments

MB 6

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: MB Garcia

Date: 5-10-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: MBGarcia Approved by: _____

Date: 5-10-95 Date: _____

ask/Project Leader must approve data package.

TAV-BH-01

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 2-22-95

to: Lou Dawson

from: Howard Seeley, 7576

project: TCE Plume COC: 02621

Lab: Quanterra

Lab #: 40469

Date Sampled: 2-6-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center
D. Stockham
E. Vinsant

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

Project Name TCE Plume - TAS
Case Number 3617.300
Sample Numbers 021752, 021754, 021755, 021756

AR/COC No. 02621 Analytical laboratory Quanterra SDG No. 40469
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Not Used

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

HJ 2/22/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 2-22-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).	HS	2/22/95		
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).			N/A	

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 2-22-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

Reviewed by: H. Seeley

Date: 2-22-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 2-22-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume - TAS

Case Number 3617.300

Sample Numbers 021752, 021754, 021755, 021756

AR/COC No. D2621 Analytical laboratory Quanterra SDG No. 40469

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements? SAP not provided	✓		
4) Quantitation limit met for all samples?		✓	021755 - Selenium
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓		

Reviewed by: Howard Seeley

Date: 2-22-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?		✓	021752, 021754, 021756 - Acetone 021755 - Zinc
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		No trip blank or equipment blanks associated.
8) Narrative included, correct, and complete?	✓		

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

1) Selenium - per case narrative, the reporting limit for selenium in sample 021755 was raised to 0.52 mg/kg. Project-specific criteria not available to determine data impact.

Reviewed by: H. Sedey

Date: 2-22-95

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

2.0 COMMENTS CONTINUATION SHEET

2) Method blank - Acetone - detected below the CRQL at 2.3 ug/kg (CRQL=10). All associated results were less than the CRQL and less than 10x the blank result. For all three samples, the acetone result has been flagged as non-detect at the CRQL.

3) Method blank - Zinc - detected just above CRQL at 2.1 mg/kg (CRQL=2 mg/kg). Since the sample result was greater than 10x the blank value, no action has been taken.

Reviewed by: H. Seeley

Date: 2-22-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021755	Selenium	Q	Per case narrative.
021752	Acetone	U-B	Acetone in method blank.
021754	↓	↓	Consider results non-detect,
021756	↓	↓	w/ detection limit of 10 ug/kg.

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 2-22-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

KS 3-22-95

Reviewed by: Howard Seeley Approved by:* _____

Date: 3-22-95 Date: _____

*Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC 02621

Dept. No./Mail Stop: 7582
Project/Task Manager: Lon Dawson
Project Name: TA-5 Phase TAS
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/7/95
Carrier/Waybill No.: 1 41833
Lab Contact: Allen Lekivick
Lab Destination: Quanterra
SMO Contact/Phone: Pam Russant
Send Report to SMO: Debra Croslant

Contract No.: 67-17XB
Case No.: 3617.300
SMO Authorization: D. McGarle
Bill to: Sandia National Laboratories
Supplier Services Department
P.O. Box 5800 MS 0154
Albuquerque, NM 87185-0154

Location — Tech Area: V — Building: 6588 — Room: –

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	[illegible]	TAL Metals							Lab Sample ID
021752-00	TAS-BH-01-221.0	221.0	None	2/1/95; 11:21	S	Steel liner	250ml	NONE	G	SA	X									
021754-00	TAS-BH-01-240.75	240.75	↓	; 13:35	↓	↓	↓	↓	↓	↓	X									
021755-00	TAS-BH-01-241.00	241.0	↓	; 13:35	↓	↓	↓	↓	↓	↓			X							
021756-00	TAS-BH-01-260.50	260.50	↓	; 14:50	↓	↓	↓	↓	↓	↓	X									

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush Required Report Date

Sample Tracking
Date Entered (mm/dd/yy): 2-9-95
Entered by: D. Gerrie
QC inits.

Special Instructions/QC Requirements
* TAX Preliminary 8240 results to Lon Dawson at 505-818-0417.
Please list as separate report.

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Lockheed 7582

1. Relinquished by Michael Wade	Org. 7582	Date 2-7-95	Time 7:16	4. Relinquished by	Org.	Date	Time
1. Received by D. McGarle	Org. SMO 7576	Date 2-7-95	Time 7:16	4. Received by	Org.	Date	Time
2. Relinquished by	Org. 7576	Date	Time	5. Relinquished by	Org.	Date	Time
2. Received by	Org.	Date	Time	5. Received by	Org.	Date	Time
3. Relinquished by	Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by	Org.	Date	Time	6. Received by	Org.	Date	Time

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

SF 2001 COC (8 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Members: Record the names and affiliations of all members of the sample[illegible]ion team.

Relinqu[illegible]/Received by: Sign full name, and enter organization, date, and time when [illegible]nquishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken int[illegible]

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-23-95

to: Lou Dawson

from: Mary Beth Garcia, 7576

project: TA 5 TCE COC: 2738

Lab: Quantera

Lab #: 40534

Date Sampled: 2/7, 2/9, 2/10/95

Enclosed are/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0036 or 848-0338.

It is your responsibility to file this report in the Record Center.

SAMPLE MANAGEMENT OFFICE

Mary Beth Garcia

Mary Beth Garcia

MBG:7576:pp

P.S. I will send a hard copy of Pg 0004 upon receipt

Distribution:
7500 Record Center

c: P. Purissant
M Garcia
E. Vinsant
D. Stockham

should be 21135 MB

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

Project Name TA 5 TCE Plume
Case Number 3617.300
Sample Numbers 021660, 61, 65, 64, 67, 68, 69, 71, 72, 35

AR/COC No. 2738 Analytical laboratory Quantera SDG No. 40534
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log N A

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: M B Garcia

Date: 3-23-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	←			→
Lab sample number		✓	✓	
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: MB Garcia Date: 3-23-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log NA

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☑	☐

If any boxes have been checked no, describe problem and resolution:
the COC did not have the lab sample # on it but the accompanying letter did. The COC did not have the Record Center Code documented.

Reviewed by: M B Garcia
Date: 3-23-95

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

5.3 Document Comparison N/A

	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.4 Analytical Laboratory Report

	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: MBGarcia Approved by:*
Date: 3-23-95 Date:

* Task/Project Leader must approve data package.

COMMENTS: Pg 0004 indicated the time of collection at 1446. The lab has faxed a corrected sheet but will follow up with a hard copy. Upon receipt I will forward this to you.

21135
MB

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

Project Name TA 5 TCE Plume

Case Number 3617.300

Sample Numbers 021660, 61, 65, 64, 67, 68, 69, 71, 72, 35

AR/COC No. 2738 Analytical laboratory Quanterra SDG No. 40534

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		However the reporting limits were raised for sample 021671/TA5BH01-BW, due to the dilution
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓	—	

Reviewed by: MB Garcia

Date: 3-23-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		
8) Narrative included, correct, and complete?	✓		

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

4) can't required because to target compound present

Reviewed by: MB Garcia

Date: 3-23-95

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

2.0 COMMENTS CONTINUATION SHEET

Zn in the method blank - since zn was detected in the sample at a concentration of 24.1 + this is 10x higher than the level in the blank the data is acceptable.

Reviewed by: MB Garcia

Date: 3-23-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021664-00	Zn	B	Zn was detected in the
↓	↓	↓	method blank at 2.1 mg/kg
↓	↓	↓	with a reporting limit of 2.0 mg/kg.
021664-00	Se	MI	Se reporting limit was
			raised due to matrix
			interference (MI)

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: MB Garcia

Date: 3-23-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: MB Garcia Approved by: _____

Date: 3-23-95 Date: _____

Task/Project Leader must approve data package.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

PAGE 1 OF 1

SF 2001-COC (9-94)

AR/COC- 02738

Dept. No./Mail Stop: 7582 / 1317
Project/Task Manager: Lon Dawson
Project Name: TA5 TCE Plume
Record Center Code: N.A.
Logbook Ref No: N.A.
SMO Reference No.: N.A.

Date Samples Shipped: 2-10-95
Carrier/Waybill No.: ~~A44275~~ A44836
Lab Contact: Ellen LeRiviere
Lab Destination: Quanterra
SMO Contact/Phone: Pam Russeau - 848-0102
Send Report to SMO: Debra Constant

Contract No.: 679736B
Case No.: 3667300
SMO Authorization:
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Parameter & Method Requested

Reference LOV (available at SMO)

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240	TAL Metals	8270	418.1 (TPH)	8010/8020 (RUSH)	8015 (TPH + TEPH)					Lab Sample ID
021660-00	TA5-BH-01-440.50	440.5	NONE	2/9/95; 11:10	S	SL	250ml	NONE	G	SA	X										-01
021661-00	TA5-BH-01-460.50	460.50		; 12:56					G	SA	X										-02
021665-00	TA5-BH-01-481.00	481.0		; 14:16							X										-03
021664-00	TA5-BH-01-480.50	480.5		; 14:16			500ml					X	X								-04
021667-00	TA5-BH-01-491.00	491.0		; 15:16			250ml				X										-05
021668-00	TA5-BH-01-490.50	490.50		; 15:16										X							-06
021669-00	TA5-BH-01-500.75	500.75		; 16:25							X										-07
021671-00	TA5-BH-01-BW	499		2/10/95; 10:56	W	AG	64oz	NONE	G	SA			X								-08
021672-00	TA5-BH-01-BW	499		2/10/95; 10:56	W	VOA	3 40ml VOAs	HCL						3	X						-09
021135-00	TA5-BH 01-381.00	381.0		2/7/95; 16:11	S	SL	125ml	NONE	G	SA				[illegible]		X					-10

Location: Tech Area V; Building 6594; Room –

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☒ Normal ☐ Rush 8010/8020 Required Report Date

Sample Tracking: Date Entered (mm/dd/yy); Entered by; QC inits.

Special Instructions/QC Requirements: * Rush analysis on 8010/8020 water samples (021672 – TA5-BH 01-BW) – FAX results to Lon D @ 848-0417 or call w/ results @ 505-250-7919

LIST AS SEPARATE REPORT

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael Wade	Michael Wade	MW	Quanterra/7582
	Paul Freehour	[signature]	PF	SNL/7584

	Org.	Date	Time		Org.	Date	Time
1. Relinquished by	7584	2/10/95	12:20	4. Relinquished by			
1. Received by	7576	2/10/95	1220	4. Received by			
2. Relinquished by	7576	2/10/95	1400	5. Relinquished by			
2. Received by		2/11/95	930	5. Received by			
3. Relinquished by				6. Relinquished by			
3. Received by				6. Received by			

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

SF 2001 COC (9-94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type (e.g., TB, FS, DP, MS, etc.) from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required. **Only one turnaround time type is allowed for each AR/COC.**

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special I[illegible]ctions/QC Requirements: Record special instructions/QC requirements.

Sample [illegible] Members: Record the names and affiliations of all members of the sample[illegible]ion team.

Relinquis[illegible]/Received by: Sign full name, and enter organization, date, and time when relinquishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that [illegible]

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 2-22-95

to: Lon Dawson

from: Howard Seeley, 7576

project: TCE Plume (Chemical) COC: 02598

Lab: Quanterra

Lab #: 40440

Date Sampled: 1-31-95

Enclosed ~~are~~/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 0846.

SAMPLE MANAGEMENT OFFICE

Howard Seeley

HS:7576:pp

Distribution:
7500 Record Center
D. Stockham
E. Vinsant

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

Project Name TCE Plume

Page 1 of 4

Case Number 3617.300

Sample Numbers 021703, 021706, 021708, 021709, 021714, 021715

AR/COC No. 02598 Analytical laboratory Quanterra SDG No. 40440
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log

Not Used

Item	Complete? Yes	Complete? No	Corrected? Yes	Corrected? No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

NA
HS 2/22/95

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: Howard Seeley

Date: 2-22-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓		✓	
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	✓			
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison

NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: H. Seeley Date: 2-22-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data	NA			
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment

For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☑	☐

If any boxes have been checked no, describe problem and resolution:
Incorrect case number on COC - Corrections made as documented in attached 'Notification of Error' report.

Reviewed by: H. Seeley
Date: 2-22-95

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

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution: NA

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: Howard Seeley Approved by:* _____
Date: 2-22-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

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

Project Name TCE Plume

Case Number 3617.300

Sample Numbers 021703, 021706, 021708, 021709, 021714, 021715

AR/COC No. 02598 Analytical laboratory Quanterra SDG No. 40440

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?		✓	021703 - Selenium 021709, 021714 - Most metals (see comments)
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓		

Reviewed by: Howard Seeley

Date: 2-22-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	NA		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	NA		
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	NA		No trip blank associated w/ samples.
8) Narrative included, correct, and complete?	✓		

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

i) For 021703, per case narrative, selenium reporting limit was slightly elevated. Project-specific criteria not available for confirmation.

Reviewed by: H. Seeley

Date: 2-22-95

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

2.0 COMMENTS CONTINUATION SHEET

2) Samples 021709 and 021714: For sample 02174, all metal reporting limits were high by 2x, except mercury. For sample 021709, the reporting limits were increased 2X, except for Hg, As, Se, and Tl. Project-specific criteria not available to assess impact ~~on~~ on data.

Reviewed by: H. Seeley

Date: 2-22-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021703	Selenium	Q	Per case narrative.
021709	Metals	Q	Per case narrative (except Hg, As, Tl, Se)
021714	Metals	Q	Per case narrative (all except Hg)

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: H. Seeley

Date: 2-22-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

Reviewed by: Howard Seeley Approved by:* _____

Date: 2-22-95 Date: _____

*Task/Project Leader must approve data package.

RMAL Industrial Sample Checklist Revision 6.0 January 24, 1994

Project #: 4040 Date/Time Received: 2-4-95 900

Company Name & Sampling Site: Sudice

*Cooler #(s): _____ _____ _____ _____ * Place copy of airbill inside all non-RMAL coolers. Describe here.

Temperatures: 5.0 _____ _____ _____

UNPACKING & LABELING CHECK POINTS:	Y	N	INITIALS
1. Radiation Checked; (record reading if > 0.5 mR/hr):	✓		JD
2. Cooler seals Intact:	✓		
3. Chain of Custody Present:	✓		
4. Bottles broken or leaking (comment if Y): -photograph broken bottles-		✓	
5. Containers labeled (comment if N):	✓		
6. Chain of Custody includes "received by" and "relinquished by" signatures, dates, and times:	✓		
7. CoC agrees with bottle count (comment if N):	✓		
8. CoC agrees with labels (comment if N):	✓		
9. VOA samples filled completely (comment if N):	✓		
10. Are VOA samples preserved? (Check for bottle labels)	✓		
11. Sediment present in "D" bottles:	n/a		
12. Are analyses with short holding times requested?		✓	
13. Is extra sample volume provided for Matrix Spike and/or matrix replicates?		✓	
14. Multi phase samples present (comment if Y): -photograph multiphase samples-		✓	
15. Clear picture taken, labeled, and stapled to project folder?	✓		

Comments: include action taken to resolve discrepancies/problems. Include a hard copy of VAX mail or extra paper if more space is needed.

Sample Seals intact

Initials: _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

2/21/95 PAGE 1 OF 1

SF 2001-COC (9-94)

3617.300 AR/COC- 02598

Dept. No./Mail Stop: 7582/
Project/Task Manager: Don Dawson
Project Name: TA5 TCC MUNI
Record Center Code:
Logbook Ref No: NA
SMO Reference No.: NA

Date Samples Shipped: 2/3/95
Carrier/Waybill No.: A 44832
Lab Contact: Allen Pivnick
Lab Destination: California
SMO Contact/Phone: Pam Brissant
Send Report to SMO: Debra Constant

Contract No. 67-9736B
Case No. 3624.300
SMO Authorization:
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location — Tech Area V — Building 6588 — Room —

Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	TAL Metals/ICP/MS	SVOCs	VOCs-8240	Lab Sample ID
102170 6 - 00	TA5-BH-01-21.00	21.00	NONE	1/31/95 12:01	Soil	Steel Liner	250 ml	NONE	G	ASA			X	
102170 3 - 00	TA5-BH-01-20.50	20.50		12:01			500 ml				X	X		
102170 8 - 00	TA5-BH-01-31.00	31.00		14:15			250 ml						X	
102170 9 - 00	TA5-BH-01-30.50	30.50		14:15			500 ml				X	X		
102171 5 - 00	TA5-BH-01-42.0	42.0		15:54			250 ml						X	
102171 4 - 00	TA5-BH-01-41.5	41.5		15:54			500 ml				X	X		
							~~250 ml~~							
							~~500 ml~~							

Reference LOV (available at SMO)

RMMA ☐ Yes ☒ No Ref. No.

Sample Disposal ☐ Return to Client ☒ Disposal by lab

Turnaround Time ☑ Normal ☐ Rush Required Report Date

Sample Tracking: Date Entered (mm/dd/yy) 2-6-95; Entered by: Bigelow; QC Inits.

Special Instructions/QC Requirements

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
	Michael WADE	Michael Wade	MW	Lutera/7582
	DON SCHOFIELD	Don Schofield	DS	SNL/7584

	Org.	Date	Time
1. Relinquished by Michael Wade	7582	1/31/95	16:21
1. Received by	7584	1/31/95	16:21
2. Relinquished by	7584	1/31/95	17:00
2. Received by	[illegible]	[illegible]	13:55
3. Relinquished by	7584	2/1/95	13:28
3. Received by	7576	2/1/95	[illegible]
4. Relinquished by	7576	2/3/95	[illegible]
4. Received by			
5. Relinquished by			
5. Received by			
6. Relinquished by			
6. Received by			

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

SF 2001 COC (8 94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required.
Only one turnaround time type is allowed for each AR/COC.

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Members: Record the names and affiliations of all members of the sampl tion team.

Relinqu /Received by: Sign full name, and enter organization, date, and time whe nquishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into custody

NOTIFICATION OF ERROR

CHAIN OF CUSTODY #: 02598 SHIP DATE: 8/3/95

LAB DESTINATION: Quanterra SHIPPER #: A44832

PROJECT MANAGER: Dawson DIVISION: 7582

SAMPLE TEAM MEMBER(S): M. Wade / D. Schofield

RELINQUISHED BY: Schofield RECEIVED BY: Rose

THE FOLLOWING ERROR WAS NOTED BY THE DATA MANAGEMENT OFFICE,
BY: Deborah Constant DATE: 2/21/95
Case number for TCE Plume is 3617.300
not 3624.300.

CORRECTIVE ACTION:
Contacted Lab. Notified Jon Dawson
Made corrections to database
for tracking and billing purposes.

DISTRIBUTION:

Lon Dawson
Mike Wade
Don Schofield
Mack Mclaughlin

Sandia National Laboratories
Albuquerque, New Mexico 87185

date: 3-~~24~~ 23 -95

to: Lon Dawson

from: Mary Beth Garcia, 7576

project: TA5 TCE Plume COC: 2629
Bldg 6594

Lab: Quanterra

Lab #: 40517

Date Sampled: 2-8-95

Enclosed are/is 1 data package(s) for your project. The package(s) include original sample collection documentation, COC form(s), analytical report(s), verification check lists, and additional supporting documentation. The SMO has performed a data verification level I and level II on the data. The data is being forwarded to you so that data validation and approval can be performed. Refer to the report narrative and verification check lists for comments regarding data quality. If you need assistance with the data review or have any questions regarding the data please contact me at 848-0036 or 848-0338.

It is your responsibility to file this report in the Record Center.

SAMPLE MANAGEMENT OFFICE

Mary Beth Garcia

Mary Beth Garcia

MBG:7576:pp

Distribution:
7500 Record Center
c: P. Puissant
MB Garcia
E. Vincent
D. Stockhon

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

Project Name TA 5 TCE Plume

Case Number 3617.300

Sample Numbers 0211-40, 41, 43, 50, 51, 49, 57, 48

AR/COC No. 2629 Analytical laboratory Quanterra SDG No. 040517

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

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

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

1.0 EVALUATION

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
1) Sample volume, container, and preservation correct?	✓		
2) Holding times met for all samples?	✓		
3) Reporting units appropriate for the matrix and meet project-specific requirements?	✓		
4) Quantitation limit met for all samples?	✓		
5) Accuracy a) Laboratory control sample accuracy reported and met for all samples?	✓		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique?	✓		

Reviewed by: MB Garcia

Date: 3-23-95

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

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
c) Matrix spike recovery data reported and met for all samples for which it was requested?	✓		–
6) Precision a) Laboratory control sample precision reported and met for all samples?	✓		
b) Matrix spike duplicate RPD data reported and met for all samples for which it was requested?	* ✓		MS/MSD was reported as "not calculated" for Al, Ca, Fe + Mg for sample b21140-00
7) Blank data a) Method or reagent blank data reported and met for all samples?	✓		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met?	✓		
8) Narrative included, correct, and complete?	✓		

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

6b) The lab does not perform % recovery calculations if the spike level is less than or equal to 25% of the value of the sample.

Reviewed by: MB Garcia

Date: 3-23-95

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

2.0 COMMENTS CONTINUATION SHEET

Sample 021948-00 trip blank, Acetone + 2-Butanone were found at concentrations greater than 10x the reporting limit. These compounds were not detected above the reporting limit for any of the associated samples.

Sample 021140-00 zinc was detected in the associated sample at 37.2 mg/kg. Since this concentration is 10 x higher than the concentration detected in the blank the sample data was not adversely affected.

Reviewed by: MB Garcia

Date: 3-23-95

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

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

Sample/ Fraction No.	Analysis	Qualifiers	Comments
021948-00	8240	B	TRIP BLANK- Acetone, 2-Butanone
↓	↓	↓	+ 2 Hexanone were detected
↓	↓	↓	at 180, 110, 16 ug/kg respectively.
021140-00	ZINC	B	Zn was detected in the
			method blank at 2.1 mg/kg
			with a reporting limit of 2.0

Attach continuation sheet for additional samples

QUALIFIERS:

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

Reviewed by: MB Garcia

Date: 3-23-95

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

SAMPLE FINDINGS SUMMARY CONTINUATION SHEET

Sample/ Fraction No.	Analysis	Qualifiers	Comments

MB 6

Reviewed by: MB Garcia Approved by: _____

Date: 3-23-95 Date: _____

Task/Project Leader must approve data package.

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

Project Name TAS TCE Plume

Case Number 3617.300

Sample Numbers 021140, 41, 43, 50, 51, 49, 57, 48

AR/COC No. 2629 Analytical laboratory Quanterra SDG No. 40517
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____
AR/COC No. _____ Analytical laboratory _____ SDG No. _____

In the tables below, mark any information that is missing or incorrect.

1.0 Sample Collection Log NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Date				
Sheet number and total number of sheets below				
General information				
Sample description				
Sample ID number(s) and fraction number(s)				
Location				
Time of sample collection				
Sample type				
Depth below surface				
QC sample?[b]				
Comments				
Analyses requested				
Project information				
Project name				
Case number/service order number				
Contact information				
Turnaround time				
Regulatory program				
Special QC requirements				
Sample team member(s), their signature(s), and initials				
Sample tracking information (the "Data Entered" and "By" spaces may be empty)				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.
[b] Comments are only required for QC samples; for other samples, this item can be blank.

Reviewed by: MB Garcia

Date: 3-23-95

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

2.0 Analysis Request and Chain of Custody Record

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Page number and total number of pages	✓			
Project information	✓			
Sample shipping information	✓			
Contract and case number	✓			
SMO authorization signature	✓			
Location information	✓			
Sample number(s)/fraction number(s)	✓			
Sample ID information	✓			
Date/time sample(s) collected	✓			
Sample matrix	✓			
Container type(s)	✓			
Sample volume	✓			
Preservative (chemical and/or thermal)	✓			
Sample collection method	✓			
Sample type	✓			
Required analytical testing	✓			
Sample information	✓			
Special instruction/QC requirements	✓			
Custody records	←			→
Lab sample number	✓			
Condition upon receipt	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

3.0 Document Comparison NA

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Dates on Sample Collection Log and AR/COC agree.				
Sample team members on the Sample Collection Log and the AR/COC agree.				
Sample ID numbers on Sample Collection Log and AR/COC agree.				
Date and time on Sample Collection Log and AR/COC agree.				
Analyses requested on AR/COC agree with those shown on Sample Collection Log.				
Project information on Sample Collection Log and AR/COC agree.				
The sample location on the Sample Collection Log agrees with the AR/COC and project- specific plan requirements or authorized changes to the plan(s).				
The number of investigative and QC samples collected was that specified in the project-specific plan(s) or authorized changes to the plan(s).				
The analyses requested on the AR/COC were those specified in the project-specific plan(s) or authorized changes to the plan(s).				

[a] Describe any uncorrected deficiencies in Section 5.0, "Completeness Assessment," below.

Reviewed by: MB Garcia Date: 3-23-95

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

4.0 Analytical Laboratory Report

Item	Complete?		Corrected?	
	Yes	No	Yes	No[a]
Data reviewed, signature	✓			
Date samples received	✓			
Method reference number(s)	✓			
Quality control data	✓			
Matrix spike/matrix spike duplicate data		✓	✓	
Narrative complete	✓			

[a] Describe any uncorrected deficiencies in Section 5.0 "Completeness Assessment" below.

5.0 Completeness Assessment For each section below, mark the appropriate box and describe any problems that remain unresolved.

5.1 Sample Collection Log

NA

	Yes	No
All boxes on the Sample Collection Log are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.2 Analysis Request And Chain Of Custody Record AR/COC

	Yes	No
All boxes on the AR/COC review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

The "Prepared Center Code" was not documented on the COC. Gasoline + Diesel Range organics were requested from a depth of 400.50 ft after samples were shipped to the lab.

Reviewed by: MB Garcia

Date: 3-23-95

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

NA

5.3 Document Comparison	Yes	No
All boxes on the Document Comparison are complete:	☐	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:

5.4 Analytical Laboratory Report	Yes	No
All boxes on the Lab Report review are complete:	☑	☐
Some boxes have been checked no; all problems are resolved.	☐	☐

If any boxes have been checked no, describe problem and resolution:
P.61 MS/MSD results - the lab inadvertently left out Pb results. I have requested a corrected sheet + it will be forwarded upon receipt. The lab faxed a corrected sheet + I inserted it as a place saver.

BASED ON THE REVIEW, DOCUMENTATION IS COMPLETE: ☑ Yes ☐ No

Reviewed by: MBGarcia Approved by:* _____
Date: 3-23-95 Date: _____

* Task/Project Leader must approve data package.

COMMENTS: _____

RMAL Industrial Sample Checklist Revision 6.0 January 24, 1994

Project #: 40517 Date/Time Received: 2-10-95 900

Company Name & Sampling Site: SAMPA

*Cooler #(s): _____ _____ _____ _____ * Place copy of airbill inside all non-RMAL coolers. Describe here.

Temperatures: 4.0 _____ _____ _____

UNPACKING & LABELING CHECK POINTS:	Y	N	INITIALS
1. Radiation Checked; (record reading if > 0.5 mR/hr):	✓		JD
2. Cooler seals Intact:	✓		
3. Chain of Custody Present:	✓		
4. Bottles broken or leaking (comment if Y): -photograph broken bottles-		✓	
5. Containers labeled (comment if N):	✓		
6. Chain of Custody includes "received by" and "relinquished by" signatures, dates, and times:	✓		
7. CoC agrees with bottle count (comment if N):	✓		
8. CoC agrees with labels (comment if N):	✓		
9. VOA samples filled completely (comment if N):	✓		
10. Are VOA samples preserved? (Check for bottle labels)	✓		
11. Sediment present in "D" bottles:		✓	
12. Are analyses with short holding times requested?		✓	
13. Is extra sample volume provided for Matrix Spike and/or matrix replicates?	✓	~~✓~~	
14. Multi phase samples present (comment if Y): -photograph multiphase samples-		✓	
15. Clear picture taken, labeled, and stapled to project folder?	✓		

Comments: include action taken to resolve discrepancies/problems. Include a hard copy of VAX mail - extra paper if more space is needed.

TESTS ADDED scenale

Initials: JD

000064

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SF 2001-COC (9-94)

PAGE 1 OF ___

AR/COC- 02629

Dept. No./Mail Stop: 7582 / 1347
Project/Task Manager: Len Dawson
Project Name: TA5 ICS Phase E
Record Center Code:
Logbook Ref No:
SMO Reference No.:

Date Samples Shipped: 2/9/95
Carrier/Waybill No.: 7444835
Lab Contact: Ellen LeRiviere
Lab Destination: Quanterra
SMO Contact/Phone: Pam Dressnt - 848-0462
Send Report to SMO: Debra Constant

Contract No.: 67-91-2613
Case No.: 2613.200
SMO Authorization: [signature]
Bill to: Sandia National Laboratories, Supplier Services Department, P.O. Box 5800 MS 0154, Albuquerque, NM 87185-0154

Location Tech Area V
Building 6594 Room —

Reference LOV (available at SMO)

	Sample No. - Fraction	ER Sample ID or Sample Location Detail	Beginning Depth in Ft.	ER Site No.	Date/Time Collected	Sample Matrix	Container Type	Container Volume	Preservative	Sample Collection Method	Sample Type	8240 (VOC)	TAL Metals	8270	MS/MSD	Mercury						Lab Sample ID
✓	021140-00	TA5-BH-01-400.50	400.50	NONE	2/8/95; 9:15	S	SL	500ml	NONE	G	MS MSD		X	X	X							
✓	021141-00	TA5-BH-01-400.75	400.75	↓	↓; 9:15	S	SL	250ml	↓	↓	MS/MSD	X			X							
✓	021143-00	TA5-BH-01-EB2	400		2/8/95; 16:13	W	~~VOA~~ G	40ml 3X	HCL	G	LB	X										
✓	~~021145-00~~	~~TA5-BH-01-EB2~~	~~400~~		; 16:13	W	↓	↓	↓	↓	↓	X										
✓	021146-00	TA5-BH-01-EB2	400		; 16:13	W	↓	↓	↓	↓	↓	X										
✓	021150-00	TA5-BH-01-EB2	400		; 16:21	W	P	1L	HNO_3	G	LB		X									
✓	021151-00	TA5-BH-01-EB2	400		; 16:18	W	G	1L	HNO_3	G	↓					X						
✓	021149-00	TA5-BH-01-EB2	400		; 16:25	W	AG	1L	NONE	G	↓			X								
✓	021657-00	TA5-BH-01-420.50	420.50	↓	↓; 16:56	S	SL	250ml	NONE	G	SA	X										
	021148-00	~~TA5~~ N/A	N/A	N/A	2/8/95 1700	E	G	1L	NONE	G	TB	X										

RMMA ☐ Yes ☒ No Ref. No. ___

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☑ Normal ☐ Rush Required Report Date ___

Sample Tracking
Date Entered (mm/dd/yy): 2-14-95
Entered by: Blynzie
QC inits.

Special Instructions/QC Requirements
~~Hold Samples~~ ~~021145~~ ~~021146~~ } Backup VOAs for ~~021143 only~~
LST A's separate report.
* FAX 8240 results to Len Dawson: 848-0458

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization
✓	Michael Wade	Michael Wade	MW	Quanterra / 7582

1. Relinquished by	Michael Wade	Org. 7582	Date 2/9/95	Time 7:40	4. Relinquished by	Org.	Date	Time
1. Received by	[signature]	Org. SMO 7576	Date 2/9/95	Time 7:40	4. Received by	Org.	Date	Time
2. Relinquished by	[signature]	Org. SMO 7576	Date 2/9/95	Time 1400	5. Relinquished by	Org.	Date	Time
2. Received by		Org.	Date	Time	5. Received by	Org.	Date	Time
3. Relinquished by		Org.	Date	Time	6. Relinquished by	Org.	Date	Time
3. Received by		Org.	Date	Time	6. Received by	Org.	Date	Time

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

SF 2001 COC (9-94)

INSTRUCTIONS FOR COMPLETING THE ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

The Analysis Request and Chain of Custody Record must be accurately completed at the time of sample collection. The white original and blue copy accompany the samples to the laboratory. The yellow copy is filed at the SMO. The pink copy is the field record. Following sample receipt at the laboratory and completion of the laboratory fields on this form, the blue copy is returned to Sandia National Laboratories, Sandia Management Office (SMO) as verification of sample receipt. Following are instructions for completing the individual fields on this form:

Enter Page of Page: Indicate the number of the current page and the total number of pages.

Department No.: Record the number of the Sandia National Laboratories department responsible for collecting the samples, and the corresponding mail stop.

Project/Task Manager: Indicate the Sandia National Laboratories person responsible for managing the sample collection project or task.

Project Name: Enter the sample collection site name or monitoring program name as appropriate.

Record Center Code: Enter the sample collection site name or monitoring program name as appropriate.

Logbook Ref. No.: Record logbook reference number or other reference number to tie field collection notes to the AR/COC.

SMO Reference No.: Record Contractor Billing No. (if applicable)

Date Samples Shipped: Enter the date that the samples were relinquished to commercial carrier for delivery to the laboratory or the date samples were delivered by sampling personnel to the laboratory.

Carrier/Waybill No.: Record Sandia Shipper No. from the Sandia Shipper form and record waybill number (if applicable).

Lab Contact: Indicate the name of the laboratory employee that SMO has contacted regarding receipt of these samples.

Lab Destination: Enter the name of the laboratory to receive the samples and perform the analysis.

SMO Contact/Phone: Record the name and telephone number of the SMO person for the laboratory to contact should any questions arise.

Send Report to SMO: Enter the SMO personnel to whom the laboratory analysis report should be sent.

Contract No.: Record the number of the contract between Sandia and the analytical laboratory receiving the samples. If no contract exists, this field may be used to record a purchase order requisition number.

Case No.: Enter the Sandia budget case number or service order number, if known, to which the cost for these requested analysis will be charged.

SMO Authorization: The designated SMO representative signs this line authorizing the laboratory to perform the requested analysis.

Bill to: The address for Sandia Suppliers Services Department 10154 is preprinted. In any deviation of this address see special instructions attachment sheet.

Location: Select the technical area, building, and room from the list of values (LOV) provided. List available from SMO.

Sample Number: Enter the unique SNL/Sample Management Office sample number and corresponding fraction number (if any) for samples in this set. Use a strictly numeric, one digit per block format.

ER Sample ID or Sample Location Detail: See ER Sample Location ID Special Instruction.

Beginning Depth in Feet: Enter the Beginning Depth, in the units of feet.

ER Site Number: Enter the ER site number if applicable.

Date/Time Collected: Record the date and time each sample was collected.

Sample Matrix: Select a description of the sample matrix (e.g., soil, water, air, oil, waste, etc.). For any other values see special instructions.

Container Type: Indicate the type of sample container(s) used (e.g., polyethylene, glass, amber glass, etc.) from the LOV, available in special instructions.

Sample Volume: Indicate the volume of each sample or sample fraction collected and units (i.e., oz, ml).

Preservative: Record the chemical or physical methods used to preserve the sample prior to analysis (e.g., nitric acid, sodium hydroxide, ice, etc.) from the LOV in special instructions.

Sample Collection Method: Enter the sample collection method (e.g., grab, Composite, Biased, etc.).

Sample Type: Enter the sample type **(e.g., TB, FS, DP, MS, etc.)** from the LOV on special instructions.

Required Analytical Testing: List a complete description of the analysis to be performed on each sample. *Include analytical method reference numbers.*

Lab Sample Number: The laboratory must record internally assigned sample identification numbers corresponding to the Sandia sample number(s).

Condition on Receipt: The laboratory must record and report to the SMO any abnormalities with the shipment that are found at sample receipt.

RMMA: Indicate if samples were collected from a Radioactive Materials Management Area and the reference number of that area.

Sample Disposal: Check whether samples are to be returned to SMO or disposed of by the laboratory. Enter the date when samples should no longer be archived at the laboratory. (This date may generally be 30 to 60 days following the date the analytical report is required.)

Turnaround Time: Check if "Normal" or "Rush" analysis are authorized. Indicate 3 day, 7 day or 14 day rush and the date receipt of the analytical report is required. **Only one turnaround time type is allowed for each AR/COC.**

Possible Hazard Identification: Indicate if the samples are suspected to contain sufficient concentrations of hazardous materials to pose health and safety hazards.

Special Instructions/QC Requirements: Record special instructions/QC requirements.

Sample Team Members: Record the names and affiliations of all members of the sample collection team.

Relinquished/Received by: Sign full name, and enter organization, date, and time when relinquishing custody of the samples. *The first person relinquishing the samples must be a member of sampling team.* Similarly, upon receipt and verification sign full name, and enter organization, date, and time that samples are taken into custody.

ANNEX 2-J
Risk Screening Assessment

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SWMU 275: RISK SCREENING ASSESSMENT

I. Site Description and History

The following sections provide the description and operational history of SWMU 275.

I.1 Site Description

Solid Waste Management Unit (SWMU) 275 is located within Technical Area (TA)-V, in the southern part of Kirtland Air Force Base (KAFB). TA-V is located immediately east of the TA-III gate, and is approximately 1 mile southwest of Lovelace Road. It is reached by traveling southeast on Lovelace Road, and then turning southwest on the paved TA-III/V access road. SWMU 275 encompasses 0.26 acre of industrially developed, flat-lying land at an average mean elevation of 5,433 feet above mean sea level (amsl).

SWMU 275 consists of two septic tanks and six seepage pits located immediately south of Building 6588 near the center of TA-V. A security fence splits the site diagonally; the northern half is gravel-covered and contains three seepage pits. The southern half of the site contains the two septic tanks and three additional seepage pits.

The surficial sediments at SWMU 275 consist of a thin veneer of recent (Holocene) alluvial fan deposits (Plate I, "Surficial Geologic Map of SNL/KAFB, Albuquerque, New Mexico," SNL/NM December 1995). Subsurface sediments encountered in a borehole (TAV-BH-01) that was drilled in the center of the seepage pits area from the surface to the saturated zone in February 1995 consisted of interbedded gravelly sands, sands, silts, and clays. A thin (less than 5 feet) saturated zone was penetrated in the borehole at 380 feet bgs but no water was produced. The regional aquifer was encountered at a depth of 491 feet bgs, and the borehole was drilled an additional 29 feet to a total depth of 520 feet. The boring was converted to monitoring well TAV-MW1 at the conclusion of drilling, and groundwater samples are being routinely collected from this well as part of the ongoing TA-V groundwater investigation.

The water-table elevation in TAV-MW1 was approximately 4,930 feet amsl in July 1998 (SNL/NM July 1998). Groundwater flow in the vicinity of TA-III and TA-V is in a westerly direction (SNL/NM March 1997). The nearest production wells are northwest of SWMU 275 and include KAFB-1, KAFB-2, KAFB-4, KAFB-7, and KAFB-11, which range from approximately 2.9 to 5.0 miles away from the site (SNL/NM August 1996).

II. Comparison of Results to Data Quality Objectives

The confirmatory sampling conducted at SWMU 275 was designed to collect adequate samples to:

- Determine if hazardous waste or hazardous constituents that may have been released via the seepage pits at the site remained in the vadose zone in significant concentrations

- Characterize the nature and extent of any releases
- Provide Level 2 analytical data to support screening risk assessments.

Table 1 summarizes the sample location design for SWMU 275. The source of potential Constituent of Concern (COCs) at this site is effluent discharged to the subsurface via the seepage pit system. Specific COCs that may have been released to the seepage pits are unknown, but potentially include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), RCRA metals, tritium, and other miscellaneous radionuclides.

Table 1
Summary of Sampling Performed to Meet Data Quality Objectives

SWMU	Potential COC Source	Area of Site (acres)	Number of Sampling Locations	Sample Frequency	Sampling Location Rationale
275	Seepage pits	0.26	1 vertical boring	• Samples every 10 feet from 10 to 100 feet bgs • Samples every 20 feet at from 120 to 500 feet bgs	A single boring, located in the center of the seepage pits area, was drilled to determine the nature and extent of potential contamination from the surface to groundwater (at approximately 500 feet bgs). Soil samples were collected at 10 to 20-foot intervals throughout the length of the borehole to determine the vertical extent of potential contamination.

COC = Constituent of concern.
bgs = Below ground surface.
SWMU = Solid waste management unit.

The location of the borehole (designated TAV-BH-01) and the sampling depth and number of intervals was designed to determine the potential extent of contamination from the surface to groundwater.

Table 2 summarizes the analytical methods and data quality requirements necessary to (1) adequately characterize hazardous waste or hazardous constituents considered most likely to be associated with the seepage pits, and (2) to support screening risk assessments.

A total of 85 separate analyses were performed on samples collected from borehole TAV-BH-01 at SWMU 275 and were analyzed by off-site laboratories. The minimum detection limits (MDLs) for the RCRA metals analyses were in most cases lower than the maximum approved background concentrations for arsenic, barium, chromium, and lead. The cadmium MDL range was 0.5 to 1 mg/kg versus the maximum background concentration limit of 0.9 mg/kg. Mercury, selenium, and silver do not have quantified maximum background

Table 2
Summary of Data Quality Requirements

Analytical Requirement	Data Quality Level	Radiation Protection Sample Diagnostics Laboratory Department 7713 SNL/NM	Quanterra Environmental Services laboratory, Arvada, CO.	TMA/Eberline Albuquerque Laboratory
RCRA metals, EPA Method 6010/7471	Level 2	NA	13 samples	NA
VOCs, EPA Method 8240	Level 2	NA	25 samples	NA
SVOCs, EPA Method 8270	Level 2	NA	9 samples	NA
TPH, EPA Method 418.1	Level 2	NA	1 sample	NA
Tritium by distillation, EPA Method 600-906.0	Level 2	NA	NA	28 samples
Gamma Spectroscopy	Level 2	9 samples	NA	NA

EPA = U.S. Environmental Protection Agency.
NA = Not applicable.
RCRA = Resource Conservation and Recovery Act.
SNL/NM = Sandia National Laboratories/New Mexico.
SVOC = Semivolatile organic compound.
TPH = Total petroleum hydrocarbons.
VOC = Volatile organic compound.

concentrations. The silver MDL ranged from 1 to 2 milligrams per kilogram (mg/kg). The mercury MDL was 0.1 mg/kg. The MDL for selenium ranged from 0.5 to 1.6 mg/kg.

The SNL/NM Sample Management Office conducted Data Validation I and Data Validation II reviews in accordance with Technical Operating Procedure 94-03. Rev. 0 (SNL/NM July 1994). An independent review of the validation process confirmed that the reviews performed by SNL/NM were accurate and that the data are acceptable for use in the NFA proposal for SWMU 275. The data quality objectives (DQOs) for SWMU 275 have been met.

III. Determination of Nature, Rate, and Extent of Contamination

III.1 Introduction

The determination of the nature, rate and extent of contamination at SWMU 275 was based upon an initial conceptual model validated by confirmatory sampling at the site. The conceptual model was developed from historical background information including site inspections,

personnel interviews, historical aerial photograph review, active soil vapor surveys, and passive soil vapor surveys. The DQOs are contained in a Record of Verbal Communication with EPA Region VI (Dawson January 1995) that identified the sample locations, sample density, sample depths, and analytical requirements. The sample data were subsequently used to develop the final conceptual model for SWMU 275, presented in Section 2.5 of the associated No Further Action (NFA) proposal. The quality of the data specifically used to determine the nature, rate, and extent of contamination are described below.

III.2 Nature of Contamination

The nature of contamination at SWMU 275 was determined with analytical testing of soil media and the potential for degradation of relevant COCs (Section V). The analytical requirements included VOCs, SVOCs, total petroleum hydrocarbons (TPH) (one sample), and RCRA metals to characterize nonradiological organic and inorganic constituents potentially released at the site. Gamma spectroscopy was used to characterize miscellaneous radionuclides. Tritium analysis was also performed on samples from SWMU 275. These analytes and methods are appropriate to characterize the COCs and potential degradation products associated with the historical activities at SWMU 275.

III.3 Rate of Contaminant Migration

SWMU 275 is an inactive site, therefore all primary sources of COCs (disposal of liquid waste to septic tanks and seepage pits) have been removed. Only secondary sources of COCs in soil remain at SWMU 275. The rate of COC migration is dependent predominantly on site meteorological and subsurface hydrologic processes as described in Section V. Data available from the Site-Wide Hydrogeologic Characterization Project (published annually); numerous SNL/NM air, surface water, and radiological monitoring programs; biological surveys; and other governmental atmospheric monitoring at the Kirtland Air Force Base (i.e., National Oceanographic and Atmospheric Administration) are adequate to estimate the rate of COC migration at SWMU 275.

III.4 Extent of Contamination

Subsurface soil samples were collected during the drilling of borehole TAV-BH-01, located in the center of the 0.26-acre seepage pits area at SWMU 275. A uniform distribution of COCs at SWMU 275 is expected due to the materials from the septic tanks through the distribution box and into the seepage pits. Because the waste entered the septic tanks prior to distribution to the seepage pits, COCs at SWMU 275 were potentially homogenized. A single boring in the center of the seepage pits area would therefore determine the potential extent of vertical contamination from the seepage pits to the groundwater. Because the borehole was located in the center of the seepage pits, maximum concentrations of COCs at this location would be expected.

Because of the relatively low solubility of most metals and organic compounds, and isolated lithologic units of low to very low permeabilities encountered during drilling activities, the vertical rate of migration is expected to be low. The first sample collected was from 10 feet bgs and

was analyzed for radionuclides. From 10 feet bgs to 100 feet bgs, samples were collected from most 10-foot intervals and were analyzed for VOCs, SVOCs, metals, and radionuclides. From 120 to 480 feet bgs, samples were collected from selected 20-foot intervals and were analyzed mainly for VOCs and tritium. One sample (from 490 feet bgs) was also analyzed for TPH. The sample collection protocol used at SWMU 275 is appropriate for the media potentially impacted by the site activities and is sufficient to determine the vertical extent of COC migration.

In summary, the design of the confirmatory sampling was appropriate and adequate to determine the nature, rate, and extent of contamination.

IV. Comparison of COCs to Background Screening Levels

Site history and characterization activities are used to a limited extent to identify potential COCs. The identification of COCs, and the sampling to determine the concentration levels of those COCs across the site, are described in the SWMU 275 NFA proposal. Generally, COCs evaluated in this risk assessment include all detected organics and radiological contaminants and all inorganic COCs that were analyzed for. If the detection limit of an organic compound was too high (could possibly cause an adverse effect to human health or the environment), the compound was retained. Nondetect organics that were not included in this assessment were determined to have low enough detection limits to ensure protection of human health and the environment. In order to provide conservatism in this risk assessment, the calculation uses only the maximum concentration value of each COC determined for the entire site. The approved SNL/NM maximum background concentration (Dinwiddie September 1997) was selected to provide the background screen in Tables 3 and 4. If applicable, human health nonradiological COCs were also compared to proposed RCRA Subpart S action levels (Table 3) (IT July 1994).

Nonradiological inorganics that are essential nutrients such as iron, magnesium, calcium, potassium, and sodium are not included in this risk assessment (EPA 1989). Both radiological and nonradiological COCs are evaluated. The nonradiological COCs evaluated in this risk assessment include inorganics and organics.

Nonradiological COCs for Human Health and Ecological Risk Assessment at SWMU 275 are listed in Table 3. Radiological COCs are listed in Table 4. All tables show the associated approved SNL/NM maximum background concentration values (Dinwiddie September 1997). Discussion of Tables 3 and 4 is provided in Sections VI.4 and VII.2. All samples were collected at 5 feet bgs or deeper; therefore, evaluation of ecological risk was not performed.

V. Fate and Transport

The primary releases of COCs at SWMU 275 were to the subsurface soil in association with waste water discharges from a septic system that was abandoned in 1992. It is estimated that 3,000 to 5,000 gallons of water were disposed into these pits on a daily basis between the early 1960s and 1992. The COCs may have migrated through the soil from the point of release as the water migrated. The migration of water would be principally downward (with gravity),

Table 3
Nonradiological COCs for Human Health Risk Assessment at SWMU 275 with Comparison to the Associated SNL/NM Background Screening Value, BCF, and Log K_{ow}

COC Name	Maximum Concentration (mg/kg)	SNL/NM Background Concentration (mg/kg)[a]	Is Maximum COC Concentration Less Than or Equal to the Applicable SNL/NM Background Screening Value?	BCF (maximum aquatic)	Log K_{ow} (for organic COCs)	Is COC a Bioaccumulator?[b] (BCF>40, log K_{ow}>4)
Arsenic	4.7	4.4	**No**	44[c]	NA	**Yes**
Barium	120	214	Yes	170[d]	NA	**Yes**
Beryllium	0.66	0.65	No	19[c]	NA	No
Cadmium	0.5[e]	0.9	Yes	64[c]	NA	**Yes**
Chromium, total	19.5	15.9	**No**	16[c]	NA	No
Cobalt	6.6	5.2	No	10,000[f]	NA	**Yes**
Lead	64.6	11.8	**No**	49[c]	NA	**Yes**
Mercury	0.065 J	<0.1	**Unknown**	5500[c]	NA	**Yes**
Selenium	0.8[e]	<1	**Unknown**	800[g]	NA	**Yes**
Silver	1[e]	<1	**No**	0.5[c]	NA	No
Acetone	0.034 B	NA	NA	0.69[h]	-0.24[h]	No
2-Hexanone	0.006 J	NA	NA	6[i]	1.38[i]	No
Methyl isobutyl ketone	0.0042 J	NA	NA	5[h]	1.19[h]	No
Methylene chloride	0.0047 J	NA	NA	5[h]	1.25[h]	No
Bis(2-ethylhexyl) phthalate	0.066 J	NA	NA	851[j]	7.6[k]	**Yes**
N-nitrosodiphenylamine	14	NA	NA	217[k]	3.13[k]	**Yes**
N-nitrosodipropylamine	0.13 J	NA	NA	3.2[l]	1.4[l]	No
Di-n-butyl phthalate	0.081 J	NA	NA	6,761[j]	4.61[k]	**Yes**

[a]From Dinwiddie (September 1997) Southwest Test Area.
[b]Based upon NMED criteria (NMED March 1998).
[c]BCF and/or Log K_{ow} from Yanicak (March 1997).
[d]BCF from Neumann (1976).
[e]COC not detected, concentration assumed to be one-half of the highest detection limit.
[f]BCF from Vanderploeg et al. (1975).
[g]BCF from Callahan et al. (1979).
[h]BCF and/or Log K_{ow} from Howard (1990).
[i]BCF and/or Log K_{ow} from Howard (1993).
[j]BCF and/or Log K_{ow} from Howard (1989).
[k]BCF and/or Log K_{ow} from NLM (1998).
[l]BCF and/or Log K_{ow} from EPA (1995).

B = Analyte detected in associated blank.
BCF = Bioconcentration factor.
COC = Constituent of concern.
J = Estimated concentration.
K_{ow} = Octanol-water partition coefficient.
Log = Logarithm (base 10).
mg/kg = Milligrams per kilogram.
NA = Not applicable.
NMED = New Mexico Environment Department.
SNL/NM = Sandia National Laboratories/New Mexico.
SWMU = Solid waste management unit.

Table 4
Radiological COCs for Human Health at SWMU 275 with Comparison to the Associated SNL/NM Background Screening Value, BCF, and Log K_{ow}

COC Name	Maximum Concentration (pCi/g)	SNL/NM Background Concentration (pCi/g)[a]	Is Maximum COC Concentration Less Than or Equal to the Applicable SNL/NM Background[a] Screening Value?	BCF (maximum aquatic)	Is COC a Bioaccumulator?[b] (BCF>40, log K_{ow}>4)
Cs-137	0.14	0.079	**No**	3000[c]	**Yes**
U-238	4.75 (ND)	1.4	**No**	900[c]	**Yes**
U-235	0.06[d]	0.16	Yes	900[c]	**Yes**
U-234	0.59[d]	1.6	Yes	900[c]	**Yes**
H-3	0.07	0.043	No	Not a bioaccumulator	No

[a]From Dinwiddie (September 1997), Southwest Test Area.
[b]Based upon NMED Criteria (NMED March 1998).
[c]From Baker and Soldat (1992).
[d]U-234 and U-235 values were calculated using the U-238 concentration and assuming that the U-238 to U-234 ratio was equal to that detected during waste characterization of depleted uranium-contaminated soils generated during the radiological voluntary corrective measures project, where U-234=U-238/8 and U-235=U-238/73 (Brown January 1998).

BCF = Bioconcentration factor.
COC = Constituent of concern.
K_{ow} = Octanol-water partition coefficient.
Log = Logarithm (base 10).
MDA = Minimum detectable activity.
NA = Not applicable.
ND = Not detected. Value shown is sample MDA. Although not actually quantified, MDA value will be the assumed concentration for this screening exercise.
pCi/g = Picocuries per gram.
SNL/NM = Sandia National Laboratories/New Mexico.
SWMU = Solid waste management unit.

although some lateral and upward migration (capillary flow) is also expected to have occurred. Upward migration due to capillary flow, however, is not expected to be sufficient to reach surface soils. The groundwater at SWMU 275 is approximately 500 feet bgs. Currently, water is received at the site as precipitation (rain or occasionally snow). The average annual precipitation in this area is about 8 inches (NOAA 1990) and the evapotranspiration value is 95 percent of the total rainfall (Thomson and Smith 1985). Therefore, it is also unlikely that the infiltration and percolation of precipitation at the site will be sufficient to reach groundwater. Volatile COCs can migrate by diffusion through the pore space of soil in vapor phase and may migrate beyond the area of subsurface-water migration. The site is currently covered with gravel and contains no vegetative cover or habitat that supports wildlife. Therefore, food chain uptake is not a potential mechanism of transport at this site.

Degradation of COCs at SWMU 275 may result from biotic (microbial) or abiotic processes. The COCs at this site include organic and inorganic analytes, and radionuclides. Degradation processes for organic COCs may include hydrolysis and biotransformation. Hydrolysis includes chemical transformations in water, and may occur in the soil solution. Biotransformation is the metabolization of COCs in biota (microorganisms). Inorganic COCs are considered elemental in form, and therefore are not considered to be degradable. Radiological COCs are also elemental, but will undergo decay to stable isotopes or radioactive daughter elements.

Table 5 summarizes the fate and transport processes that may occur at SWMU 275. Because the release of COCs was to subsurface soil and the site does not contain vegetation, the potential for transport by wind, surface water, and food chain uptake is negligible. Because no additional discharges of water from the septic system are occurring, COCs are not expected to migrate further through soil due to water migration. Low annual precipitation and high evaporation rates make it unlikely that the percolation of rainwater will result in significant migration of COCs to groundwater. VOCs and SVOCs may migrate in vapor phase. Degradation of these compounds may occur by hydrolysis and biotransformation; however, these processes are likely to be slow in subsurface soil. Inorganic COCs are unlikely to migrate further and no degradation of these COCs is expected. Loss of radiological COCs through decay will be insignificant due to the long half-lives of the radionuclides.

Table 5
Summary of Fate and Transport at SWMU 275

Transport and Fate Mechanism	Existence at Site	Significance
Wind	No	None
Surface runoff	No	None
Migration to groundwater	No (present); Yes (historically)	None (present); Moderate to High (historically)
Food chain uptake	No	None
Transformation/degradation	Yes	Low

SWMU = Solid waste management unit.

VI. Human Health Risk Screening Assessment

VI.1 Introduction

Human health risk screening assessment of this site includes a number of steps that culminate in a quantitative evaluation of the potential adverse human health effects caused by constituents located at the site. The steps to be discussed include:

Step 1.	Site data are described that provide information on the potential COCs, as well as the relevant physical characteristics and properties of the site.
Step 2.	Potential pathways are identified by which a representative population might be exposed to the COCs.
Step 3.	The potential intake of these COCs by the representative population is calculated using a tiered approach. The first component of the tiered approach includes two screening procedures. One screening procedure compares the maximum concentration of the COC to an approved SNL/NM maximum background screening value. COCs that are not eliminated during the first screening procedure are subjected to a second screening procedure that compares the maximum concentration of the COC to the proposed RCRA Subpart S action level.
Step 4.	Toxicological parameters are identified and referenced for COCs that are not eliminated during the screening steps.
Step 5.	Potential toxicity effects (specified as a hazard index [HI]) and excess cancer risks are calculated for nonradiological COCs and background. For radiological COCs, the incremental total effective dose equivalent (TEDE) and incremental estimated cancer risk are calculated by subtracting applicable background concentrations directly from maximum on-site contaminant values. This background subtraction only occurs when a radiological COC occurs as contamination and exists as a natural background radionuclide.
Step 6.	These values are compared with guidelines established by the U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy (DOE) to determine if further evaluation, and potential site clean-up, is required. Nonradiological COC risk values are also compared to background risk so that an incremental risk may be calculated.
Step 7.	Uncertainties in the previous steps are discussed.

VI.2 Step 1. Site Data

The description and history for SWMU 275 is provided in Section I. Comparison of results to DQOs is presented in Section II. The determination of the nature, rate, and extent of contamination is described in Section III.

VI.3 Step 2. Pathway Identification

SWMU 275 has been designated a future land-use scenario of industrial (DOE et al. September 1995) (see Appendix 1 for default exposure pathways and parameters). Because of the location and the characteristics of the potential contaminants, the primary pathway for human

exposure is considered to be soil ingestion for the nonradiological COCs and, for the radiological COCs, direct gamma exposure. The inhalation pathway for both nonradiological and radiological COCs is included because of the potential to inhale dust and volatiles (nonradiological constituents only). Soil ingestion is included for the radiological COCs as well. No water pathways to the groundwater are considered. Depth to groundwater at SWMU 275 is approximately 500 feet bgs. Because of the lack of surface water or other significant mechanisms for dermal contact, the dermal exposure pathway is considered not to be significant. No intake routes through plant, meat, or milk ingestion are considered appropriate for the industrial land-use scenario. However, plant uptake is considered for the residential land-use scenario, per New Mexico Environment Department (NMED) guidance.

Pathway Identification

Nonradiological Constituents	Radiological Constituents
Soil ingestion	Soil ingestion
Inhalation (dust and volatiles)	Inhalation (dust)
Plant uptake (residential only)	Plant uptake (residential only)
	Direct gamma

VI.4 Step 3. COC Screening Procedures

Step 3 is discussed in this section and includes two screening procedures. The first screening procedure is a comparison of the maximum COC concentration to the approved background screening level. The second screening procedure compares maximum COC concentrations to proposed RCRA Subpart S action levels. This second procedure is applied only to COCs that are not eliminated during the first screening procedure.

VI.4.1 Background Screening Procedure

VI.4.1.1 Methodology

Maximum concentrations of COCs are compared to the approved SNL/NM maximum screening level for this area (Dinwiddie September 1997). The approved SNL/NM maximum background concentration is selected to provide the background screen in Table 3 and used to calculate risk attributable to background in Table 9. Only the COCs that are above their respective SNL/NM maximum background screening level or do not have a quantifiable background screening level are considered in further risk assessment analyses.

For radiological COCs that exceed the SNL/NM background screening levels, background values are subtracted from the individual maximum radionuclide concentrations. Those that do not exceed these background levels are not carried any further in the risk assessment. This approach is consistent with DOE Order 5400.5, "Radiation Protection of the Public and the Environment" (DOE 1993). Radiological COCs that did not have a background value and were detected above the analytical minimum detectable activity were carried through the risk

assessment at their maximum levels. The resultant radiological COCs remaining after this step are referred to as background-adjusted radiological COCs.

VI.4.1.2 Results

Tables 3 and 4 present a comparison of SWMU 275 maximum COC concentrations to the approved SNL/NM maximum background values (Dinwiddie September 1997) for human health risk assessment. For the nonradiological COCs, six constituents have maximum measured values greater than their respective background screening levels. Two other nonradiological COCs do not have quantifiable background concentrations, so it is not known whether those COCs exceeded background. Eight COCs are organic compounds and do not have background screening levels.

The maximum concentration value for lead is 64.6 mg/kg. The EPA intentionally provides no human health toxicological data on lead, and therefore no risk parameter values can be calculated. However, EPA Region 6 guidance for the screening value for lead for an industrial land-use scenario is 2,000 mg/kg (EPA 1996a); for a residential land-use scenario, the EPA screening guidance value is 400 mg/kg (EPA July 1994). The maximum concentration value for lead at this site is less than both screening values, and therefore lead is eliminated from further consideration in the human health risk assessment.

For the radiological COCs, only cesium-137 exceeded the SNL/NM background screening values (subsurface value) (Table 4). However, in all cases the minimum detectable activity (MDA) of the sample exceeded the SNL/NM background value for uranium. Therefore, the highest value of MDA was reported and assumed to be the actual concentration. In this case, U-238 and Cs-137 were the only radiological COCs that were subject to the RESRAD analysis.

VI.4.2 Subpart S Screening Procedure

VI.4.2.1 Methodology

The maximum concentrations of nonradiological COCs not eliminated during the background screening process were compared with action levels (IT July 1994) calculated using methods and equations promulgated in the proposed RCRA Subpart S (EPA 1990) and Risk Assessment Guidance for Superfund (RAGS) (EPA 1989). Accordingly, all calculations were based upon the assumption that receptor doses from both toxic and potentially carcinogenic compounds result most significantly from ingestion of contaminated soil. If there were ten or fewer COCs and each had a maximum concentration less than 1/10 of the action level, then the site would be judged to pose no significant health hazard to humans. If there were more than ten COCs, the Subpart S screening procedure was not performed.

VI.4.2.2 Results

Because the SWMU 275 sample set has more than ten COCs that continue past the first screening level (including COCs that have no background screening values), the proposed

Subpart S screening process was not performed. All COCs not eliminated during the background screening process for SWMU 275 have a calculated hazard quotient (HQ) and excess cancer risk value.

Radiological COCs do not have predetermined action levels analogous to proposed Subpart S levels, and therefore this step in the screening process is not performed for radiological COCs.

VI.5 Step 4. Identification of Toxicological Parameters

Tables 6 (nonradiological) and 7 (radiological) show the COCs retained in the risk assessment and the values for the available toxicological information. The toxicological values used for nonradiological COCs in Table 6 are from the Integrated Risk Information System (IRIS) (EPA 1998), Health Effects Assessment Summary Tables (HEAST) (EPA 1997a), EPA Region 9 (EPA 1996b), or EPA Region 3 (EPA 1997b) databases. Dose conversion factors (DCF) used in determining the excess TEDE values for radiological COCs for the individual pathways were the default values provided in the RESRAD computer code (Yu et al. 1993b) as developed in the following documents:

- DCFs for ingestion and inhalation are taken from Federal Guidance Report No. 11, Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion (EPA 1988).

- DCFs for surface contamination (contamination on the surface of the site) were taken from DOE/EH-0070, External Dose-Rate Conversion Factors for Calculation of Dose to the Public (DOE 1988).

- DCFs for volume contamination (exposure to contamination deeper than the immediate surface of the site) were calculated using the methods discussed in "Dose-Rate Conversion Factors for External Exposure to Photon Emitters in Soil" (Health Physics 28:193-205 [Kocher 1983]), and ANL/EAIS-8, "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil" (Yu et al. 1993b).

VI.6 Step 5. Exposure Assessment and Risk Characterization

Section VI.6.1 describes the exposure assessment for this risk assessment. Section VI.6.2 provides the risk characterization, including the HI value and the excess cancer risk, for both the potential nonradiological COCs and associated background for industrial and residential land uses. The incremental TEDE and incremental estimated cancer risk are provided for the background-adjusted radiological COCs for both industrial and residential land uses.

VI.6.1 Exposure Assessment

Appendix 1 shows the equations and parameter input values used in calculating intake values and subsequent HI and excess cancer risk values for the individual exposure pathways. The appendix shows parameters for both industrial and residential land-use scenarios. The equations for nonradiological COCs are based upon RAGS (EPA 1989). Parameters are based

Table 6
Toxicological Parameter Values for SWMU 275 Nonradiological COCs

COC Name	RfD_o (mg/kg-day)	Confidence[a]	RfD_{inh} (mg/kg-day)	Confidence[a]	SF_o (mg/kg-day)$^{-1}$	SF_{inh} (mg/kg-day)$^{-1}$	Cancer Class[b]
Arsenic	3E-4[c]	M	--	--	1.5E+0[c]	1.5E+1[c]	A
Beryllium	3E-3[c]	L to M	5.7E-6[c]	M	--	8.4E+0	B1
Chromium III	1E+0[c]	L	5.7E-7[e]	--	--	--	--
Chromium VI	5E-3[c]	L	--	--	--	4.2E+1[c]	A
Cobalt	6E-2[f]	--	2.9E-4[f]	--	--	--	--
Mercury	3E-4[d]	--	8.6E-5[c]	M	--	--	D
Selenium	5E-3[c]	H	--	--	--	--	D
Silver	5E-3[c]	L	--	--	--	--	D
Acetone	1E-1[c]	L	1E-1[f]	--	--	--	D
2-Hexanone	4E-2[e]	--	--	--	--	--	--
Methyl isobutyl ketone	8E-2[d]	--	2.3E-2[f]	--	--	--	--
Methylene chloride	6E-2[c]	M	8.6E-1[d]	--	7.5E-3[c]	1.7E-3[c]	B2
bis (2-ethylhexyl) phthalate	2E-2[f]	--	2.2E-2[f]	--	1.4E-2[f]	1.4E-2[f]	--
n-Nitroso-diphenylamine	--	--	--	--	4.9E-3[c]	4.9E-3[f]	B2
n-Nitroso-dipropylamine	--	--	--	--	7E+0[c]	7E+0[f]	B2
Di-n-butyl phthalate	1E-1[c]	L	1E-1[f]	--	--	--	D

[a]Confidence associated with IRIS (EPA 1998) database values (L = low, M = medium, H = high).
[b]EPA weight-of-evidence classification system for carcinogenicity (EPA 1989) taken from IRIS (EPA 1998):
A - human carcinogen.
B2- Probable human carcinogen. Sufficient evidence in animals and inadequate or no evidence in humans.
D - not classifiable as to human carcinogenicity.
[c]Toxicological parameter values from IRIS electronic database (EPA 1998).
[d]Toxicological parameter values from HEAST database (EPA 1997a).
[e]Toxicological parameter values from EPA Region 3 (EPA 1997b).
[f]Toxicological parameter values from EPA Region 9 (EPA 1996b).

COC = Constituent of concern.
EPA = U.S. Environmental Protection Agency.
HEAST = Health Effects Assessment Summary Tables.
IRIS = Integrated Risk Information System.
mg/kg-day = Milligram(s) per kilogram day.
(mg/kg-day)$^{-1}$ = Per milligram per kilogram day.
RfD_{inh} = Inhalation chronic reference dose.
RfD_o = Oral chronic reference dose.
SF_{inh} = Inhalation slope factor.
SF_o = Oral slope factor.
SWMU = Solid waste management unit.
-- = Information not available.

Table 7
Toxicological Parameter Values for SWMU 275 Radiological COCs Obtained from RESRAD Risk Coefficients[a]

COC Name	SF_o (1/pCi)	SF_{inh} (1/pCi)	SF_{ev} (g/pCi-yr)	Cancer Class[b]
Cs-137	3.20E-11	1.90E-11	2.10E-06	A
U-238	6.2E-11	1.20E-08	6.60E-08	A
H-3	7.2E-14	9.6E-14	0.0	A

[a]From Yu et al. (1993a).
[b]EPA weight-of-evidence classification system for carcinogenicity (EPA 1989): A - human carcinogen.
1/pCi = One per picocurie.
COC = Constituent of concern.
EPA = U.S. Environmental Protection Agency.
g/pCi-yr = Gram(s) per picocurie-year.
SF_{ev} = External volume exposure slope factor.
SF_{inh} = Inhalation slope factor.
SF_o = Oral (ingestion) slope factor.
SWMU = Solid waste management unit.

upon information from RAGS (EPA 1989) and other EPA guidance documents and reflect the reasonable maximum exposure (RME) approach advocated by the RAGS (EPA 1989). For radiological COCs, the coded equations provided in RESRAD computer code are used to estimate the incremental TEDE and cancer risk for individual exposure pathways. Further discussion of this process is provided in the Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD, Version 5.0 (Yu et al. 1993a).

Although the designated land-use scenario is industrial for this site, risk and TEDE values for a residential land-use scenario are also presented. These residential risk and TEDE values are presented only to provide perspective of potential risk to human health under the more restrictive land-use scenario.

VI.6.2 Risk Characterization

Table 8 shows that for the SWMU 275 nonradiological COCs, the HI value is 0.02, and the excess cancer risk is 4E-6 for the designated industrial land-use scenario. The numbers presented included exposure from soil ingestion and dust and volatile inhalation for the nonradiological COCs. Table 9 shows that assuming the maximum background concentrations of the SWMU 275 associated background constituents, the HI is 0.01, and the excess cancer risk is 2E-6 for the designated industrial land-use scenario.

For the radioactive COCs, contribution from the direct gamma exposure pathway is included. For the industrial land-use scenario, a TEDE was calculated for an industrial office worker who spends a majority of his time indoors and for an industrial worker who splits his time evenly indoors and outdoors on the site. After analyzing these two scenarios, the most conservative is the 50/50 time split. This resulted in an incremental TEDE of 0.12 millirem per year (mrem/yr). In accordance with EPA guidance found in OSWER Directive No.9200-4-18 (EPA 1997c), an

Table 8
Risk Assessment Values for SWMU 275 Nonradiological COCs

COC Name	Maximum Concentration (mg/kg)	Industrial Land-Use Scenario[a]		Residential Land-Use Scenario[a]	
		HI	Cancer Risk	HI	Cancer Risk
Arsenic	4.7	0.02	3E-6	0.27	5E-5
Beryllium	0.66	0.00	3E-10	0.00	5E-10
Chromium, total[b]	19.5	0.00	4E-8	0.02	7E-8
Cobalt	6.6	0.00	--	0.00	--
Mercury	0.065 J	0.00	--	0.11	--
Selenium	0.8[c]	0.00	--	0.28	--
Silver	1[c]	0.00	--	0.04	--
Acetone	0.034 B	0.00	--	0.01	--
2-Hexanone	0.006 J	0.00	--	0.00	--
Methyl isobutyl ketone	0.0042 J	0.00	--	0.00	--
Methylene chloride	0.0047 J	0.00	3E-10	0.00	4E-8
bis (2-ethylhexyl) phthalate	0.066 J	0.00	3E-10	0.00	1E-9
n-Nitrosodiphenyl-amine	14	0.00	3E-8	0.00	6E-6
n-Nitroso-dipropylamine	0.13 J	0.00	9E-7	0.00	7E-4
Di-n-butyl phthalate	0.081 J	0.00	--	0.00	--
TOTAL		**0.02**	**4E-6**	**0.7**	**8E-4**

[a]EPA (1989).
[b]Chromium, total assumed to be chromium VI (most conservative).
[c]COC not detected, concentration assumed to be one-half of the detection limit.
B = Analyte detected in associated blank.
COC = Constituent of concern.
EPA = U.S. Environmental Protection Agency.
HI = Hazard index.
J = Estimated.
mg/kg = Milligram(s) per kilogram.
SWMU = Solid waste management unit.
-- = Information not available.

Table 9
Risk Assessment Values for SWMU 275 Nonradiological Background Constituents

COC Name	Background Concentration[a] (mg/kg)	Industrial Land- Use Scenario[b]		Residential Land- Use Scenario[b]	
		Hazard Index	Cancer Risk	Hazard Index	Cancer Risk
Arsenic	4.4	0.01	2E–6	0.25	5E–5
Beryllium	0.65	0.00	3E-10	0.00	5E-10
Chromium, total[c]	15.9	0.00	--	0.01	--
Cobalt	5.2	0.00	--	0.00	--
Mercury	<0.1	--	--	--	--
Selenium	<1	--	--	--	--
Silver	<1	--	--	--	--
TOTAL		**0.01**	**2E–6**	**0.3**	**5E–5**

[a]From Dinwiddie (September 1997), Southwest Test Area.
[b]EPA (1989).
[c]Chromium, total assumed to be chromium III.
COC = Constituent of concern.
EPA = U.S. Environmental Protection Agency.
mg/kg = Milligram(s) per kilogram
SWMU = Solid waste management unit.
-- = Information not available.

incremental TEDE of 15 mrem/yr is used for the probable land-use scenario (industrial in this case); the calculated dose value for SWMU 275 for the industrial land use is well below this guideline. The estimated excess cancer risk is 1.4E-6.

For the residential land-use scenario nonradiological COCs, the HI value increases to 0.7, and the excess cancer risk is 8E-4 (Table 8). The numbers presented include exposure from soil ingestion, dust and volatile inhalation, and plant uptake. Although EPA (1991) generally recommends that inhalation not be included in a residential land-use scenario, this pathway is included because of the potential for soil in Albuquerque, New Mexico, to be eroded and, subsequently, for dust to be present in predominantly residential areas. Because of the nature of the local soil, other exposure pathways are not considered (see Appendix 1). Table 9 shows that for the SWMU 275 associated background constituents, the HI is 0.3, and the excess cancer risk is 5E-5.

For the radiological COCs, the incremental TEDE for the residential land-use scenario is 0.34 mrem/yr. The guideline being used is an excess TEDE of 75 mrem/yr (SNL/NM February 1998) for a complete loss of institutional controls (residential land use in this case); the calculated dose value for SWMU 275 for the residential land-use is well below this guideline. Consequently, SWMU 275 is eligible for unrestricted radiological release as the residential land-use scenario resulted in an incremental TEDE to the on-site receptor of less than 75 mrem/yr. The estimated excess cancer risk is 4.3E-6. The excess cancer risk from the nonradiological COCs and the radiological COCs is not additive, as noted in RAGS (EPA 1989).

VI.7 Step 6. Comparison of Risk Values to Numerical Guidelines.

The human health risk assessment analysis evaluated the potential for adverse health effects for both an industrial land-use scenario (the designated land-use scenario for this site) and a residential land-use scenario.

For the industrial land-use scenario nonradiological COCs, the HI calculated is 0.02 (much less than the numerical guideline of 1 suggested in RAGS [EPA 1989]). The excess cancer risk is estimated at 4E-6. Guidance from the NMED indicates that excess lifetime risk of developing cancer by an individual must be less than 1E-6 for Class A and B carcinogens and less than 1E-5 for Class C carcinogens (NMED March 1998). The excess cancer risk is driven by arsenic which is a Class A carcinogen. Thus, the total excess cancer risk for this site is above the suggested acceptable risk value of 1E-6.

This risk assessment also determined risks considering background concentrations of the potential nonradiological COCs for both the industrial and residential land-use scenarios. For nonradiological COCs, assuming the industrial land-use scenario, the HI is 0.01. The excess cancer risk is estimated at 2E-6. Incremental risk is determined from subtracting risk associated with background from potential COC risk. These numbers are not rounded before the difference is determined and therefore may appear to be inconsistent with numbers presented in tables and within the text. The incremental HI is 0.01, and the incremental cancer risk is 1.1E-6 for the industrial land-use scenario.

For radiological COCs in the industrial land-use scenario, the incremental TEDE is 0.12 mrem/yr, which is significantly less than EPA's numerical guideline of 15 mrem/yr. The incremental estimated excess cancer risk is 1.4E-6.

For the residential land-use scenario nonradiological COCs, the calculated HI is 0.7, which is below the numerical guidance. The excess cancer risk is estimated at 8E-4. The excess cancer risk is again driven by arsenic which is a Class A carcinogen. Therefore, the total excess cancer risk for this site is above the suggested acceptable risk value of 1E-6. The HI for associated background for the residential land-use scenario is 0.3. The excess cancer risk is estimated at 5E-5. The incremental HI is 0.47, and the incremental cancer risk is 7E-4 for the residential land-use scenario. These incremental risk calculations indicate potentially significant contribution to human health risk from the COCs considering a residential land-use scenario.

The incremental TEDE for a residential land-use scenario from the radiological components is 0.34 mrem/yr, which is significantly less than the numerical guideline of 75 mrem/yr suggested in SNL/NM RESRAD Input Parameter Assumptions and Justification (SNL/NM February 1998). The estimated excess cancer risk is 4.3E-6.

VI.8 Step 7. Uncertainty Discussion

The nature, rate, and extent of contamination at SWMU 275 were determined using an initial conceptual model validated with confirmatory sampling at the site. The confirmatory sampling was implemented in accordance with the Sampling and Analysis Plan (Dawson January 1995) which is consistent with NMED guidelines (NMED March 1998). The DQOs in the Sampling and Analysis Plan (Dawson January 1995) are appropriate for use in screening risk

assessments. The data collected based upon sample location and depth intervals are representative of the site. The analytical requirements and results satisfy the DQOs. Data quality was validated in accordance with SNL/NM procedures (SNL/NM July 1994) (Annex 2-H). Therefore, there is no uncertainty associated with the data quality used to perform the screening risk assessment at SWMU 275.

Because of the location, history of the site, and future land-use (DOE et al. September 1995), there is low uncertainty in the land-use scenario and the potentially affected populations that were considered in making the risk assessment analysis. Because the COCs are found in soils and because of the location and physical characteristics of the site, there is little uncertainty in the exposure pathways relevant to the analysis.

An RME approach was used to calculate the risk assessment values. This means that parameter values used in the calculations are conservative and that calculated intakes are probably overestimates. Maximum measured values of the concentrations of the COCs are used to provide conservative results.

Table 6 shows the uncertainties (confidence) in nonradiological toxicological parameter values. There is a mixture of estimated values and values from IRIS (EPA 1998), HEAST (EPA 1997a), EPA Region 9 (EPA 1996b) and EPA Region 3 (EPA 1997b) electronic databases. Where values are not provided, information is not available from the HEAST (EPA 1997a), IRIS (EPA 1998), or the EPA regions (EPA 1996b and 1997b). Because of the conservative nature of the RME approach, the uncertainties in toxicological values are not expected to be sufficiently high to change the conclusion from the risk assessment analysis.

Incremental excess cancer risk for nonradiological COCs is above the human health acceptable range for the industrial land-use scenario compared to established numerical guidance. The excess cancer risk is driven by arsenic. If the average arsenic concentration (2.5 mg/kg) is used in the risk calculations, the incremental risk (7E-8) is below the NMED proposed guidelines. Because the site is adequately characterized, use of average arsenic concentrations is more realistic than use of maximum arsenic concentrations in the risk calculations. Also, the detections occurred at depth, so realistically no inhalation or ingestion exposure pathways exist.

For radiological COCs, the conclusion of the risk assessment is that potential effects on human health, for both industrial and residential land-use scenarios are within guidelines and are a small fraction of the estimated 360 mrem/yr received by the average U.S. population (NCRP 1987).

The overall uncertainty in all of the steps in the risk assessment process is considered not significant with respect to the conclusion reached.

VI.9 Summary

Inorganic, organic, and radiological COCs have been identified at SWMU 275. Because of the location of the site, the designated industrial land-use scenario, and the nature of contamination, potential exposure pathways identified for this site included soil ingestion and dust and volatile inhalation for chemical constituents, and soil ingestion, dust inhalation, and

direct gamma exposure for radiologicals. Plant uptake was included as an exposure pathway for the residential land-use scenario.

Using conservative assumptions and employing an RME approach to risk assessment, calculations for nonradiological COCs show that for the industrial land-use scenario the HI of 0.02 is significantly less than the accepted numerical guidance from the EPA. The total excess cancer risk is 4E-6 and is above the acceptable risk value provided by the NMED for an industrial land use and the presence of a Class A carcinogen (NMED March 1998). The incremental HI is 0.01, and the incremental cancer risk is 1.1E-6 for the industrial land-use scenario. Incremental excess cancer risk is above proposed guidelines to human health for an industrial land-use scenario. The excess cancer risk is driven by arsenic. If the average concentration (2.5 mg/kg) is used in the risk calculations, the incremental risk (7E-8) is below the NMED proposed guidelines. Because the site is adequately characterized, use of average arsenic concentrations is more realistic than use of maximum arsenic concentrations in the risk calculations. Also, the detections occurred at depth so realistically no exposure pathways exist.

Incremental TEDE and corresponding estimated cancer risk from radiological COCs are much less than EPA guidance values; the estimated TEDE is 0.12 mrem/yr for the industrial land-use scenario. This value is much less than the numerical guidance of 15 mrem/yr in EPA guidance (EPA 1997c). The corresponding incremental estimated cancer risk value is 1.4E-6 for the industrial land-use scenario. Furthermore, the incremental TEDE for the residential land-use scenario that results from a complete loss of institutional control is only 0.34 mrem/year with a corresponding risk of 4.3E-6. The guideline for this scenario is 75 mrem/yr (SNL/NM February 1998). Therefore SWMU 275 is eligible for unrestricted radiological release.

Uncertainties associated with the calculations are considered small relative to the conservativeness of risk assessment analysis. It is therefore concluded that this site does not have potential to affect human health under an industrial land-use scenario.

VII. Ecological Risk Screening Assessment

VII.1 Introduction

This section addresses the ecological risks associated with exposure to constituents of potential ecological concern (COPEC) in soils at the TA-V seepage pits. A component of the NMED Risk-Based Decision Tree is to conduct an ecological assessment that corresponds with that presented in the EPA's Ecological Risk Assessment Guidance for Superfund (EPA 1997d). The current methodology is tiered and contains an initial scoping assessment, which determines whether further evaluation is warranted for the site. Initial components of NMED's decision tree (a discussion of DQOs, a data assessment, and evaluations of bioaccumulation and fate-and-transport potential) are addressed in the scoping assessment (Section VII.2), with the exception of DQOs, which are reviewed in Section II of this report. At the end of the scoping assessment, a determination is made as to whether a more detailed examination of potential ecological risk is necessary.

VII.2 Scoping Assessment

The scoping assessment focuses primarily on the likelihood of exposure of biota at or adjacent to the site being exposed to constituents associated with site activities. Included in this section are an evaluation of existing data and a comparison of maximum detected concentrations to background concentrations (if applicable), an examination of bioaccumulation potential, and an evaluation of fate-and-transport potential. A Scoping Risk Management Decision will involve a summary of the scoping results and a determination as to whether further examination of potential ecological impacts is necessary.

VII.2.1 Data Assessment

As indicated in Section IV, all COCs at SWMU 275 are at depths greater than 5 feet bgs. For this reason, none of the COCs are considered to be COPECs.

VII.2.2 Bioaccumulation

Because no COCs at SWMU 275 are considered to be COPECs (Section VII.2.1), bioaccumulation potential is not evaluated as part of the ecological risk scoping assessment.

VII.2.3 Fate and Transport Potential

The potential for the COCs to move from the source of contamination to other media or biota is discussed in Section V. As noted in Table 5 (Section V), COCs at this site were released to subsurface soil (>5 feet bgs) and no transport mechanism is expected to result in significant upward migration of COCs. SWMU 275 is in TA-V, which is highly developed, and the SWMU is covered by gravel. No ecological receptors or viable habitat to support receptors exist at the site. Therefore, food-chain uptake is not expected to be a potential transport mechanism for COCs associated with this site. For these reasons, no ecological pathways are expected to exist at this site.

VII.2.4 Scoping Risk Management Decision

Based upon information gathered through the scoping assessment, it was concluded that complete ecological pathways do not exist at SWMU 275. For this reason, further evaluation of ecological risk at this site is not warranted.

VIII. References

Baker, D.A., and J.K. Soldat, 1992. *Methods for Estimating Doses to Organisms from Radioactive Materials Released into the Aquatic Environment*, PNL-8150, Pacific Northwest Laboratory, Richland, Washington, pp. 16–20.

Brown, C.D. (Sandia National Laboratories). Memo to Devon Jercinovic (International Technology Corporation), "Radiological Data Tables and DU Ratios, Sandia National Laboratories," Memo (unpublished), Albuquerque, New Mexico. January 14, 1998.

Callahan, M.A., M.W. Slimak, N.W. Gabel, I.P. May, C.F. Fowler, J.R. Freed, P. Jennings, R.L. Durfee, F.C. Whitmore, B. Maestri, W.R. Mabey, B.R. Holt, and C. Gould, 1979, "Water-Related Environmental Fate of 129 Priority Pollutants," EPA-440/4-79-029, Office of Water Planning and Standards, Office of Water and Waste Management, U.S. Environmental Protection Agency, Washington, D.C.

Dawson, L., January 1995. Personal communication with N. Morlock (U.S. Environmental Protection Agency, Region 6) "Sampling Requirements for TAV-BH-01/TAV-MW1, SMWU 275," January 4, 1995.

Dinwiddie, R.S. (New Mexico Environment Department). Letter to M.J. Zamorski (U.S. Department of Energy), "Request for Supplemental Information: Background Concentrations Report, SNL/KAFB," September 24, 1997.

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

Howard, P.H., 1989, Handbook of Environmental Fate and Exposure Data for Organic Chemicals: Volume I Large Production and Priority Pollutants, Lewis Publishers, Inc., Chelsea, Michigan.

Howard, P.H., 1990, Handbook of Environmental Fate and Exposure Data for Organic Chemicals: Volume II Solvents, Lewis Publishers, Inc., Chelsea, Michigan.

Howard, P.H., 1993, Handbook of Environmental Fate and Exposure Data for Organic Chemicals: Volume IV Solvents 2, Lewis Publishers, Inc., Chelsea, Michigan.

IT, see IT Corporation.

IT Corporation (IT), July 1994. "Report of Generic Action Level Assistance for the Sandia National Laboratories/New Mexico Environmental Restoration Program," IT Corporation, Albuquerque, New Mexico.

IT Corporation (IT), November 1996. "Data Validation and Comparison of Level II and Level III Analytical Data to Published Background Ranges at Sandia National Laboratories/New Mexico, Site 14, Operable Unit 1335," IT Corporation, Albuquerque, New Mexico.

IT Corporation (IT), July 1998. "Predictive Ecological Risk Assessment Methodology for the SNL/NM ER Program, Sandia National Laboratories, New Mexico," IT Corporation, Albuquerque, New Mexico.

Kocher, D., 1983. "Dose Rate Conversion Factors for External Exposure to Photon Emissions in Soil," Health Physics 28:193-205.

Nagy, K.A., 1987. "Field Metabolic Rate and Food Requirement Scaling in Mammals and Birds," *Ecological Monographs*, Vol. 57, No. 2, pp. 111–128.

National Council on Radiation Protection and Measurements (NCRP), 1987. "Exposure of the Population in the United States and Canada from Natural Background Radiation," NCRP Report No. 94, National Council on Radiation Protection and Measurements, Bethesda, Maryland.

National Library of Medicine (NLM), 1998, Hazardous Substances Data Base, Produced by Micromedex, Inc.

NCRP, see National Council on Radiation Protection and Measurements.

Neumann, G., 1976, "Concentration Factors for Stable Metals and Radionuclides in Fish, Mussels and Crustaceans – a Literature Survey," Report 85-04-24, National Swedish Environmental Protection Board.

New Mexico Environment Department (NMED), March 1998. "Risk-Based Decision Tree Description," in New Mexico Environment Department, "RPMP Document Requirement Guide," New Mexico Environment Department, Hazardous and Radioactive Materials Bureau, RCRA Permits Management Program, Santa Fe, New Mexico.

NMED, see New Mexico Environment Department.

NOAA, see National Oceanographic and Atmospheric Administration.

National Oceanographic and Atmospheric Administration (NOAA), 1990. Local Climatological Data, Annual Summary with Comparative data, Albuquerque, NM.

Sandia National Laboratories/New Mexico (SNL/NM), July 1994. "Technical Operating Procedure 94-03, Verification and Validation of Chemical and Radiological Data," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), November 1995. "Chemical Waste Landfill Groundwater Assessment Report," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), December 1995. "Conceptual Geological Model of Sandia National Laboratories and Kirtland Air Force Base," Sandia National Laboratories, Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 1996. "Well Locations at Kirtland Air Force Base," Geographic Information System, Sandia National Laboratories, Map No. 961160, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1997. "Groundwater Protection Program, Calendar Year 1996, Annual Groundwater Monitoring Report, Sandia National Laboratories/New Mexico," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), February 1998. "RESRAD Input Parameter Assumptions and Justification," Sandia National Laboratories/New Mexico Environmental Restoration Project, Albuquerque, NM.

Sandia National Laboratories/New Mexico (SNL/NM), July 1998. Personal communication from Robert Lynch, Department 6134, regarding most recent water level for Well TAV-MW1.

SNL/NM, See Sandia National Laboratories, New Mexico.

Thomson, B.M., and G. J. Smith, 1985. Investigation of Groundwater Contamination Potential at Sandia National Laboratories, Albuquerque, NM, in Proceedings of the Fifth DOE Environmental Protection Information Meeting, Albuquerque, NM, November 6-8, 1984, CONF-841187, pp. 531-540.

U.S. Department of Energy (DOE), 1988. "External Dose-Rate Conversion Factors for Calculation of Dose to the Public," DOE/EH-0070, U.S. Department of Energy, Assistant Secretary for Environment, Safety and Health, Washington, D.C.

U.S. Department of Energy (DOE), 1993. DOE Order 5400.5, "Radiation Protection of the Public and the Environment", 1993.

U.S. Department of Energy (DOE) and United States Air Force, September 1995. "Workbook: Future Use Management Area 2," prepared by the Future Use Logistics and Support Working Group in cooperation with U.S. Department of Energy Affiliates and the U.S. Air Force.

U.S. Environmental Protection Agency (EPA), 1988. "Federal Guidance Report No. 11, Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," U.S. Environmental Protection Agency, Office of Radiation Programs, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1989. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual," EPA/540-1089/002, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1990. "Corrective Action for Solid Waste Management Units (SWMU) at Hazardous Waste Management Facilities, Proposed Rule," Federal Register, Vol. 55, Title 40, Parts 264, 265, 270, and 271.

U.S. Environmental Protection Agency (EPA), 1991. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B)," U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA). Memorandum from E. Laws (Assistant Administrator to Region Administrators I–X), "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Active Facilities." July 14, 1994.

U.S. Environmental Protection Agency (EPA), 1995. "Supplemental Technical Support Document for the Hazardous Waste Identification Rule: Risk Assessment for Human and Ecological Receptors," RT1, November 1995.

U.S. Environmental Protection Agency (EPA), 1996a. Draft Region 6 Superfund Guidance, Adult Lead Cleanup Level, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1996b. "Region 9 Preliminary Remediation Goals (PRGs) 1996," electronic database maintained by U.S. Environmental Protection Agency, Region 9, San Francisco, California.

U.S. Environmental Protection Agency (EPA), 1997a. "Health Effects Assessment Summary Tables (HEAST), FY 1997 Update," EPA-540-R-97-036, Office of Research and Development and Office of Solid Waste and Emergency Response, Washington, D.C..

U.S. Environmental Protection Agency (EPA), 1997b. "Risk-Based Concentration Table," electronic database maintained by U.S. Environmental Protection Agency, Region III, Philadelphia, Pennsylvania.

U.S. Environmental Protection Agency (EPA), 1997c. "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination," OSWER Directive No. 9200.4-18, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1997d. "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risks," Interim Final, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1998, Integrated Risk Information System (IRIS) electronic database, maintained by the U.S. Environmental Protection Agency.

Vanderploeg, H.A., D.C. Parzyck, W.H. Wilcox, J.R. Kercher, and S.V. Kaye, 1975. "Bioaccumulation Factors for Radionuclides in Freshwater Biota," ORNL-5002, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Yanicak, S., March 1997, Letter to Mat Johansen, DOE/AIP/POC of Los Alamos National Laboratory, regarding "(Tentative) list of constituents of potential ecological concern (COPECs) which are considered to be bioconcentrators and/or biomagnifiers" dated March 3, 1997, from New Mexico Environment Department's Department of Energy Oversight Bureau.

Yu, C., A.J. Zielen, J.-J. Cheng, Y.C. Yuan, L.G. Jones, D.J. LePoire, Y.Y. Wang, C.O. Loureiro, E. Gnanapragasam, E. Faillace, A. Wallo III, W.A. Williams, and H. Peterson, 1993a. "Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD," Version 5.0. Environmental Assessment Division, Argonne National Laboratory, Argonne, Illinois.

Yu, C., C. Loureiro, J.-J. Cheng, L.G. Jones, Y.Y. Wang, Y.P. Chia, and E. Faillace, 1993b. "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil," ANL/EAIS-8, Argonne National Laboratory, Argonne, Illinois.

APPENDIX 1
EXPOSURE PATHWAY DISCUSSION FOR CHEMICAL AND RADIONUCLIDE CONTAMINATION

Sandia National Laboratories (SNL/NM) proposes that a default set of exposure routes and associated default parameter values be developed for each future land-use designation being considered for SNL/NM Environmental Restoration (ER) project sites. This default set of exposure scenarios and parameter values would be invoked for risk assessments unless site-specific information suggested other parameter values. Because many SNL/NM solid waste management units (SWMU) have similar types of contamination and physical settings, SNL/NM believes that the risk assessment analyses at these sites can be similar. A default set of exposure scenarios and parameter values will facilitate the risk assessments and subsequent review.

The default exposure routes and parameter values suggested are those that SNL/NM views as resulting in a Reasonable Maximum Exposure (RME) value. Subject to comments and recommendations by the U.S. Environmental Protection Agency (EPA) Region VI and New Mexico Environment Department (NMED), SNL/NM proposes that these default exposure routes and parameter values be used in future risk assessments.

At SNL/NM, all SWMUs exist within the boundaries of the Kirtland Air Force Base (KAFB). Approximately 157 potential waste and release sites have been identified where hazardous, radiological, or mixed materials may have been released to the environment. Evaluation and characterization activities have occurred at all of these sites to varying degrees. Among other documents, the SNL/NM ER draft Environmental Assessment (DOE 1996) presents a summary of the hydrogeology of the sites, the biological resources present and proposed land-use scenarios for the SNL/NM SWMUs. At this time, all SNL/NM SWMUs have been tentatively designated for either industrial or recreational future land use. The NMED has also requested that risk calculations be performed based upon a residential land-use scenario. All three land-use scenarios will be addressed in this document.

The SNL/NM ER project has screened the potential exposure routes and identified default parameter values to be used for calculating potential intake and subsequent Hazard index (HI), risk and dose values. The EPA (EPA 1989a) provides a summary of exposure routes that could potentially be of significance at a specific waste site. These potential exposure routes consist of:

- Ingestion of contaminated drinking water
- Ingestion of contaminated soil
- Ingestion of contaminated fish and shell fish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water
- Dermal contact with chemicals in soil
- Inhalation of airborne compounds (vapor phase or particulate)

- External exposure to penetrating radiation (immersion in contaminated air; immersion in contaminated water and exposure from ground surfaces with photon-emitting radionuclides).

Based upon the location of the SNL/NM SWMUs and the characteristics of the surface and subsurface at the sites, we have evaluated these potential exposure routes for different land-use scenarios to determine which should be considered in risk assessment analyses (the last exposure route is pertinent to radionuclides only). At SNL/NM SWMUs, there does not currently occur any consumption of fish, shell fish, fruits, vegetables, meat, eggs, or dairy products that originate on site. Additionally, no potential for swimming in surface water is present due to the high-desert environmental conditions. As documented in the RESRAD computer code manual (ANL 1993), risks resulting from immersion in contaminated air or water are not significant compared to risks from other radiation exposure routes.

For the industrial and recreational land-use scenarios, SNL/NM ER has, therefore, excluded the following four potential exposure routes from further risk assessment evaluations at any SNL/NM SWMU:

- Ingestion of contaminated fish and shell fish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming.

That part of the exposure pathway for radionuclides related to immersion in contaminated air or water is also eliminated.

For the residential land-use scenario, we will include ingestion of contaminated fruits and vegetables because of the potential for residential gardening.

Based upon this evaluation, for future risk assessments, the exposure routes that will be considered are shown in Table 1. Dermal contact is included as a potential exposure pathway in all land use scenarios. However, the potential for dermal exposure to inorganics is not considered significant and will not be included. In general, the dermal exposure pathway is generally considered to not be significant relative to water ingestion and soil ingestion pathways but will be considered for organic components. Because of the lack of toxicological parameter values for this pathway, the inclusion of this exposure pathway into risk assessment calculations may not be possible and may be part of the uncertainty analysis for a site where dermal contact is potentially applicable.

Equations and Default Parameter Values for Identified Exposure Routes

In general, SNL/NM expects that ingestion of compounds in drinking water and soil will be the more significant exposure routes for chemicals; external exposure to radiation may also be significant for radionuclides. All of the above routes will, however, be considered for their appropriate land use scenarios. The general equations for calculating potential intakes via these routes are shown below. The equations are from the Risk Assessment Guidance for Superfund (RAGS): Volume 1 (EPA 1989a, 1991). These general equations also apply to calculating potential intakes for radionuclides. A more in-depth discussion of the equations

Table 1
Exposure Pathways Considered for Various Land Use Scenarios

Industrial	Recreational	Residential
Ingestion of contaminated drinking water	Ingestion of contaminated drinking water	Ingestion of contaminated drinking water
Ingestion of contaminated soil	Ingestion of contaminated soil	Ingestion of contaminated soil
Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)
Dermal contact	Dermal contact	Dermal contact
External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces	Ingestion of fruits and vegetables
		External exposure to penetrating radiation from ground surfaces

used in performing radiological pathway analyses with the RESRAD code may be found in the RESRAD Manual (ANL 1993). Also shown are the default values SNL/NM ER suggests for use in RME risk assessment calculations for industrial, recreational, and residential scenarios, based upon EPA and other governmental agency guidance. The pathways and values for chemical contaminants are discussed first, followed by those for radionuclide contaminants. RESRAD input parameters that are left as the default values provided with the code are not discussed. Further information relating to these parameters may be found in the RESRAD Manual (ANL 1993).

Generic Equation for Calculation of Risk Parameter Values

The equation used to calculate the risk parameter values (i.e., hazard quotients/hazard index [HI], excess cancer risk, or radiation total effective dose equivalent [dose]) is similar for all exposure pathways and is given by:

Risk (or Dose) = Intake x Toxicity Effect (either carcinogenic, noncarcinogenic, or radiological)

$$= C \times (CR \times EFD/BW/AT) \times \text{Toxicity Effect} \quad (1)$$

where

C = contaminant concentration (site specific)
CR = contact rate for the exposure pathway
EFD= exposure frequency and duration
BW = body weight of average exposure individual
AT = time over which exposure is averaged.

The total risk/dose (either cancer risk or HI) is the sum of the risks/doses for all of the site-specific exposure pathways and contaminants.

The evaluation of the carcinogenic health hazard produces a quantitative estimate for excess cancer risk resulting from the constituents of concern (COC) present at the site. This estimate

is evaluated for determination of further action by comparison of the quantitative estimate with the potentially acceptable risk range of 10^{-4} to 10^{-6}. The evaluation of the noncarcinogenic health hazard produces a quantitative estimate (i.e., the HI) for the toxicity resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of this quantitative estimate with the EPA standard HI of unity (1). The evaluation of the health hazard due to radioactive compounds produces a quantitative estimate of doses resulting from the COCs present at the site.

The specific equations used for the individual exposure pathways can be found in RAGS (EPA 1989a) and the RESRAD Manual (ANL 1993). Table 2 shows the default parameter values suggested for used by SNL/NM at SWMUs, based upon the selected land use scenario. References are given at the end of the table indicating the source for the chosen parameter values. The intention of SNL/NM is to use default values that are consistent with regulatory guidance and consistent with the RME approach. Therefore, the values chosen will, in general, provide a conservative estimate of the actual risk parameter. These parameter values are suggested for use for the various exposure pathways based upon the assumption that a particular site has no unusual characteristics that contradict the default assumptions. For sites for which the assumptions are not valid, the parameter values will be modified and documented.

Summary

SNL/NM proposes the described default exposure routes and parameter values for use in risk assessments at sites that have an industrial, recreational or residential future land-use scenario. There are no current residential land-use designations at SNL/NM ER sites, but this scenario has been requested to be considered by the NMED. For sites designated as industrial or recreational land-use, SNL/NM will provide risk parameter values based upon a residential land-use scenario to indicate the effects of data uncertainty on risk value calculations or in order to potentially mitigate the need for institutional controls or restrictions on SNL/NM ER sites. The parameter values are based upon EPA guidance and supplemented by information from other government sources. The values are generally consistent with those proposed by Los Alamos National Laboratory, with a few minor variations. If these exposure routes and parameters are acceptable, SNL/NM will use them in risk assessments for all sites where the assumptions are consistent with site-specific conditions. All deviations will be documented.

References

ANL, see Argonne National Laboratory.

Argonne National Laboratory (ANL), 1993. *Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD*, Version 5.0, ANL/EAD/LD-2, Argonne National Laboratory, Argonne, IL.

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

Table 2
Default Parameter Values for Various Land Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure frequency (day/yr)	***	***	***
Exposure duration (yr)	30[a,b]	30[a,b]	30[a,b]
Body weight (kg)	70[a,b]	56[a,b]	70 adult[a,b] 15 child
Averaging Time (days) for carcinogenic compounds (= 70 y x 365 day/yr) for noncarcinogenic compounds (= ED x 365 day/yr)	25550[a] 10950	25550[a] 10950	25550[a] 10950
Soil Ingestion Pathway			
Ingestion rate	100 mg/day[c]	6.24 g/yr[d]	114 mg-yr/kg-day[a]
Inhalation Pathway			
Inhalation rate (m^3/yr)	5000[a,b]	146[d]	5475[a,b,d]
Volatilization factor (m^3/kg)	chemical specific	chemical specific	chemical specific
Particulate emission factor (m^3/kg)	1.32E9[a]	1.32E9[a]	1.32E9[a]
Water Ingestion Pathway			
Ingestion rate (L/day)	2[a,b]	2[a,b]	2[a,b]
Food Ingestion Pathway			
Ingestion rate (kg/yr)	NA	NA	138[b,d]
Fraction ingested	NA	NA	0.25[b,d]
Dermal Pathway			
Surface area in water (m^2)	2[b,e]	2[b,e]	2[b,e]
Surface area in soil (m^2)	0.53[b,e]	0.53[b,e]	0.53[b,e]
Permeability coefficient	chemical specific	chemical specific	chemical specific

***The exposure frequencies for the land use scenarios are often integrated into the overall contact rate for specific exposure pathways. When not included, the exposure frequency for the industrial land use scenario is 8 hr/day for 250 day/yr; for the recreational land use, a value of 2 hr/wk for 52 wk/yr is used (EPA 1989b); for a residential land use, all contact rates are given per day for 350 day/yr.

[a]RAGS, Vol 1, Part B (EPA 1991).

[b]Exposure Factors Handbook (EPA 1989b)

[c]EPA Region VI guidance.

[d]For radionuclides, RESRAD (ANL 1993) is used for human health risk calculations; default parameters are consistent with RESRAD guidance.

[e]Dermal Exposure Assessment (EPA 1992).

U.S. Department of Energy (DOE), 1996. "Environmental Assessment of the Environmental Restoration Project at Sandia National Laboratories/New Mexico," U.S. Department of Energy, Kirtland Area Office.

U.S. Environmental Protection Agency (EPA), 1989a. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual," EPA/540-1089/002, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1989b. *Exposure Factors Handbook*, EPA/600/8-89/043, U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1991. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B)," EPA/540/R-92/003, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1992. "Dermal Exposure Assessment: Principles and Applications," EPA/600/8-91/011B, Office of Research and Development, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1996. "Soil Screening Guidance: Technical Background Document," EPA/540/1295/128, Office of Solid Waste and Emergency Response, Washington, D.C.

RSI

Statement of Basis
Approval of No Further Action

January 2000

Solid Waste Management Unit 275
Operable Unit 1306
Round 11

RSI Originally Submitted September 1999

Site-Specific Comments

RESPONSES TO COMMENTS ON NO FURTHER ACTION PROPOSALS SEPTEMBER 1998 (11TH ROUND)

OU 1295

ER Site 275, TA-V Seepage Pits

ER Site 275 is appropriate for No Further Action (NFA) petition, pending submittal of the below requested information.

1. **Page 2-24, Phase-II Passive SVS, 1st paragraph -- Specify in detail which soil-vapor survey (SVS) samples correspond to locations of environmental restoration (ER) sites, dry wells, and stained soils.**

   Response: As shown on the Phase II Petrex survey map included in Annex 2-B of the ER Site 275 NFA proposal, the Phase II survey was designed to be a more broad-based screening survey of the northern portion of Technical Area V and was not focused on any specific individual ER site, stained soil area, dry well, etc. The Phase I Petrex samplers were concentrated primarily in and around ER Site 275. A limited number of Phase I samplers were also placed at ER Sites 5 and 52 (the liquid waste disposal system drainfield and holding tanks) and at ER Site 196 (Building 6597 cistern), and a few points were also located in an unpaved strip of property northwest of ER Site 275 and south of Building 6517. The purpose of both of these passive soil gas surveys was to aid in identifying, in a qualitative sense, potential near-surface source areas for trichloroethene and other constituents subsequently detected in some of the Technical Area V monitoring wells. An improved map (Figure 3.5-1) showing all of the Phases I and II survey point locations is included in Attachment A, which is taken from the "Summary Report of Groundwater Investigations at Technical Area V, Operable Units 1306 and 1307," by Sandia National Laboratories/New Mexico, March 1999.

2. **Phase-II Passive SVS – Results for samples 44 and 45, presumably collected at the TA-V Seepage Pits, are not reported in Annex 2-B. Analytical results for these samples are critical in order to determine, qualitatively, whether the TA-V Seepage Pits may be an important source of TCE or other contamination relative to other ER sites/locations.**

   Response: A number of discrepancies were found to exist between the sample location maps and analytical summary results table for the Phase II Petrex passive soil vapor sampling task conducted in Technical Area V in October and November 1994. Some sample locations are shown on the map but are not listed on the table and vice versa. The sample location map shows that points 44 and 45 were located on the northern side of the seepage pit system. However, these (and other) points are not listed on the corresponding analytical results summary table. All attempts to locate the analytical results (or

locations) for the apparent missing points within ER project hard copy and electronic files failed. Also, the company that manufactured and analyzed the Petrex samplers (Northeast Research Institute) is no longer in business, so they could not be contacted to determine whether this information exists in their files. Therefore, the data for the missing points is considered lost. However, as many as 17 Petrex samplers were placed either directly above or directly adjacent to the seepage pit system as part of the Phase I Petrex survey conducted in and around the northern part of Technical Area V in August 1994. As shown on the Phase I Petrex sample location map in Annex 2-B, samples 25 and 26 were placed in essentially similar locations as the Phase II samplers 44 and 45. None of the Phase I samplers placed in and around the seepage pit system indicated that significant volatile organic compounds contamination exists in the near-surface above and around this system. Therefore, the missing analytical data for Phase II points 44 and 45 are essentially duplicates of Phase I points and are not critical in determining the presence of shallow contamination around the seepage pits system.

3. **The sample location map in Annex 2-B is labeled "draft". Please submit a final version of this map.**

   Response: A copy of the Petrex Phase II sample location map without the word "draft" is provided in Attachment B.

4. **Analytical results for field and laboratory quality control samples need to be summarized and discussed.**

   Response: This section describes the data quality assessment results for the quality assurance/quality control samples collected during drilling and sampling of borehole TA5-BH-01.

   Metals:

   The two quality assurance/quality control samples collected for metals analysis during the drilling and sampling of borehole TA5-BH-01 were aqueous equipment blanks, and were analyzed by an off-site laboratory for the target analyte list metals. Trace levels (less than or equal to 0.15 mg/L) of calcium, copper, lead, manganese, and zinc were detected in the first equipment blank. Trace levels (less than or equal to 0.20 mg/L) of aluminum, calcium, chromium, copper, lead, manganese, and zinc were also detected in the second equipment blank.

   No duplicate (replicate) samples were collected from the TA5-BH-01 borehole; therefore, relative percent differences for metals samples cannot be assessed. However, it is very unlikely that relative percent differences would be high enough to have a significant impact on the outcome of the risk assessment completed for this site, considering the low levels of metals that were detected in TA5-BH-01 samples.

   The following data quality issues were noted as part of the analytical data quality review

for metals analyses of TA5-BH-01 samples:

1. For the matrix spike/matrix spike duplicate sample associated with the soil sample taken from 80.5 feet below ground surface for metals analysis, all recoveries were satisfactory except antimony, for which the average recovery was 44 percent. Therefore, the possibility exists for false negatives (biased low) antimony results. Antimony, reported as "ND" in this sample (at 6 mg/kg reporting limit), is not a contaminant of concern at this site, and no action was taken.

2. Zinc was detected at 2.1 mg/kg in the method blank associated with the metals soil samples taken from 241 and 480.5 feet below ground surface for metals analysis. However, because sample results for zinc were greater than 10 times the amount in the blank, no action was taken.

3. Metals reporting limits for the sample taken from 30.5 feet below ground surface were elevated by a factor of 2 compared to the reporting limits for metals in other samples from TA5-BH-01, except for arsenic, mercury, selenium, and thallium. Reporting limits were also elevated by a factor of 2 for the metals concentrations in the sample taken from 41.5 feet below ground surface, with the exception of mercury. The reporting limits for cadmium and silver for both samples were slightly above the maximum approved background concentrations (1 versus 0.9 mg/kg respectively for cadmium, and 2 versus <1 mg/kg respectively for silver). Also, the reporting limits for selenium and thallium for the sample taken from 41.5 feet below ground surface were slightly above the maximum approved background concentrations (1.6 versus <1 mg/kg, respectively, for selenium, and 2 versus <1.1 mg/kg, respectively, for thallium).

   The eight Resource Conservation and Recovery Act metals, plus beryllium and cobalt, were considered potential contaminants of concern at ER Site 275 and were, therefore, evaluated in the human health and ecological risk assessments for this site. For metals that were detected, the highest concentration detected in any sample was used in the risk assessments. For other metals that were not detected, a value of one-half of the reporting limits was used. The slightly elevated levels of metals in the samples taken from 30.5 and 41.5 feet below ground surface were evaluated and had no significant impact on the outcome of the risk assessment.

4. Zinc was reported at 2.1 mg/kg in the method blank associated with the soil sample taken from 400.5 feet below ground surface for metals analysis. The zinc concentration in the soil sample (at 37.2 mg/kg) was more than 10 times that yielded by the blank, and no action was taken.

Radionuclides

Table 2.4.4-2 presents the analytical results for radionuclides of concern that were detected in the single gamma spectroscopy quality assurance/quality control sample (an

equipment blank) collected during the drilling and sampling of borehole TA5-BH-01. This sample was analyzed by an Sandia National Laboratories/New Mexico on-site laboratory. Elevated radionuclide activities were not detected in the equipment blank sample. This indicates that radionuclide cross-contamination did not occur during the sampling event.

Table 2.4.4-3 presents the results for the quality assurance/quality control samples that were collected for tritium analysis during this drilling and sampling campaign. These samples included two equipment blank samples that were analyzed for tritium by an off-site laboratory. The fact that elevated tritium activities were not detected in either of the equipment blank samples indicates that tritium cross-contamination did not occur.

No replicate (duplicate) samples were collected for gamma spectroscopy radionuclide or tritium analysis during this sampling event; therefore, relative percent differences for tritium or gamma spectroscopy radionuclides, and differences between on-site and off-site laboratory gamma spectroscopy analyses could not be assessed.

Volatile Organic Compounds

Table 2.4.4-4 presents the analytical results for volatile organic compounds in the quality assurance/quality control samples that were collected during the drilling and sampling of borehole TA5-BH-01. These samples included two aqueous equipment blanks and a soil trip blank, all of which were analyzed by an off-site laboratory. Acetone was detected in one of the two equipment blanks at a concentration of 10 J µg/L, and no volatile organic compounds were detected in the second equipment blank sample. Five volatile organic compounds were detected in the soil trip blank, including acetone (at 180 B µg/kg), 2-hexanone (at 16 µg/kg), 2-butanone (at 110 µg/kg), 4-methyl 2-pentanone (at 7.5 J µg/kg), methylene chloride (at 2.6 J µg/kg), and xylene (at 1.3 J µg/kg). Soil used for the trip blank was initially collected from a Sandia National Laboratories/New Mexico location believed to be free of volatile organic compounds. It was then prepared through heating the material in a drying oven and then transferring it immediately to the sample container. This heating process eliminated any residual organic compounds (if present) and soil moisture that may have been in the material. It is thought that when the soil trip blank container was opened at the laboratory, it immediately adsorbed both moisture and volatile organic compounds present in the laboratory atmosphere to a significantly greater degree than the associated site samples.

The following data quality issues were noted as part of the analytical data quality review for analyses of volatile organic compounds in the TA5-BH-01 samples:

1. The positive acetone level in one of the equipment blanks was greater than or comparable to that detected in the associated environmental samples. Therefore, the acetone concentrations in the associated samples were flagged as nondetects because they were less than 10 times the amount in the equipment blank.

Site-Specific Comments

2. The method blank associated with soil samples taken from 221, 240.75, and 260.5 feet below ground surface for volatile organic compounds analysis contained 2.3 µg/kg of acetone. The acetone detections in these three samples were less than 10 times the amount of acetone detected in the associated blank and were, therefore, flagged as nondetects.

3. The method blank associated with soil samples taken from 300.5, 341, and 360.5 feet below ground surface for volatile organic compounds analysis also contained 2.3 µg/kg of acetone. The acetone concentrations in these three samples were less than 10 times the amount of acetone detected in the associated blank and were, therefore, flagged as nondetects.

Semivolatile Organic Compounds

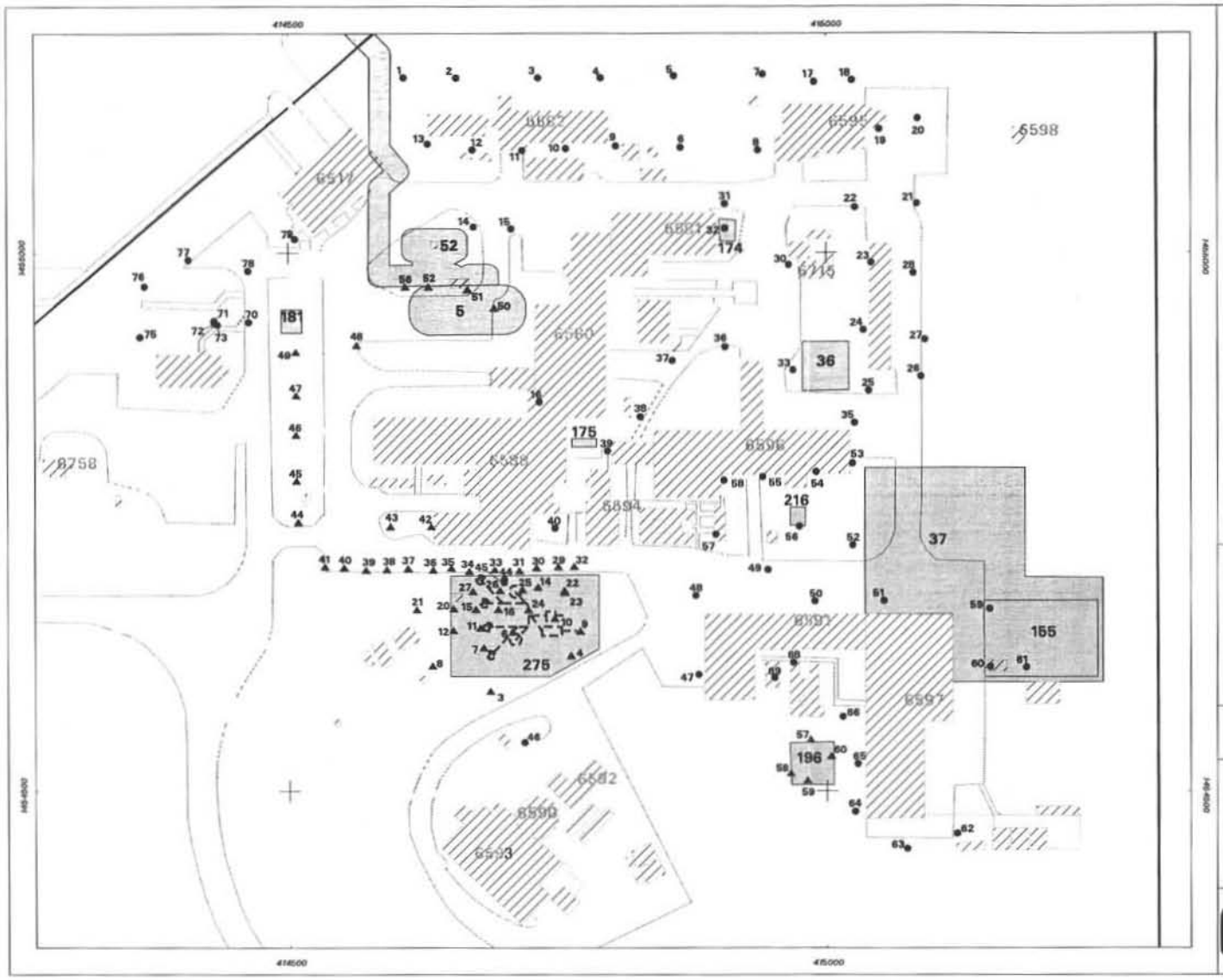
Table 2.4.4-6 presents the semivolatile organic compound analytical results for quality assurance/quality control samples that were collected during the drilling and sampling of borehole TA5-BH-01. These samples included two aqueous equipment blanks, both of which were analyzed by an off-site laboratory. Bis(2-ethylhexyl) phthalate was detected at a concentration of 8.8 J µg/L in one of the two samples; no semivolatile organic compounds were detected in the second sample.

The soil sample collected from 320.25 feet below ground surface was initially analyzed at a dilution of 5 times because of high amounts of target compounds, namely the compound n-nitrosodiphenylamine, which was detected at 14,000 µg/kg. This sample was subsequently reanalyzed (out of holding time) to confirm the elevated n-nitrosodiphenylamine concentration, and the compound was not detected in the reanalysis. The laboratory indicated that this compound, which is a component used to vulcanize rubber, was inhomogenously distributed in the sample. The Sandia National Laboratories/New Mexico task leader for this site also noted that fragments of the plastic sand catchers that were used to collect the soil samples were found in this and other samples from the borehole and were the likely source for the elevated n-nitrosodiphenylamine in the samples.

Attachment A

ATTACHMENT A

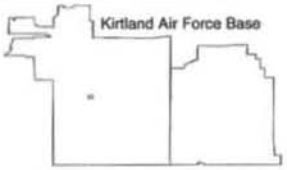
ER SITE 275
SUPPLEMENTAL FIGURE 3.5-1
PHASE I AND II SURVEY POINT LOCATIONS



Legend

- NERU # — Phase I passive soil gas sample point
- NERU # — Phase II passive soil gas sample point
- Roadway (all types)
- TA-V septic system
- TA-V boundary
- Building
- SWMU

0 100 200
Scale in Feet
0 20 40
Scale in Meters



Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Figure 3.5-1
Phase I & II Passive Soil Vapor Survey Sample Point Locations, 1994

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone, 1927 North American Horizontal Datum, 1929 North American Vertical Datum

MAPID = 980116

Unclassified

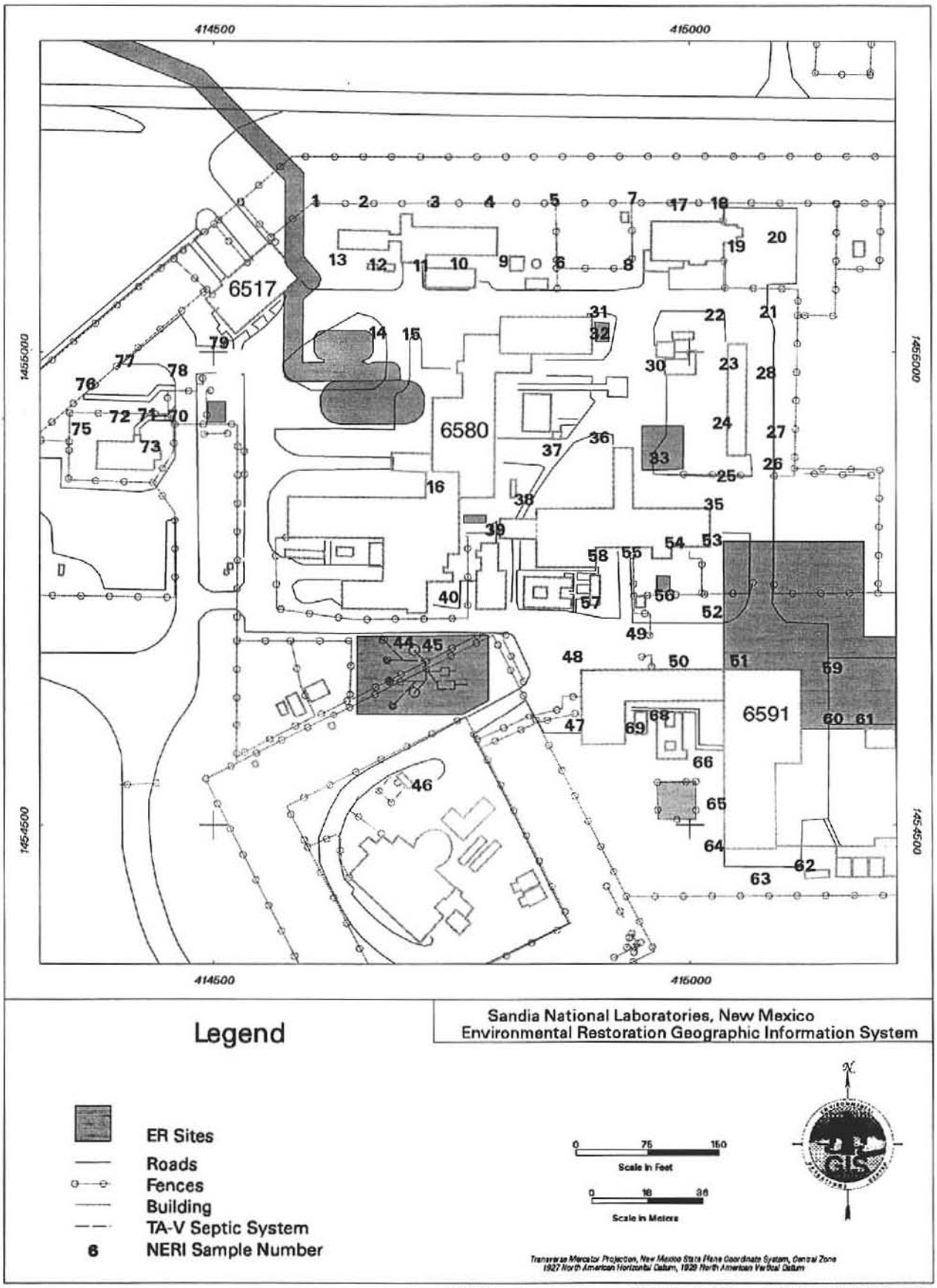
SNL GIS ORG. 6804

DHelfrich dh980116.aml 12/23/98

Attachment B

ATTACHMENT B

ER SITE 275
REVISED PETREX PHASE II SAMPLE LOCATION MAP



SWMU 275: Phase II Passive Soil Gas Survey Results
Sample Location Map