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Mr. John Kieling, Manager
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Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Road
Building E
Santa Fe, NM 87505

Dear Mr. Kieling:

Enclosed is one of two NMED copies of the Department of Energy (DOE) and Sandia National Laboratories/ New Mexico (SNL/NM) report, Summary of Monitoring Well Activities, TA-V Groundwater Investigation. This report was prepared to document the drilling of four new groundwater monitoring wells for the purpose of further investigation of the trichloroethylene (TCE) contamination in groundwater at Technical Area V. The new monitoring wells were placed at both the suspected source of the TCE , and immediately downgradient of the suspected source. Soil and soil gas samples were collected during well drilling to characterize the vadose zone in these locations. The enclosed report summarizes the drilling and installation of the wells, and the sampling results.

If you have any questions, please contact John Gould at 845-6089.

Sincerely,

Michael J. Zamorski
Area Manager

Enclosure

SNL 1219

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Sandia National Laboratories/New Mexico

SUMMARY OF MONITORING WELL DRILLING ACTIVITIES TA-V GROUNDWATER INVESTIGATION

October 2001

Environmental
Restoration
Project

United States Department of Energy
Albuquerque Operations Office

TABLE OF CONTENTS

LIST OF FIGURES iii
LIST OF TABLES iv
LIST OF APPENDICES vi
LIST OF ANNEXES vii
ACRONYMS AND ABBREVIATIONS viii

1.0 INTRODUCTION 1-1
1.1 Site Description and History 1-1
1.2 Objective 1-1
2.0 WELLSITE GEOLOGY 2-1
2.1 Surface and Subsurface Geology 2-1
2.2 Structural Geology 2-1
3.0 DRILLING AND WELL CONSTRUCTION 3-1
3.1 Well TAV-MW9 3-1
3.1.1 Drilling Operations 3-1
3.1.2 Geophysical and Lithologic Logging 3-1
3.1.3 Well Construction 3-2
3.1.4 Well Development 3-2
3.2 Well TAV-MW7 3-3
3.2.1 Drilling Operations 3-3
3.2.2 Geophysical and Lithologic Logging 3-3
3.2.3 Well Construction 3-3
3.2.4 Well Development 3-4
3.3 Well TAV-MW8 3-5
3.3.1 Drilling Operations 3-5
3.3.2 TAV-MW8 Lithologic Logging 3-5
3.3.3 TAV-MW8 Sample Collection 3-5
3.3.4 TAV-MW8 Well Construction 3-5
3.3.5 Well Development 3-6
3.4 Well TAV-MW6 3-7
3.4.1 TAV-MW6 Drilling Operations 3-7
3.4.2 Lithologic Logging 3-7
3.4.3 Sample Collection 3-7
3.4.4 Well Construction 3-7
3.4.5 Well Development 3-8
4.0 SAMPLE COLLECTION AND LABORATORY ANALYTICAL RESULTS 4-1
4.1 Soil Sample Collection and Analytical Methods 4-1
4.2 Soil-Vapor Sample Collection and Analytical Methods 4-1
4.3 Analytical Results 4-1
4.3.1 TAV-MW6 Borehole Samples 4-2
4.3.2 TAV-MW8 Borehole Samples 4-4
5.0 DISCUSSION AND INTERPRETATION OF SOIL AND SOIL-VAPOR SAMPLE ANALYTICAL RESULTS 5-1
5.1 Results from TAV-MW6 Borehole 5-1
5.2 Results from TAV-MW8 Borehole 5-2
5.3 Soil Moisture in the Vadose-Zone 5-2

TABLE OF CONTENTS (Concluded)

6.0 AQUIFER PARAMETERS 6-1
7.0 CONCLUSIONS AND RECOMMENDATIONS 7-1
8.0 REFERENCES 8-1

LIST OF FIGURES

Figure	
1	Location Map of Sandia National Laboratories and Technical Areas III and V
2	TA-V Monitoring Wells Location Map
3	LWDS Drainfield and Holding Tanks
4	Approximate TCE Distribution in TA-V Groundwater, February, 2000
5	Tijeras—Sandia Fault Zone
6	Soil Moisture versus Depth
7	Hvorslev Analysis of TAV-MW6 Slug Test
8	Hvorslev Analysis of TAV-MW7 Slug Test
9	Hvorslev Analysis of TAV-MW8 Slug Test
10	Hvorslev Analysis of TAV-MW9 Slug Test

LIST OF TABLES

Table

1 Soil and Soil-vapor Sample Summary and Analytical Suites for Samples Collected from the TAV-MW6 and TAV-MW8 Boreholes, TA-V, April 2001 ..... T-1

2 Summary of Soil Sampling Metals Analytical Results, TAV-MW6 Borehole, April 2001 ..... T-4

3 Summary of Metals Analytical Method Detection Limits Used for TAV-MW6 Borehole, April 2001(Off-Site Laboratory) T-5

4 Summary of Soil Sampling VOC Analytical Results, TAV-MW6 Borehole, April 2001 (Off-Site Laboratory) T-6

5 Summary of VOC Soil Sample Analytical Method Detection Limits Used for TAV-MW6 Borehole, April 2001 (Off-Site Laboratory) T-8

6 Summary of Soil-Vapor Sampling VOC Analytical Results, TAV-MW6 Borehole, April 2001 (On-Site Laboratory) T-9

7 Summary of Soil-Vapor Sample VOC Analytical Method Detection Limits Used for TAV-MW6 Borehole, April 2001 (On-Site Laboratory) T-10

8 Summary of Soil Sampling Tritium Analytical Results, TAV-MW6 Borehole, April 2001 (Off-Site Laboratory) T-11

9 Summary of Soil Moisture Results, TAV-MW6 Borehole, April 2001 (Off- and On-Site Laboratories) T-12

10 Summary of Soil Sampling Long-Lived Radionuclide Analytical Results, TAV-MW6 Borehole, April 2001 (On-Site Laboratory) T-13

11 Summary of Soil Sampling Metals Analytical Results, TAV-MW8 Borehole, April 2001 (Off-Site Laboratory) T-14

12 Summary of Metals Analytical Method Detection Limits Used for TAV-MW8 Borehole, April 2001 (Off-Site Laboratory) T-15

13 Summary of Soil Sampling VOC Analytical Results, TAV-MW8 Borehole, April 2001 (Off-Site Laboratory) T-16

14 Summary of VOC Soil Sample Analytical Method Detection Limits Used for TAV-MW8 Borehole, April 2001 (Off-Site Laboratory) T-17

15 Summary of Soil-Vapor VOC Analytical Results, TAV-MW8 Borehole, April 2001 (On-Site Laboratory) T-18

LIST OF TABLES (Concluded)

Table

16 Summary of Soil-Vapor Sample VOC Analytical Method Detection Limits Used for TAV-MW8 Borehole, April 2001 (On-Site Laboratory) T-19

17 Summary of Soil Sampling Tritium Analytical Results, TAV-MW8 Borehole, April 2001 (Off-Site Laboratory) T-20

18 Summary of Soil Moisture Results, TAV-MW8 Borehole, April 2001 (Off- and On-Site Laboratories) T-21

19 Summary of Soil Sampling Long-Lived Radionuclide Analytical Results, TAV-MW8 Borehole, April 2001 (On-Site Laboratory) T-22

20 Summary of Hydraulic Conductivity Values for TA-V Monitoring Wells Installed in 2001 ..... T-23

LIST OF APPENDICES

Appendix

A Lithologic and Geophysical Logs with Well Construction Diagrams

LIST OF ANNEXES

Annex	
A	Analysis Request/Chain-of-Custody Forms
B	Data Validation Reports
C	Gamma Spectroscopy Results

ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
ARCH	air rotary casing hammer
ARG	ancestral Rio Grande
bgs	below ground surface
cm	centimeter(s)
Co-60	cobalt-60
Cs-137	cesium-137
°C	degrees Celsius
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ERCL	ER Chemistry Laboratory
g	gram(s)
GEL	General Engineering Laboratories, Inc.
ID	inside diameter
kg	kilogram(s)
L	liter(s)
LWDS	Liquid Waste Disposal System
MDA	minimum detectable activity
MDL	method detection limit
µg	microgram(s)
µmhos	micromhos
mg	milligram(s)
NMED	New Mexico Environment Department
NTU	Nephelometric Turbidity Unit
OD	outside diameter
pCi	picocurie(s)
%	percent
ppmv	parts per million by volume
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
QED	QED Environmental System, Inc.
Ra-226	radium-226
RCRA	Resource Conservation and Recovery Act
RPSD	Radiation Protection Sample Diagnostics
SPR	single point resistance
SGS	Southwest Geophysical Services, Inc.
SNL/NM	Sandia National Laboratories/New Mexico
SWMU	Solid Waste Management Unit
TA	Technical Area
TAL	Target Analyte List
TCE	trichloroethylene
TD	total depth
Th-232	thorium-232
U-235	uranium-235
U-238	uranium-238
VOC	volatile organic compound
WDC	Water Development Corporation, Inc.

1.0 INTRODUCTION

This report describes and documents the drilling, sampling, and monitoring well construction activities for four groundwater monitoring wells installed by the Sandia National Laboratories/ New Mexico (SNL/NM) Environmental Restoration (ER) Project. The wells were installed March through April of 2001 and are located in Technical Area (TA)-V (Figure 1). Analytical results of soil and soil-vapor samples that were collected in two of the well boreholes during drilling are also presented and evaluated. Finally, the results of slug tests conducted in the four wells in July 2001 are presented and discussed.

1.1 Site Description and History

Since 1993, the ER Project has been investigating the source of low levels of trichloroethylene (TCE) in groundwater beneath TA-V. The highest concentrations of TCE (up to 24 micrograms (μg) per liter (L) detected in February of 2000) have been detected in the Liquid Waste Disposal System (LWDS) monitoring well LWDS-MW1, shown on Figure 2. The "Summary Report of Groundwater Investigations at Technical Area V, Operable Units 1306 and 1307" (SNL/NM March 1999), herein referred to as the "March 1999 report," recommended some additional studies to further investigate the TCE contamination. These recommendations were approved by the New Mexico Environment Department (NMED) Hazardous Waste Bureau in August 1999 (NMED August 1999). The March 1999 report stated that the most likely source of TCE contamination was the LWDS drainfield (Tank #3), which is Solid Waste Management Unit (SWMU) 5 (Figure 3). Figure 4 shows the TCE "plume" that was beneath TA-V as of February 2000. In order to determine if residual contaminants were present in the vadose-zone beneath the LWDS drainfield, the March 1999 report recommended the installation of a water-table groundwater monitoring well and a second deeper well (approximately 100 feet below the water table) at this location. The report also recommended extensive characterization of the vadose-zone beneath the drainfield by collecting both soil and soil-vapor samples during the drilling of the well boreholes and analyzing those samples for a number of parameters, especially volatile organic compounds (VOCs), including TCE. This sampling would determine if residual wastewater and contamination were present in the vadose-zone beneath the system.

The report also recommended that a second pair of shallow and deep monitoring wells be installed at a location in the parking lot west of TA-V. These two wells would help determine the horizontal and vertical extent of groundwater contamination downgradient of both TA-V and the well with the highest TCE contamination, LWDS-MW1.

1.2 Objective

The objective of this project was to collect soil and soil-vapor samples for vadose-zone characterization and to install four groundwater monitoring wells as recommended in the March 1999 report. The locations of the new monitoring wells (designated TAV-MW6, TAV-MW7, TAV-MW8, and TAV-MW9) are shown on Figure 2. The TAV-MW6 and TAV-MW7 well pair was installed next to the LWDS drainfield and the second pair of wells, TAV-MW8 and TAV-MW9, was installed approximately 700 feet west of the LWDS drainfield.

2.0 WELLSITE GEOLOGY

2.1 Surface and Subsurface Geology

The surficial geology in the TA-V area consists of a veneer of aeolian above a thin layer of post-Santa Fe Group alluvial-fan deposits. The thickness of these surficial materials is uncertain but is probably in the 50-foot range. Below the surficial sediments are the alluvial-fan sediments of the upper Santa Fe Group. These are typically unconsolidated but tend to become semi-consolidated with depth. Average grain size generally fines downward. The upper 300 feet is a mixture of gravel, sand, and silt; below about 300 feet the section is predominantly fine-grained sand; and below about 450 feet the section consists mainly of fine silt and clay.

The alluvial-fan sediments interfinger to the west with fluvial sediments of the ancestral Rio Grande (ARG) (SNL/NM March 1999). The ARG deposits generally have significantly better sorting and higher hydraulic conductivities than typical alluvial-fan deposits. The ARG "A" is the lower and most extensive of three ARG units. The ARG "A" or its time-equivalent muddy units may exist at depth below all of TA-V. This is suspected because the unit is present at the Mixed Waste Landfill, about 0.7 miles to the southwest, and because of its possible occurrences in two wells near TA-V. The westernmost well, TAV-MW5, was drilled to a total depth (TD) of 517 feet and encountered heaving sand at the bottom of the hole. This behavior is much more characteristic of ARG sands than alluvial-fan materials. The easternmost well, TAV-MW3, was drilled to a TD of 568 feet and encountered "clean" gravel below 556 feet. Well-sorted sediments are more typical of the ARG.

TAV-MW7 was drilled with mud to a TD of 645 feet, and TAV-MW9 was drilled with mud to a TD of 617 feet. Each borehole was expected to encounter ARG "A" at about 540 feet below ground surface (bgs) based on lithology in surrounding wells. The top of a zone of relatively high neutron and resistivity log responses (545 and 536 feet bgs in TAV-MW7 and TAV-MW9, respectively) appears to correlate to the top of the ARG "A". An earlier well drilled in 1995, AVN-1, located just to the northeast of TA-V, went to a TD of 650 feet and encountered the top of this same zone at 552 feet bgs. If the correlation of this zone in TAV-MW7, TAV-MW9, and AVN-1 to the interpreted ARG "A" in TAV-MW3 and TAV-MW5 is correct, the ARG has untypically "shaled out" in the center of TA-V, possibly indicating a fine-grained environment between major stream-channel segments.

2.2 Structural Geology

The western edge of the Tijeras-Sandia Fault zone is located about 4,500 feet east of TA-V (Figure 5). This zone is structurally complex and consists of faulted bedrock ramps that lie between the sediment-filled Albuquerque Basin to the west and the uplifted Manzanita Mountains to the east. The ramps are separated by generally west-dipping normal faults that trend northeast (and locally northwest) and exhibit down-to-the-west displacement (GRAM December 1995).

The TA-V area is floored by deeply buried bedrock at unknown depth. Wells terminate in the upper part of the saturated zone, which generally starts at about 500 feet bgs in the TA-V area. Structural mapping, therefore, must rely on correlative markers of limited extent within the

alluvial-fan sediments of the upper Santa Fe Group. To the west, where the ARG "A" is well-developed, structurally higher and therefore within the range of normal monitor wells, the upper Santa Fe Group dips about 2 degrees to the east. Stratigraphic work on-trend to the north in SNL/NM TAs I, II, and IV indicates that the alluvial-fan sedimentary package there is configured into a north-trending syncline. If it is assumed that structural axes at TA-V will have the same north-trend, and if the zone of high neutron and resistivity log curves mentioned above are a "shaled-out" equivalent to the ARG "A" package, then it is possible that structural mapping across the entire area would show a synclinal axis at about TAV-MW9.

3.0 DRILLING AND WELL CONSTRUCTION

All drilling, well completion, and well development operations were performed by Water Development Corporation, Inc. (WDC) and were supervised by SNL/NM ER project personnel. Geophysical logging services were performed by Southwest Geophysical Services, Inc. (SGS). The two deep well boreholes (TAV-MW7 and TAV-MW9) were drilled using the mud rotary drilling technique because it was the only method considered feasible for drilling unconsolidated saturated zone sediments. The air rotary casing hammer (ARCH) technique was used to drill boreholes for the two water table wells, TAV-MW6 and TAV-MW8. Soil and soil-vapor analytical samples were collected only from the two shallow well boreholes during drilling.

The following sections describe the drilling, geophysical and lithologic logging, well construction, and well development operations that were completed at each of the four drilling locations. The wells are described in the order in which they were constructed (TAV-MW9, TAV-MW7, TAV-MW8, and TAV-MW6), rather than by numerical order.

3.1 Well TAV-MW9

3.1.1 Drilling Operations

The WDC equipment and crew arrived at SNL/NM on March 8, 2001. The drilling equipment (a Speedstar 30K drilling rig and associated equipment) was initially decontaminated prior to the start of drilling operations at the ER Project decontamination pad in TA-III. Drilling of the borehole for well TAV-MW9, located in the parking lot north of Building 6585 and west of TA-V (Figure 2), commenced on March 9, 2001. A 9 5/8-inch tricone bit was used to drill this borehole. The first 25 feet of borehole was drilled with air and was also cased with temporary 11 5/8-inch outside diameter (OD) drive casing to stabilize the upper part of the hole. The drilling system was then switched over to mud rotary drilling, which commenced at 25 feet bgs. Mud drilling continued to 88 feet bgs, and the drill string was then pulled from the hole due to continuing caving problems. Additional drive casing was driven down to 89 feet bgs to further stabilize the upper part of the borehole. The drill bit and string was then re-inserted into the hole, and mud rotary drilling continued to the TD of 617 feet, which was achieved on March 14, 2001. The average drilling rate for this borehole was 103 feet per day.

3.1.2 Geophysical and Lithologic Logging

Following completion of borehole drilling, the mostly uncased mud-filled hole was logged with downhole wireline geophysical tools supplied by SGS to help determine the lithologic characteristics of sediments penetrated in the borehole. Geophysical logs run in the hole included natural gamma ray, thermal neutron, 3-arm caliper, single point resistance (SPR), and 16-inch and 64-inch normal resistivity. A lithologic log based on the cuttings returned from the borehole was also generated by the ER geologist for this location. The geophysical and lithologic logging information/data and a well construction diagram are provided in Appendix A. Surficial aeolian and unconsolidated Upper Santa Fe Group sediments were encountered in the entire length of the borehole. These sediments consisted of a heterogeneous mixture of silt,

sand, and gravel in the upper approximately 150 feet, but then changed to a generally fining-downward sequence of silty sand and then silt in the lower portion of the borehole.

3.1.3 Well Construction

Well installation began on March 15, 2001 and was completed on March 22, 2001. The lithologic and geophysical logging data for the borehole were reviewed, and a screen depth within the most transmissive units at approximately 100 feet below the water table (approximately 500 feet bgs at this location) was selected. The screen interval was selected mainly to span two 2- to 4-foot thick sand lenses sandwiched between fine-grained silty sands and sandy silts, as indicated by the geophysical logs.

The well was constructed of 5-inch inside diameter (ID) schedule-80 polyvinyl chloride (PVC) casing and a 20-foot length of 20-slot schedule-80 PVC screen. A sump consisting of a 5-foot length of 5-inch ID schedule-80 blank casing with a threaded end cap was placed at the bottom of the screen. TAV-MW9 was installed to a TD of 607 feet bgs, and the well screen was placed from 582 to 602 feet bgs. The sand pack, bentonite seal, and bentonite grout were emplaced in the annulus with a tremie pipe and mud pump.

A 10/20 silica sand pack was installed from 558 feet bgs to the bottom of the borehole (617 feet bgs). A 4-foot layer of 30/70 silica sand was placed from 554 to 558 feet bgs. A bentonite seal consisting of a mixture of one part ground bentonite and three parts 10/20 silica sand was then installed via the drilling mud stream from 545 to 554 feet bgs. On March 16, 2001, the annulus above the bentonite seal was filled with the first lift of bentonite grout to an estimated 395 feet bgs, based on theoretical volume calculations. On March 17, 2001, a second lift of grout was installed in the annulus to approximately 95 feet bgs. Each batch of grout consisted of approximately 60 gallons of clean water plus two 50-pound bags of bentonite powder. On March 22, 2001, the approximately 95 remaining feet of annulus was filled to the surface with 3/8-inch bentonite chips which were hydrated with clean water. Finally, the at-grade well head was completed; it consists of a 3-foot by 3-foot concrete pad and a 12-inch diameter well cover. A permanent well identifier consisting of a brass cap stamped with the well name "TAV-MW9" was installed in the concrete well pad at this time.

3.1.4 Well Development

Well development was performed to remove sediments and foreign materials that may have been introduced into the well during the drilling and well construction activities, and to allow the well to produce water samples that are representative of formation water. The TAV-MW9 well screen was placed to span the coarsest sediments encountered within the targeted screen zone depth, but the sediments were still relatively fine-grained silts and sands. The well is, therefore, a relatively low-volume water producer.

Development started on March 19, 2001, with a total of 790 gallons of water removed from the well with a pump and bailer on that day. Development continued intermittently on April 11, 13, 19, and 22, 2001, and consisted of repeated cycles of "swabbing" in the screen zone followed by bailing. Swabbing was performed in the screen zone to eliminate potential voids, and to settle the gravel-pack material. Because the well is a low-volume producer, it was bailed almost to dryness and then allowed to recover during each round of development.

A total of 1,370 gallons, or 11.3 well-bore volumes of water were removed from the well during the various development events. The final field parameter measurements were as follows: pH = 7.61, electrical conductance = 0.714 micromhos (µmhos)/centimeter (cm), temperature = 19.0 degrees Celsius (°C), and turbidity = 150 Nephelometric Turbidity Units (NTUs). Although a turbidity value of less than five NTUs is one of the recommended criteria of well development (SNL/NM November 1994), it is expected that allowing each well several weeks to months to sit undisturbed prior to the first sampling event will greatly reduce the turbidity values. A post-development depth to water was measured on July 10, 2001, and was determined to be 488.31 feet below the top of the well casing, or 4,925.52 feet above mean sea level (amsl). Following development, a dedicated Micropurge™ bladder pump manufactured by QED Environmental System, Inc. (QED) was installed in the well at a depth of 595 feet bgs.

3.2 Well TAV-MW7

3.2.1 Drilling Operations

Following installation of TAV-MW9, the drilling equipment was decontaminated and mobilized to the TAV-MW7 drilling location inside the TA-V secure area (Figure 2). Drilling of the TAV-MW7 borehole commenced on March 24, 2001. The first 87 feet of borehole was drilled with air and temporary drive casing was installed to stabilize the upper part of the hole. The drilling system was then switched to mud rotary. Additional drive casing was installed to 99 feet bgs because of continued unstable borehole conditions. Mud rotary drilling continued to the borehole TD of 644 feet bgs, achieved on March 30, 2001. The average drilling rate for this borehole was 129 feet for each day that drilling took place.

3.2.2 Geophysical and Lithologic Logging

Following completion of borehole drilling, the mostly uncased mud-filled hole was logged with downhole wireline geophysical tools supplied by SGS. Geophysical logs run in this hole included natural gamma ray, thermal neutron, 3-arm caliper, and single point resistance. The 16-inch and 64-inch normal resistivity logs were not run due to a miscommunication between SGS personnel. A lithologic log based on the cuttings returned from the borehole was also generated for this borehole by the ER geologist. The geophysical and lithologic logging information/data and a well construction diagram are provided in Appendix A. Unconsolidated Upper Santa Fe Group sediments were encountered in the entire length of the borehole. These sediments appeared to be generally similar to those encountered in the TAV-MW9 borehole, and consisted of a heterogeneous mixture of silt, sand, and gravel in the upper approximately 125 feet, and then gradually changed to a generally fining-downward sequence of silty sand and then silt in the lower portion of the borehole.

3.2.3 Well Construction

Well installation began on March 31, 2001 and was completed on April 6, 2001. The lithologic and geophysical logging data for the borehole were reviewed, and a screen depth within the most transmissive units at approximately 100 feet below the water table (also approximately

500 feet bgs at this location) was selected. The screen interval was selected mainly to span a series of four 1- to 3-foot thick sand lenses sandwiched between fine-grained silty sands and sandy silts, as indicated by the geophysical logs.

The well was constructed of 5-inch ID schedule-80 PVC casing and a 20-foot length of 20-slot schedule-80 PVC screen. A sump consisting of a 5-foot length of 5-inch ID schedule-80 blank casing with a threaded end cap was placed at the bottom of the screen. TAV-MW9 was installed to a TD of 622 feet bgs, and the well screen was placed from 597 to 617 feet bgs. The sand pack, bentonite seal, and bentonite grout were emplaced in the annulus with a tremie pipe and mud pump.

A 10/20 silica sand pack was installed from 589 feet bgs to the bottom of the borehole (644 feet bgs). A 2.5-foot thick layer of 30/70 silica sand was emplaced from 586.5 to 589 feet bgs. A bentonite seal consisting of a mixture of one part 3/8-inch bentonite chips and one part 10/20 silica sand was then installed via the drilling mud stream from 569 to 586.5 feet bgs. On March 31, 2001 the annulus above the bentonite seal was filled with the first lift of bentonite grout to an estimated 370 feet bgs based on theoretical volume calculations. On April 5, 2001 a second lift of grout was installed in the annulus to approximately 70 feet bgs. Drilling mud thinned with clean water was used for the bentonite grout, which greatly reduced the amount of drilling fluid waste. Each batch of grout consisted of approximately 100 gallons of thinned drilling mud plus three 50-pound bags of bentonite powder. On April 6, 2001, the annulus was topped off to the surface with a third lift of grout. Finally, the at-grade well head was completed; it consisted of a 3-foot by 3-foot concrete pad and a 12-inch diameter well cover. A permanent well identifier consisting of a brass cap stamped with the well name "TAV-MW7" was installed in the concrete well pad at this time.

3.2.4 Well Development

Although the TAV-MW7 well screen was placed to span the coarsest sediments encountered in the targeted screen zone depth, these sediments were still relatively fine-grained silts and sands. Therefore, the well is a relatively low-volume water producer. Development occurred from April 20, 2001 to April 21, 2001, and consisted of bailing and two rounds of swabbing in the screen zone. Because the well is a low-volume producer, it was bailed almost dry and then allowed to recover before the next stage of development occurred.

A total of 1,080 gallons, or 8.8 well-bore volumes of water were removed from the well during development. The final field parameter measurements were as follows: pH = 7.56, electrical conductivity = 0.744 µmhos/cm, temperature = 19.8°C, and turbidity = 264 NTUs. A post-development depth to water was measured on July 10, 2001, and was determined to be 501.78 feet below the top of the well casing, or 4,926.22 feet amsl. Following development, a dedicated QED Micropurge™ bladder pump was installed at a depth of 610 feet bgs in the well.

3.3 Well TAV-MW8

3.3.1 Drilling Operations

WDC replaced the Speedstar drilling rig with a Dresser T70 rig for the two ARCH wells. This replacement equipment was decontaminated and mobilized to the TAV-MW8 location in the parking lot north of Building 6585 and about 40 feet southeast of the deeper companion well TAV-MW9 (Figure 2). Drilling commenced on April 8, 2001 and was completed to the TD of 525 feet bgs on April 9, 2001. The entire borehole was drilled by the ARCH method and was sleeved with temporary 11 5/8-inch OD drive casing to stabilize the hole. The average drilling rate for this borehole was 262.5 feet per day.

3.3.2 TAV-MW8 Lithologic Logging

No geophysical logging was completed in the TAV-MW8 borehole, given that the TAV-MW9 borehole (which had been logged) was only about 40 feet away. A lithologic log based on cuttings returned from the TAV-MW8 borehole was generated by the ER geologist. Lithologic logging information and a well construction diagram are provided in Appendix A. No significant differences were noted in the unconsolidated sediments encountered in this borehole, versus those penetrated in TAV-MW9 borehole.

3.3.3 TAV-MW8 Sample Collection

Both soil and soil-vapor samples were collected during the drilling of the TAV-MW8 borehole. Sampling in the vadose-zone at this location was planned to be used for comparison with samples collected from the TAV-MW6 location beneath the LWDS drainfield. No contamination was expected to be found in the vadose-zone at the TAV-MW8 location.

The original plan was to collect soil and soil-vapor samples in 40-foot intervals from 40 to 480 feet bgs using a through-the-bit sampling system. The drill pipe and bit were tripped out of the hole and the first set of soil and soil-vapor samples were collected at 40 feet bgs. However, it was then determined that equipment brought to the site by WDC would not allow for through-the-bit sample collection. Therefore, the only remaining option was to trip out the drill pipe and bit prior to each sampling event, which was a considerably greater level of effort than originally envisioned. The ER project manager therefore elected to change the sampling interval from every 40 feet to 100-foot intervals in this borehole, given that the likelihood of encountering contamination at this drilling location was considered very low, and to reduce the sampling time to a more reasonable schedule.

Soil and soil-vapor samples were therefore collected at 100-, 200-, 300-, 400-, and 480-foot depth intervals. The sample collection methods, analyses, and results are discussed in Section 4.0.

3.3.4 TAV-MW8 Well Construction

Well installation began on April 10, 2001 and was completed on April 11, 2001. After the TAV-MW8 borehole was drilled to a TD of 525 feet bgs, it was left undisturbed overnight to allow

groundwater to rise to the static water level. A screen depth was selected based on the measured depth to water, lithologic data generated for this borehole, and geophysical data from the adjacent TAV-MW9 borehole. The screen was positioned to span a sand unit that the geophysical logs for TAV-MW9 indicated was present from 498 to 504 feet bgs, and which was sandwiched between fine-grained silty sands and sandy silts.

The well was constructed of 5-inch ID schedule-80 PVC casing and a 20-foot length of 20-slot schedule-80 PVC screen. A sump consisting of a 5-foot length of 5-inch ID schedule-80 blank casing with a threaded end cap was placed at the bottom of the screen. Well TAV-MW8 was installed to a TD of 516 feet bgs, and the well screen was placed from 491 to 511 feet bgs. The sand pack, bentonite seal, and bentonite grout were gravity-fed into the annulus; a tremie pipe was not used for installation of well construction materials in this sleeved vadose-zone borehole. The temporary drive casing was retracted from the borehole in stages as well construction progressed.

A 10/20 silica sand pack was installed from 482 feet bgs to the bottom of the borehole (525 feet bgs). A swabbing tool was then used to settle and eliminate voids that may have developed in the filter pack during installation. A 5-foot thick layer of 30/70 silica sand was emplaced from 477 to 482 feet bgs. A bentonite seal consisting of 3/8-inch bentonite chips was then installed from 471 to 477 feet bgs and was chased with clean water and allowed to hydrate for an hour. The annulus above the bentonite seal was filled with the first lift of bentonite grout to an estimated 380 feet bgs based on theoretical volume calculations. On the following day, April 11, 2001, a second and final lift of grout was installed in the annulus to the surface. Each batch of grout consisted of approximately 100 gallons of clean water plus three 50-pound bags of bentonite powder. Finally, the at-grade well head was completed; it consisted of a 3-foot by 3-foot concrete pad and a 12-inch diameter well cover. A permanent well identifier consisting of a brass cap stamped with the well name "TAV-MW8" was installed in the concrete well pad at this time.

3.3.5 Well Development

Although the TAV-MW8 well screen was placed to span the coarsest sediments encountered in the targeted screen zone depth at the water table, the sediments were still relatively fine-grained silts and sands. Therefore, this well is also a relatively low-volume water producer. Development occurred from April 20, 2001 through April 22, 2001, and consisted of bailing and three rounds of swabbing. Because the well is a low-volume producer, it was bailed almost dry and then allowed to recover before the next stage of development was completed.

A total of 315 gallons, or 14 well-bore volumes of water were bailed from the well during development. The final field parameter measurements were as follows: pH = 7.70, electrical conductivity = 0.611 µmhos/cm, and temperature = 19.1°C. Turbidity was always greater than the maximum (800 NTUs) that could be measured with the turbidity meter. A post-development depth to water was measured on July 10, 2001, and was determined to be 485.15 feet below the top of the well casing, or 4,929.40 feet amsl. Following development, a dedicated QED Micropurge™ bladder pump was installed at a depth of 505 feet bgs in the well.

3.4 Well TAV-MW6

3.4.1 TAV-MW6 Drilling Operations

The drilling equipment was decontaminated and mobilized to the TAV-MW6 location inside the TA-V secure area. The TAV-MW6 borehole was located about 25 feet southeast of the deeper companion well TAV-MW7 (Figure 2). Drilling commenced on April 17, 2001, and was completed to the TD of 534 feet bgs on April 21, 2001. The entire borehole was drilled with the ARCH method and was sleeved with temporary 11 5/8-inch OD drive casing to stabilize the hole. The average drilling rate for this borehole was 107 feet per day.

3.4.2 Lithologic Logging

No geophysical logging was completed in the TAV-MW6 borehole, given that the deeper TAV-MW7 borehole (which had been logged) was only about 25 feet away. A lithologic log based on the cuttings returned from the borehole was generated by the ER geologist. Lithologic logging information and a well construction diagram are provided in Appendix A. No significant differences were noted in the unconsolidated sediments encountered in this borehole, versus those penetrated in the TAV-MW7 borehole.

3.4.3 Sample Collection

Both soil and soil-vapor samples were collected during drilling of the TAV-MW6 borehole to determine if residual contamination or wastewater from the LWDS drainfield continued to be present in the vadose-zone beneath the drainfield. It was planned to collect soil and soil-vapor samples in 20-foot intervals from 20 feet bgs to as close as possible to the TD (534 feet bgs) of the borehole. Additional WDC equipment had been shipped to the drill site to allow for through-the-bit sampling. This method was used successfully to collect soil and soil-vapor samples at the 20-, 80-, and 100-foot depths in this borehole. No soil samples were collected at 40 and 60 feet bgs due to rocky soil conditions causing sampler refusal. Soil sample volume recovery decreased steadily as the sampling depth increased, and an increasing number of sampling runs were required to collect an adequate soil volume from each interval. Also, in some intervals, soil sample volume recovery after numerous sampling runs was still not sufficient for a full suite of analyses. It was finally concluded after collecting samples from the 100-foot interval that the through-the-bit sampling method was not working, and that the only remaining option was to trip out the drill pipe and bit at each sampling depth. This method was used to collect soil and soil-vapor samples from the remainder of the borehole. Analytical results are discussed in Section 4.0.

3.4.4 Well Construction

Well installation began on April 22, 2001 and was completed on April 23, 2001. After the TAV-MW6 borehole was drilled to a TD of 534 feet bgs, it was left undisturbed overnight to allow groundwater to rise to the static water level. A screen depth was selected based on the measured depth to water, lithologic data generated for this borehole, and geophysical data from the adjacent TAV-MW7 borehole. The screen interval was selected mainly to span a series of

three 2- to 4-foot thick sand lenses sandwiched between fine-grained silty sands and sandy silts, as indicated by the geophysical logs for TAV-MW7.

The well was constructed of 5-inch ID schedule-80 PVC casing and a 20-foot length of 20-slot schedule-80 PVC screen. A sump consisting of a 5-foot length of 5-inch ID schedule-80 blank casing with a threaded end cap was placed at the bottom of the screen. Well TAV-MW6 was installed to a TD of 532 feet bgs, and the well screen was placed at 507 to 527 feet bgs. The sand pack, bentonite seal, and bentonite grout were gravity-fed into the annulus; a tremie pipe was not used for installation of well construction materials in this sleeved vadose-zone borehole. The temporary drive casing was retracted from the borehole in stages as well construction progressed.

A 10/20 silica sand pack was installed from 502 feet bgs to the bottom of the borehole (534 feet bgs). The swabbing tool was then used to settle and to eliminate voids that may have developed in the filter pack during installation. A 4-foot thick layer of 30/70 silica sand was emplaced from 498 to 502 feet bgs. A bentonite seal consisting of 3/8-inch bentonite chips was then installed from 492 to 498 feet bgs and was chased with clean water and allowed to hydrate for about 30 minutes. The final task for the day was to fill the annulus above the bentonite seal with the first lift of bentonite grout to an estimated 402 feet bgs based on theoretical volume calculations. On the following day, April 23, 2001, the second lift of grout was installed in the annulus to the surface. Each batch of grout consisted of approximately 100 gallons of clean water plus three 50-pound bags of bentonite powder. Finally, the at-grade well head was completed; it consisted of a 3-foot by 3-foot concrete pad and a 12-inch diameter well cover. A permanent well identifier consisting of a brass cap stamped with the well name "TAV-MW6" was installed in the concrete well pad at this time.

3.4.5 Well Development

Although the TAV-MW6 well screen was placed to span the coarsest sediments encountered in the targeted screen zone at the water table, the sediments were still relatively fine-grained silts and sands. This well is, therefore, also a relatively low-volume water producer. Development started on May 7, 2001 and was finished the following day, and consisted of bailing and four rounds of swabbing in the screen zone. Because the well is a low-volume producer, it was bailed almost dry and then allowed to recover before the next stage of development was completed.

A total of 500 gallons, or 14 well-bore volumes of water were bailed from the well during development. The final field parameter measurements were as follows: pH = 7.65, electrical conductivity = 0.686 µmhos/cm, and temperature = 21.8°C. Turbidity was always greater than the maximum turbidity (800 NTUs) that could be measured with the turbidity meter, with one exception. Turbidity reached 791 NTUs after 265 gallons were removed from the well but returned to greater than 800 NTUs after that. A post-development depth to water measured on July 10, 2001 was determined to be 499.72 feet below the top of the well casing, or 4,929.20 feet amsl. Following development, a dedicated QED Micropurge™ bladder pump was installed at a depth of 520 feet bgs in the well.

4.0 SAMPLE COLLECTION AND LABORATORY ANALYTICAL RESULTS

Soil and soil-vapor samples were collected during the drilling of the water-table monitoring wells. This section describes the types of samples collected, the sampling methods, the analytical parameters, and the results of the analyses. Table 1 summarizes the sample identification and other related attributes for each sample, including the analytical methods. The analysis request/chain-of-custody forms are provided in Annex A.

4.1 Soil Sample Collection and Analytical Methods

Soil samples were collected from the TAV-MW6 and TAV-MW8 boreholes during the drilling activities. As described in Sections 3.3 and 3.4, the sample intervals differed in each borehole due to soil conditions or equipment availability. Soil samples were collected from the borehole for TAV-MW8 on April 8, 2001 and April 9, 2001 and from the borehole for TAV-MW6 on April 17, 2001 through April 21, 2001. All soil samples were collected using a 3-inch nominal diameter by 24-inch long stainless steel split-spoon sampler.

Soil samples were analyzed at the off-site laboratory (General Engineering Laboratories, Inc. [GEL]) for VOCs by U.S. Environmental Protection Agency (EPA) Method 8260, Target Analyte List (TAL) metals by EPA Method 6010B/7471A, tritium by EPA Method 906.0, and soil moisture by cryogenic distillation (GEL internal laboratory method GL-RAD-A-002). Soil moisture analyses were also conducted at the SNL/NM ER Chemistry Laboratory (ERCL) by laboratory operating procedure 97-11, Determining the Dry Weight of Solid Samples. The two methods of soil moisture analyses were conducted for comparative purposes. Soil samples were analyzed for gamma-emitting radionuclides by EPA Method 901.1 at SNL/NM Radiation Protection Sample Diagnostics (RPSD) Laboratory.

4.2 Soil-Vapor Sample Collection and Analytical Methods

Soil-vapor samples were also collected from the TAV-MW6 and TAV-MW8 boreholes during the drilling activities. This was accomplished by attaching a Simulprobe™ sampling device to the drill rod, lowering it to the sample depth, and then driving it into undisturbed soil beneath the drill bit, and opening the tool to expose the sampling tip. Adequate time (60 seconds) was allowed for purging of the tubing and soil vapor was then pumped into a Tedlar™ sample collection bag. Soil-vapor samples were collected prior to the soil sample at each sample depth to ensure undisturbed soil-vapor conditions. Soil-vapor samples were analyzed for VOCs by EPA Method 8260 at ERCL.

4.3 Analytical Results

Tables 2 through 19 show the analytical results and method detection limits (MDLs) for the soil and soil-vapor samples collected during the borehole drilling. The analytical tables present analytes detected at concentrations or activities exceeding NMED-approved background values (for inorganics and radionuclides) or organics above MDLs. All off-site laboratory data were validated and data validation qualifiers, where appropriate, were applied to the values. The data

validation reports are provided in Annex B. The sample results are compared to the NMED-approved background levels for chemical constituents in soil for TA-III/V, where applicable (Dinwiddie September 1997).

4.3.1 TAV-MW6 Borehole Samples

The following sections discuss the laboratory analytical results for samples collected from the TAV-MW6 borehole. This borehole is located next to the LWDS drainfield (Figure 3).

4.3.1.1 Metals

Table 2 lists the Resource Conservation and Recovery Act (RCRA) metals and beryllium detects in the TAV-MW6 samples. There were detectable levels of arsenic, barium, beryllium, cadmium, total chromium, lead, mercury, and selenium. There were no detectable levels of silver. Samples that exceeded their respective background levels are discussed below. There were no detections over the respective background levels for barium, lead, and mercury.

Six samples (collected from 20, 160, 200, 200 duplicate, 220, and 340 feet bgs) had levels of arsenic that ranged from 4.42 to 5.39 milligrams (mg) per kilogram (kg) and exceeded the background level of 4.4 mg/kg. Six samples (collected from 160, 200, 200 duplicate, 320, 340, and 500 feet bgs) had levels of beryllium that ranged from 0.653 to 0.735 mg/kg and exceeded the background level of 0.65 mg/kg. One sample (collected at 80 feet bgs) with 0.901 mg/kg cadmium exceeded the background level of 0.9 mg/kg. Six samples (collected from 100, 160, 200, 200 duplicate, 240, and 380 feet bgs) had levels of total chromium that ranged from 17.1 J to 24.3 mg/kg and exceeded the background level of 15.9 mg/kg. Three samples (collected from 80, 120, and 180 feet bgs) had levels of selenium that ranged from 1.03 to 1.27 mg/kg and exceeded the selenium background level of less than 1 mg/kg. Some of these values were given a "J" qualifier in the data validation process indicating an estimated value.

There were also detections of aluminum, calcium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, thallium, vanadium, and zinc. These non-RCRA metals are components of common rock-forming minerals and are not presented as metals of concern in this report. The MDLs for all metal analytes are given in Table 3.

4.3.1.2 Volatile Organic Compounds

There were detectable levels of five VOCs (Table 4) in the soil samples collected from the TAV-MW6 borehole. There are no established background levels for VOCs for comparison. Three samples (collected at 100, 140, and 160 feet bgs) contained detectable levels of 2-butanone ranging from 10.2 to 10.7 µg/kg. One sample collected at 160 feet bgs contained 2.18 J µg/kg 4-methyl-, 2-pentanone. Two samples (collected at 480 and 500 feet bgs) contained detectable levels of acetone of 10.7 J and 11.6 J µg/kg, respectively. Seven samples (collected at 20, 80, 100, 120, 140, 160, and 180 feet bgs) contained detectable levels of methylene chloride, ranging from 0.497 J to 3.55 J µg/kg. One sample collected at 100 feet bgs contained a detectable level of toluene at 0.7 J µg/kg. The quality assurance (QA)/quality control (QC) sample results showed 1,2-dichloropropane in one trip blank, and acetone in one equipment blank. Two trip blanks and one equipment blank had nondetect results for

bromomethane and chloromethane that were estimated (given an "J" qualifier). The nondetect results for vinyl acetate were rejected (given an "R" qualifier) during data validation. This was due to a problem with the percent difference of the continuing calibration verification for the trip blanks and the soil samples. Chloroethane and TCE were not detected in any of the soil samples, but the nondetect results for these compounds were estimated (given an "J" qualifier) for some of the samples. See the data validation report provided in Annex B for more details on qualified data results. The VOC MDLs for soil samples are given on Table 5.

The soil-vapor samples collected during the drilling of the TAV-MW6 borehole were analyzed for VOCs and the results are summarized on Table 6. There were numerous detectable levels of bromomethane and chloromethane, ranging from 0.2 J to 0.96 parts per million by volume (ppmv) and 0.4 J to 0.89 J ppmv, respectively. Three samples (collected at 220, 240, and 260 feet bgs) contained detectable levels of methylene chloride ranging from 0.32 J to 0.93 ppmv. Numerous samples contained TCE and toluene ranging from 0.048 J to 0.2 ppmv and 0.16 J to 0.29 J ppmv, respectively. The MDLs for the soil-vapor analyses are given in Table 7.

4.3.1.3 Tritium

Tritium values for soil samples collected in the TAV-MW6 borehole ranged from 114 to 573 picocuries (pCi) per liter (L). The results are given on Table 8. Four out of 21 samples did not reveal any detectable activities of tritium. Only one sample (collected at 260 feet bgs) with a tritium activity of 573 pCi/L exceeded the background activity of 420 pCi/L (Tharp February 1999). This background activity was established for site-wide surface soils and is presented here for comparison as no background activity has been established for subsurface soils. The result for the equipment blank, TAV-BH-MW6-380-EB, was rejected (given an "R" qualification) in the data validation process because the result exceeded the acceptable range (see the data validation report provided in Annex B for more details). The minimum detectable activities (MDAs) for tritium are also included on Table 8.

4.3.1.4 Soil Moisture

The soil moisture results from both laboratories are given in Table 9. The soil moisture in the samples collected from the TAV-MW6 borehole and analyzed at GEL ranged from 1.42 to 15.67 percent (%) by weight. The ERCL soil moisture samples ranged from 1.55 to 16.51 % by weight.

4.3.1.5 Gamma-Emitting Radionuclides

The results of analyses for gamma-emitting radionuclides by gamma spectroscopy for soil samples collected from the TAV-MW6 borehole are summarized in Table 10. The six long-lived radionuclides of concern are cesium-137 (Cs-137), cobalt-60 (Co-60), radium-226 (Ra-226), thorium-232 (Th-232), uranium-235 (U-235), and uranium-238 (U-238). Other radionuclides are not presented in Table 10 because they are short-lived radon progeny. The gamma spectroscopy reports are provided in Annex C.

There were no detectable activities of Cs-137 or Co-60 in any of the samples. All samples revealed detectable activities of Ra-226 and Th-232. However, only one sample (collected at

140 feet bgs) exceeded the Th-232 background activity of 1.01 pCi per gram (g) and four samples (from 20, 120, 220, and 420 feet bgs) that ranged from 1.77 to 2.29 pCi/g exceeded the Ra-226 background activity of 1.76 pCi/g. Numerous samples had detectable activities of U-235. Four samples (collected from 80, 180, 280, and 380 feet bgs) had U-235 values ranging from 0.173 to 0.202 pCi/g exceeded the background activity of 0.16 pCi/g. Eleven other samples (collected from 20, 140, 160, 220, 320, 340, 380, 400, 420, 460, and 500 feet bgs) were designated as not having any detectable activity of U-235 by the RPSD laboratory, but the MDA for these samples exceeded the background activity. The results for these samples are therefore considered detections at the respective MDA for each sample. Three samples (collected from 20, 220, and 280 feet bgs) had detectable activities of U-238 ranging from 0.415 to 0.883 pCi/g, but none were above the background activity of 1.4 pCi/g. The MDAs and errors for the reported radionuclides are also given in Table 10.

4.3.2 TAV-MW8 Borehole Samples

The following sections discuss the laboratory analytical results for samples collected from the TAV-MW8 borehole. This borehole is located west of TA-V (Figure 2).

4.3.2.1 Metals

Various metals were detected in the soil samples collected from the TAV-MW8 borehole. Table 11 lists the RCRA metals and beryllium that were detected in the samples. There were detectable levels of arsenic, barium, beryllium, cadmium, total chromium, lead, mercury, and selenium. There were no detectable levels of silver. All RCRA metals and beryllium concentrations were below the background levels. The metal MDLs are listed in Table 12.

There were also detections of aluminum, calcium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, thallium, vanadium, and zinc. These non-RCRA metals are components of common rock-forming minerals and are not presented as metals of concern in this report.

4.3.2.2 Volatile Organic Compounds

There were no detectable levels of any VOCs in the soil samples collected from the borehole for TAV-MW8. The QA/QC samples (Table 13) revealed 1,2-dichloropropane concentrations in the trip blanks (TAV-BH-MW8-40-TB and TAV-BH-MW8-400-TB) of 7.04 and 4.63 µg/kg, respectively. Trip blank TAV-BH-MW8-40-TB also revealed an acetone level of 2.94 J µg/kg. The equipment blank (TAV-BH-MW8-400-EB) contained 2.68 J µg/kg acetone. The MDLs of all VOCs are given in Table 14.

The soil-vapor samples collected during the drilling of the borehole for TAV-MW8 were analyzed for VOCs. Analytical results are summarized on Table 15. One sample (collected at 100 feet bgs) contained 1.6 ppmv of bromomethane, 1.2 ppmv chloromethane, 0.41 J ppmv methylene chloride, and 0.29 J ppmv toluene. Three samples (collected at 400, 400 duplicate, and 480 feet bgs) contained toluene at 0.23 J, 0.27 J, and 0.17 J ppmv, respectively. The MDLs for the soil-vapor analyses are given in Table 16.

4.3.2.3 *Tritium*

Table 17 lists results for the tritium analyses for the TAV-MW8 borehole. Only one sample (collected at 100 feet bgs) revealed a detectable tritium activity of 138 pCi/L, which did not exceed the background value of 420 pCi/L. The MDAs are also given on Table 17.

4.3.2.4 *Soil Moisture*

The soil moisture in the samples collected from the TAV-MW8 borehole and analyzed at GEL ranged from 4.16 to 12.6 % by weight. The ERCL soil moisture samples ranged from 2.78 to 9.17 % by weight. The results from both laboratories are given in Table 18.

4.3.2.5 *Gamma-Emitting Radionuclides*

The results of analyses for gamma-emitting radionuclides by gamma spectroscopy for soil samples collected from the TAV-MW8 borehole (Table 19) revealed detectable activities of three of the six long-lived radionuclides of concern. All samples revealed detectable activities of Th-232, but all were below the background activity of 1.01 pCi/g. U-235 was not detected in any of the soil samples from this borehole, but the MDAs were greater than the U-235 background activity in five of the six samples. The results for these samples are therefore considered detections at the respective MDA for each sample. There were detectable activities of Ra-226 in five samples, with one sample from 300 feet bgs at 1.83 pCi/g exceeding the background activity of 1.76 pCi/g. There were no detectable levels of Cs-137, Co-60, or U-238 in any of the samples. The gamma spectroscopy reports are provided in Annex C. The MDAs and errors are also given in Table 19.

5.0 DISCUSSION AND INTERPRETATION OF SOIL AND SOIL-VAPOR SAMPLE ANALYTICAL RESULTS

The analytical results of the soil and soil-vapor samples collected during the drilling activities for the TAV-MW6 and TAV-MW8 boreholes indicated numerous low-level detections of metals, VOCs, tritium, and radionuclides.

5.1 Results from TAV-MW6 Borehole

Metals of concern that exceeded their respective background concentrations for samples collected from the TAV-MW6 borehole include arsenic, beryllium, cadmium, total chromium, and selenium. The comparison of the results from the soil samples to the background values for those respective metals reveals that most detections are only slightly above the background value. The distribution of metals detected above the background in the soil samples did not appear to be confined to any specific zone nor did it appear to be consistently distributed throughout the soil column. The generally low concentrations of metals that were detected show no evidence of significant metal contamination in the vadose-zone in the area of TAV-MW6 and beneath the LWDS drainfield.

The VOCs that were detected in the soil samples form TAV-MW6 are either associated with common laboratory contaminants (EPA February 1988) (acetone, methylene chloride, and toluene) or are at very low concentrations (1,2-dichloropropane, 2-butanone, 4-methyl-, 2-pentanone) that do not appear to be significant.

The occurrence and distribution of VOCs in the soil vapor in the TAV-MW6 borehole does appear to give some indication of TCE contamination, primarily in the lower portion of the borehole. Specifically, the soil-vapor sample from 500 feet bgs (at the static groundwater level) revealed 0.2 ppmv TCE. The presence of low levels of TCE in the soil vapor just above the surface of the groundwater suggests vapor phase contamination that could be originating from TCE in the groundwater that has equilibrated. TCE detections in soil-vapor samples could also represent residual TCE contamination in the lower part of the vadose-zone. Other VOCs (acetone, 2-butanone, and toluene) that were detected in the soil and the soil-vapor samples are common laboratory contaminants and are most likely not indicative of vadose-zone contamination. The detections of bromomethane and chloromethane in the soil-vapor samples are at very low levels and are not considered to be of significance.

A target action level for total VOCs in soil vapor that has been proposed at another SNL/NM site (the Chemical Waste Landfill) is 10 ppmv (NMED July 1996). This action level for total VOC soil-vapor concentration has also been proposed for the vadose-zone soil-vapor sampling for SNL/NM non-ER septic and drain systems sites (SNL/NM September 1999). No total VOCs exceeded a level of 10 ppmv in the TAV-MW6 borehole soil-vapor samples.

There was only one sample from the TAV-MW6 borehole (collected at 260 feet bgs) that had a tritium value (573 pCi/L) that exceeded the background value of 420 pCi/L. The lack of contiguous tritium detections throughout the borehole indicates that no tritium contamination exists in the vadose-zone beneath the LWDS drainfield.

The radionuclide U-235 was detected in the borehole for TAV-MW6 above the background activity in four samples. An additional nine samples had a nondetect U-235 result, but the MDAs for these samples exceeded the background activity and, therefore, are considered detections at the given MDA. There was only one sample with a Th-232 activity just above the background activity and only four samples exceeded the background activity of Ra-226. The samples with detectable activities of Ra-226, Th-232, and U-235 are sporadic (not contiguous along the TA-MW6 borehole) and are not limited to a specific zone. The detections are very low even with the reported errors and do not indicate vadose-zone contamination of long-lived radionuclides beneath the LWDS drainfield.

5.2 Results from TAV-MW8 Borehole

There were no RCRA metals or beryllium detected in soil samples for the TAV-MW8 borehole (located downgradient from the LWDS drainfield) that exceeded any background levels for those respective metals. Therefore, no significant metal contamination is present in the vadose-zone in the area of TAV-MW8.

There were no detections of any VOCs in the soil samples for the TAV-MW8 borehole. The VOCs that were detected in the soil-vapor samples for this borehole are either associated with common laboratory contaminants (methylene chloride and toluene) or are at very low concentrations (bromomethane and chloromethane) that do not indicate VOC contamination in the vadose-zone at this location.

There was only one sample (collected at 100 feet bgs) in the TAV-MW8 borehole that had a detectable tritium activity of 138 pCi/L. This value is well below the background activity of 420 pCi/L. No other samples from the borehole revealed detectable values of tritium.

There was only one TAV-MW8 borehole sample with a detection of a long-lived radionuclide (Ra-226) above the respective background activity. Five samples had a nondetect U-235 result, but the MDAs for these samples exceeded the background activity and therefore are considered detections at the given MDA. No radionuclide contamination appears to be present in the vadose-zone in the vicinity of this borehole.

5.3 Soil Moisture in the Vadose-Zone

The GEL and ERCL soil moisture data were compared, and the results showed no significant difference between the samples and methods utilized by the two laboratories to determine soil moisture content. The % soil moisture (by weight) versus depth for the GEL samples collected from the TAV-MW6 and TAV-MW8 boreholes are shown on Figure 6. This plot shows that there is no trend in soil moisture content in either borehole with increasing depth. The TAV-MW8 borehole was drilled at a location that has never received or been impacted by wastewater discharges to the subsurface, and is not a SWMU. It can be assumed therefore, that the quantity of soil moisture found in the TAV-MW8 samples is indicative of normal or unimpacted soil moisture content in the vadose-zone in the TA-V area. The plot also shows that the soil moisture content in samples from both boreholes are generally similar, and are within the same range. This comparison clearly shows that the TAV-MW6 soil moisture samples do not contain anomalous amounts of soil moisture compared to the unimpacted TAV-MW8 samples, and that

there is no marked increase or pulse of water from the former LWDS drainfield that is moving downward through the vadose-zone beneath the system.

6.0 AQUIFER PARAMETERS

Aquifer testing within a well provides estimates of hydraulic parameters by measuring the effects of induced stress in an aquifer around a well. Stress can be induced by either withdrawing or injecting water into the well, creating a change in the water level in the well. The induced change in water level can be made continuously over an extended period of time, referred to as a pumping test. The change in water level can also be made instantaneously with a discrete volume, referred to as a slug test. Performing slug tests eliminates the need to contain and dispose of water produced from the well during a pump test. In the case of the TA-V wells, the containment and disposal of potentially contaminated groundwater would have greatly increased the cost of performing a pump test. The new wells were installed in low-permeability materials based on the observations made during the well development. A slug test is also more appropriate for soil materials that may have a conductivity too low to conduct a pumping test (Fetter 1988). Slug tests are quicker and easier to perform than pumping tests, with the understanding that the test only stresses a small radius around the well. Additionally, slug tests are more affected by local soil/formation heterogeneity and by disturbed areas around the well caused by drilling and well installation.

In July of 2001, slug tests were conducted in monitoring wells TAV-MW6, TAV-MW7, TAV-MW8, and TAV-MW9. The hydraulic conductivity values calculated from the slug tests performed on the four new TA-V wells are summarized in Table 20. Slug tests were conducted with a solid aluminum rod "slug" lowered into the well to raise and lower the water level in the well. Water-level changes induced in the wells were measured using the Solinst™ electronic pressure transducers (Model RL 002051) with an M70 probe and data logger software (ReelPC™).

The "slug out" (removal of slug from the water column) portion of the test for each well was recorded and analyzed. This portion of the test (the slug out) provides the most reliable water-level readings given the type of well construction and the unconfined aquifer conditions encountered at these well locations.

The slug test analysis method used for estimating aquifer properties from the slug test data was developed by M.J. Hvorslev (1951). This test method can be used for confined or unconfined aquifer conditions. The data were analyzed by this method using AquaTest™ Software developed by Waterloo Hydrogeologic, Inc.

The Hvorslev analysis graphs are provided as Figures 7 through 10. Hydraulic conductivity values range from 1.05E-04 feet/minute in TAV-MW9 to 7.91E-04 feet/minute in TAV-MW6 (Table 20). These values are consistent with hydraulic conductivity values of nearby TA-V wells.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The source of TCE in groundwater in the TA-V area is assumed to be from contaminated waste water released from the LWDS drainfield during the 1960s. The wells TAV-MW6, TAV-MW7, TAV-MW8, and TAV-MW9 were installed in March and April 2001 in order to further investigate vadose-zone and groundwater contamination in the TA-V area. TAV-MW6 and TAV-MW7 were located within the suspected source area, the LWDS drainfield. TAV-MW8 and TAV-MW9 were located downgradient of the suspected source area. The deep wells, TAV-MW7 and TAV-MW9, were installed to determine the vertical extent of groundwater contamination.

Based on the evaluation of the results of the soil and soil-vapor samples collected during the drilling activities, the relatively low levels of all potential contaminants (metals, VOCs, tritium, and radionuclides) indicate that no significant residual soil contamination exists in the vadose-zone. The suspected contamination source (waste water from the LWDS drainfield) was not readily identified in the vadose-zone by soil moisture analyses. The results do show that there is not significant residual contaminated water beneath the LWDS drainfield in the vadose-zone. Assuming the LWDS drainfield is the principal source of TCE in groundwater at TA-V, it appears that there is no longer a continuing source of TCE from residual waste in the vadose-zone. It is probable that all waste water from the LWDS has moved through the vadose-zone and there is no longer an active source of contamination adding to the levels currently seen.

The low levels of TCE in the soil-vapor samples above groundwater suggest that the groundwater in TAV-MW6 is contaminated with TCE; this will be evaluated once the well has been sampled. These four wells will be included in the quarterly groundwater sampling program currently in progress for all other TA-V wells. The wells will be sampled for all potential contaminants of concern as well as other parameters regularly included in the TA-V groundwater sampling program. These wells are tentatively scheduled to be sampled starting in November 2001. For the most recent data from the TA-V wells (at the writing of this report), see the "TA-V Groundwater Investigation Fiscal Years 1999 and 2000" (SNL/NM September 2001).

SNL/NM plans to evaluate the vertical extent of contamination in each of the four new TA-V wells. This can be accomplished by using the pump that is in place in each of the wells and moving the pump to different positions within the 20-foot screen section of the well. Each position will be sampled for analysis of VOCs in order to examine the vertical extent of TCE contamination beneath TA-V.

8.0 REFERENCES

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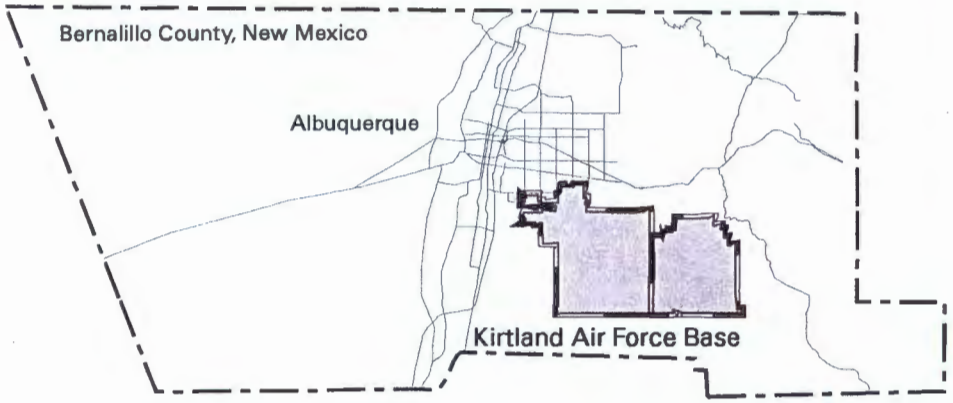
FIGURES

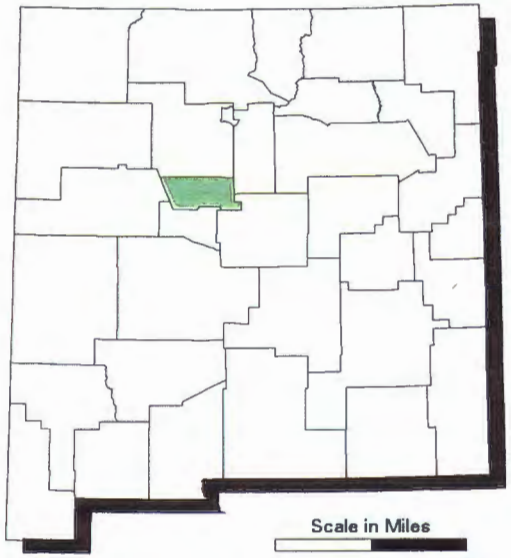


Scale in Miles
0 6 12

Figure 1

Location Map of Sandia National Laboratories/New Mexico & Technical Areas II & V

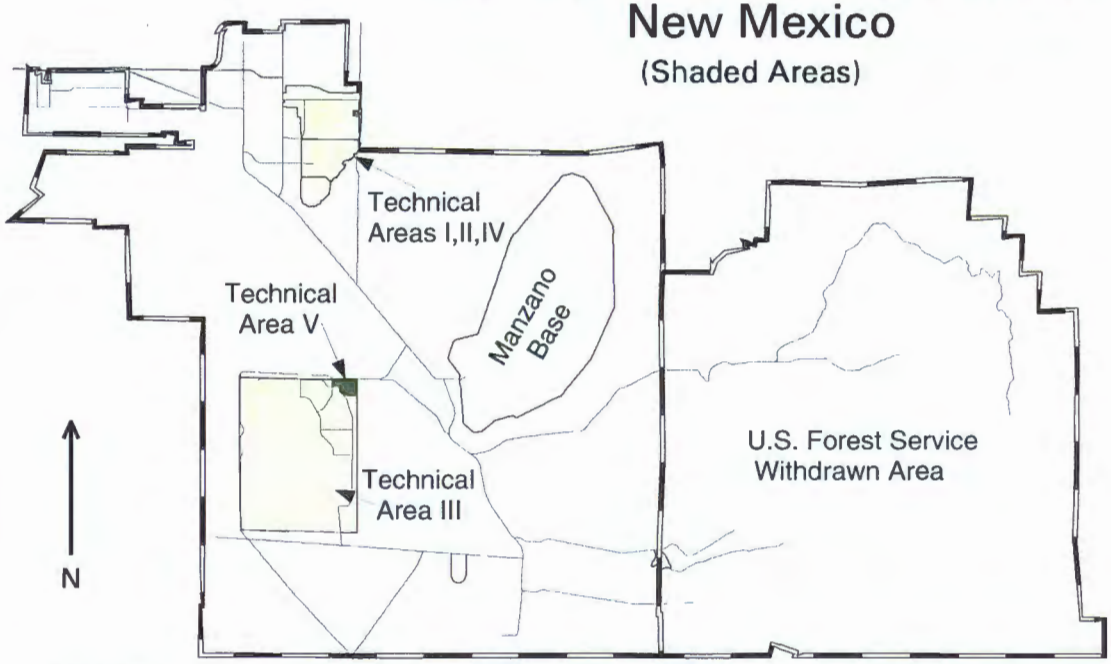
Bernalillo County, New Mexico



Scale in Miles
0 70 140

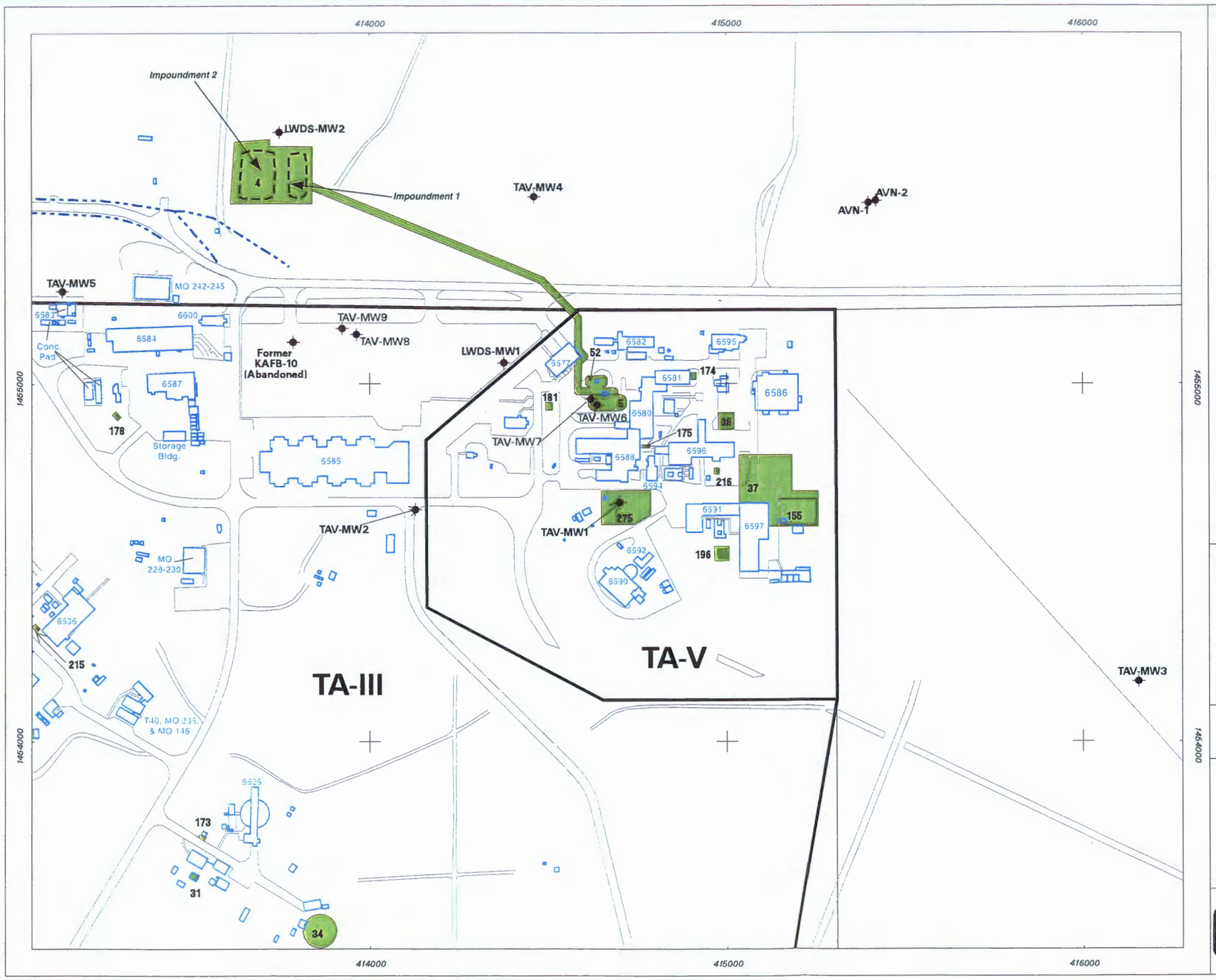
Sandia National Laboratories/ New Mexico

(Shaded Areas)



Scale in Miles
0 2.5 5

Source: SNL EGIS Database



Legend

LWDS-MW2 — Monitoring well

Surface drainage

Road

Impoundment boundary

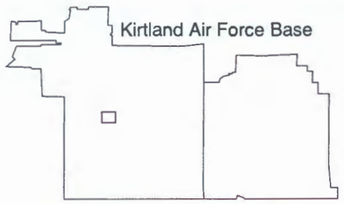
Solid waste management unit (SWMU)

SNL/NM technical area boundary

6585 — Building

0 300 600
Scale in Feet

0 72 144
Scale in Meters



Sandia National Laboratories, New Mexico
Environmental Geographic Information System

Figure 2

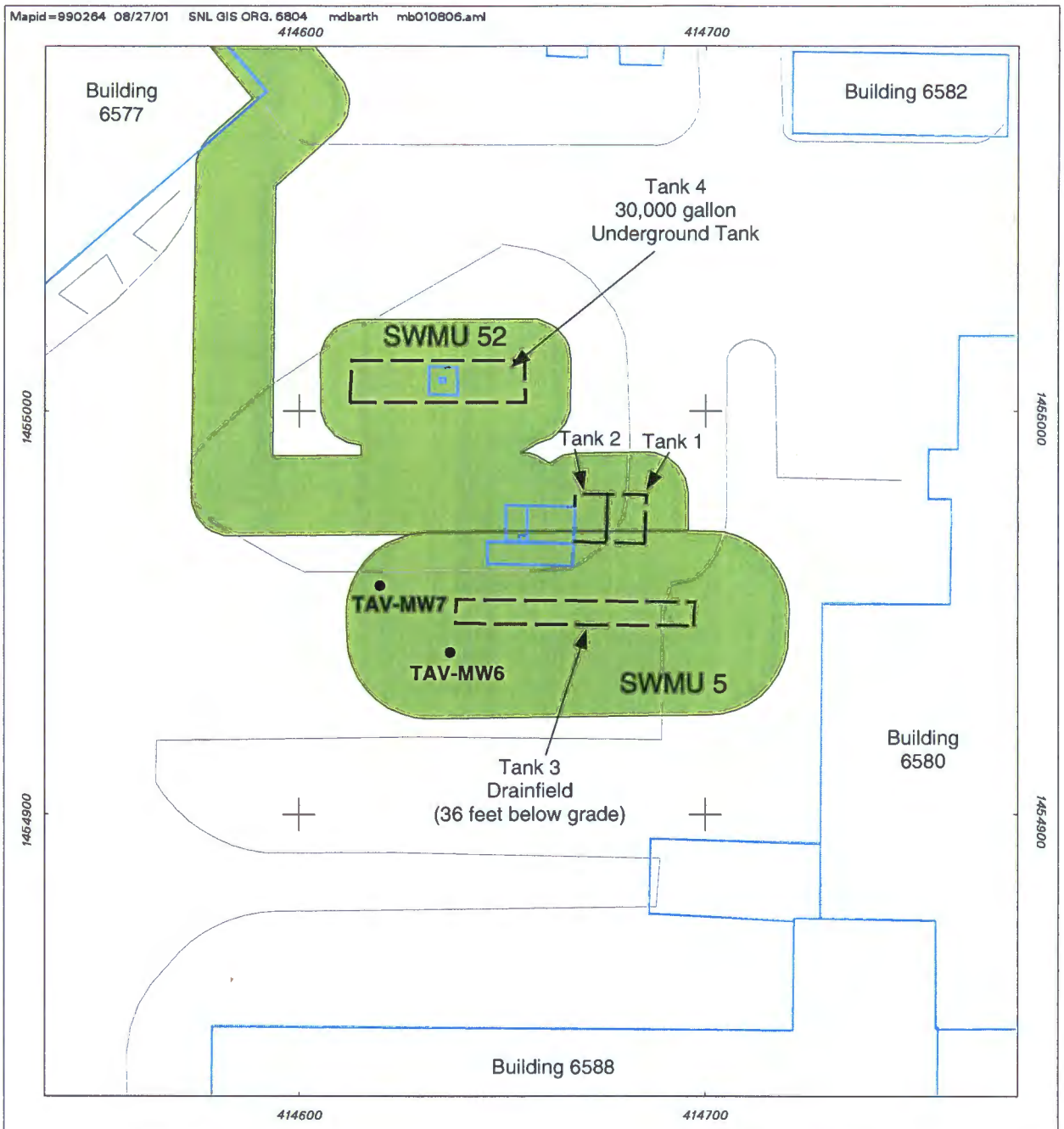
TA-V Monitoring Wells Location Map

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone, 1927 North American Horizontal Datum, 1929 North American Vertical Datum

MAPID=010528

Unclassified | SNL GIS ORG. 6135

DHelfrich | dh010528.aml | 05/25/01



Legend

- Road
- Building/Structure
- Monitoring Well
- Underground Tank / Drainfield
- Solid Waste Management Unit (SWMU)

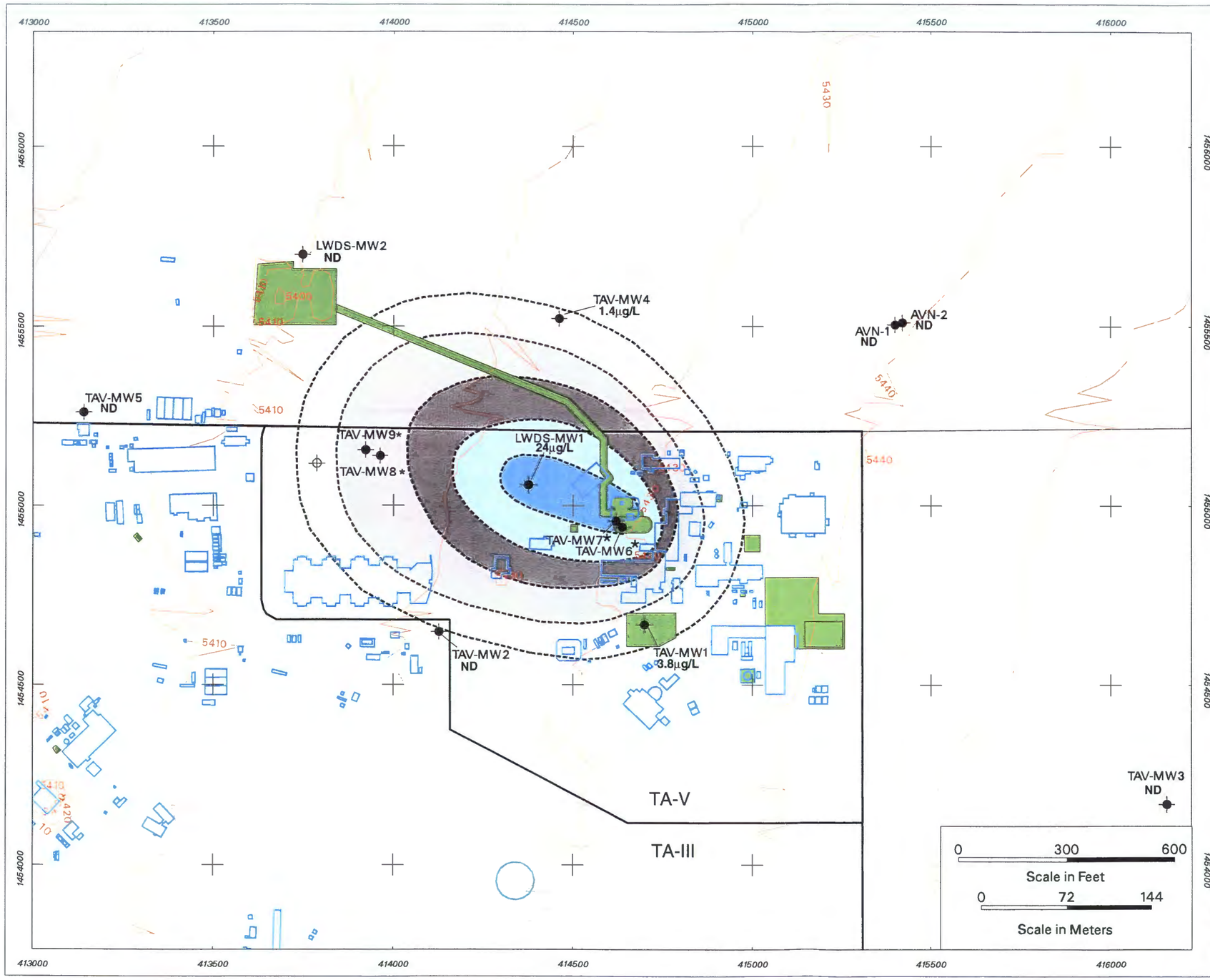
Figure 3

LWDS Drainfield & Holding Tanks TA-V

0 20 40 Scale in Feet

0 4.8 9.6 Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

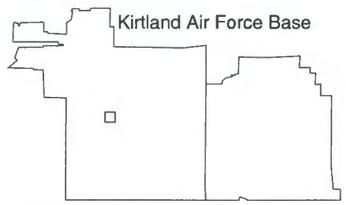


Legend

- Monitoring Well and TCE Concentration (µg/L)
  ND = Not Detected
  * = Installed 2001, not sampled
- Former KAFB Water Supply Well (Abandoned)
- Technical Area
- 10-Ft Surface Contour
- Building
- Solid Waste Management Unit

TCE Concentration

- ND-5 µg/L Contour Interval
- 5-10 µg/L Contour Interval
- 10-15 µg/L Contour Interval
- 15-20 µg/L Contour Interval
- > 20 µg/L Contour Interval



Sandia National Laboratories, New Mexico
Environmental Operations Geographic Information System

Figure 4
Approximate TCE Distribution in TA-V Groundwater, Feb., 2000

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone, 1927 North American Horizontal Datum, 1929 North American Vertical Datum

MAPID= 020011.id

Unclassified

SNL GIS ORG. 6135

mb020011.id dh010960.aml 10/02/01

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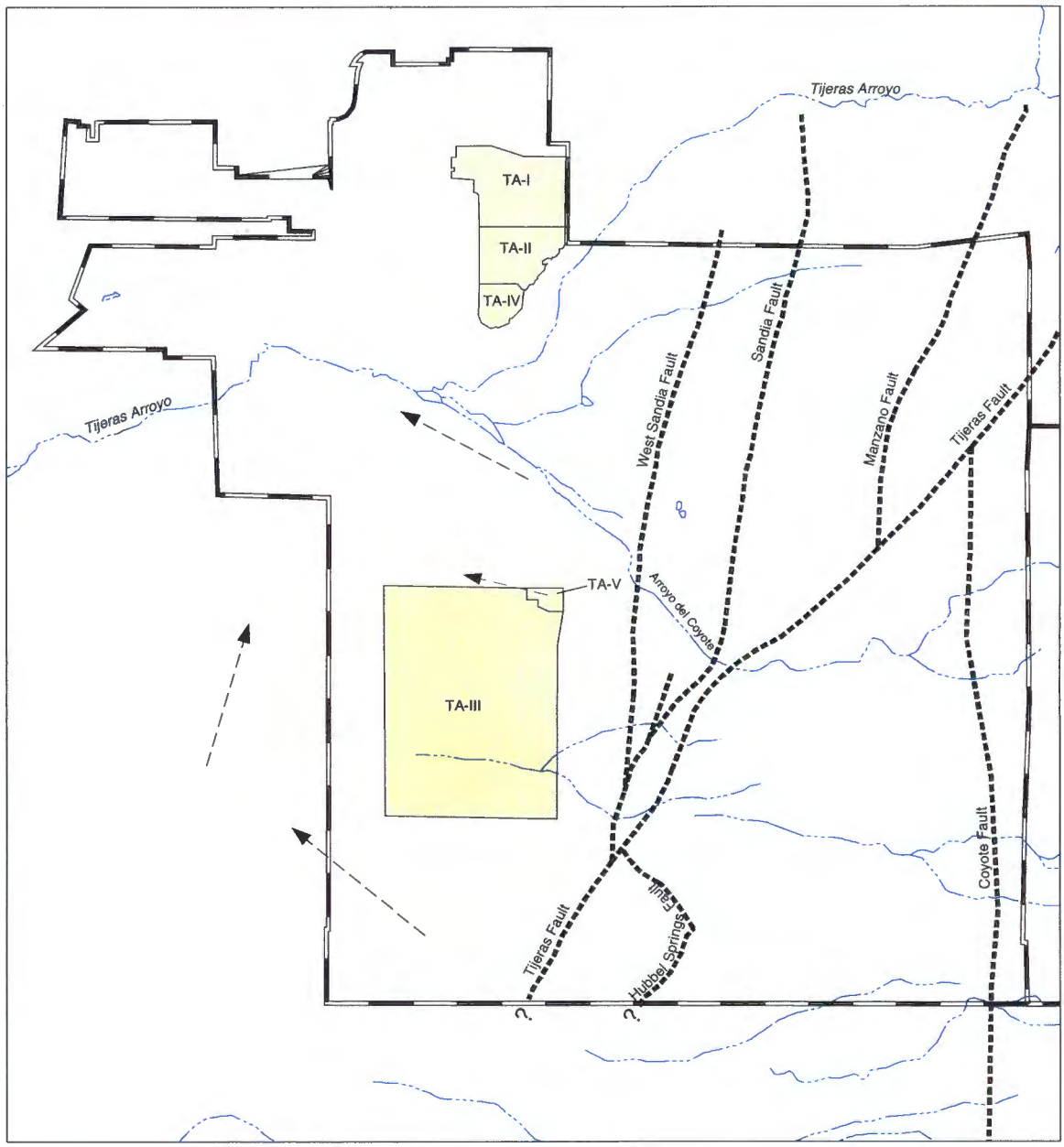


Legend

- KAFB Boundary
- Drainage
- Fault
- SNL/NM Technical Area
- General direction of groundwater flow

Figure 5
Tijeras-Sandia Fault Zone

0 4000 8000
Scale in Feet

0 960 1920
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

301462.24.90.02.00/A74

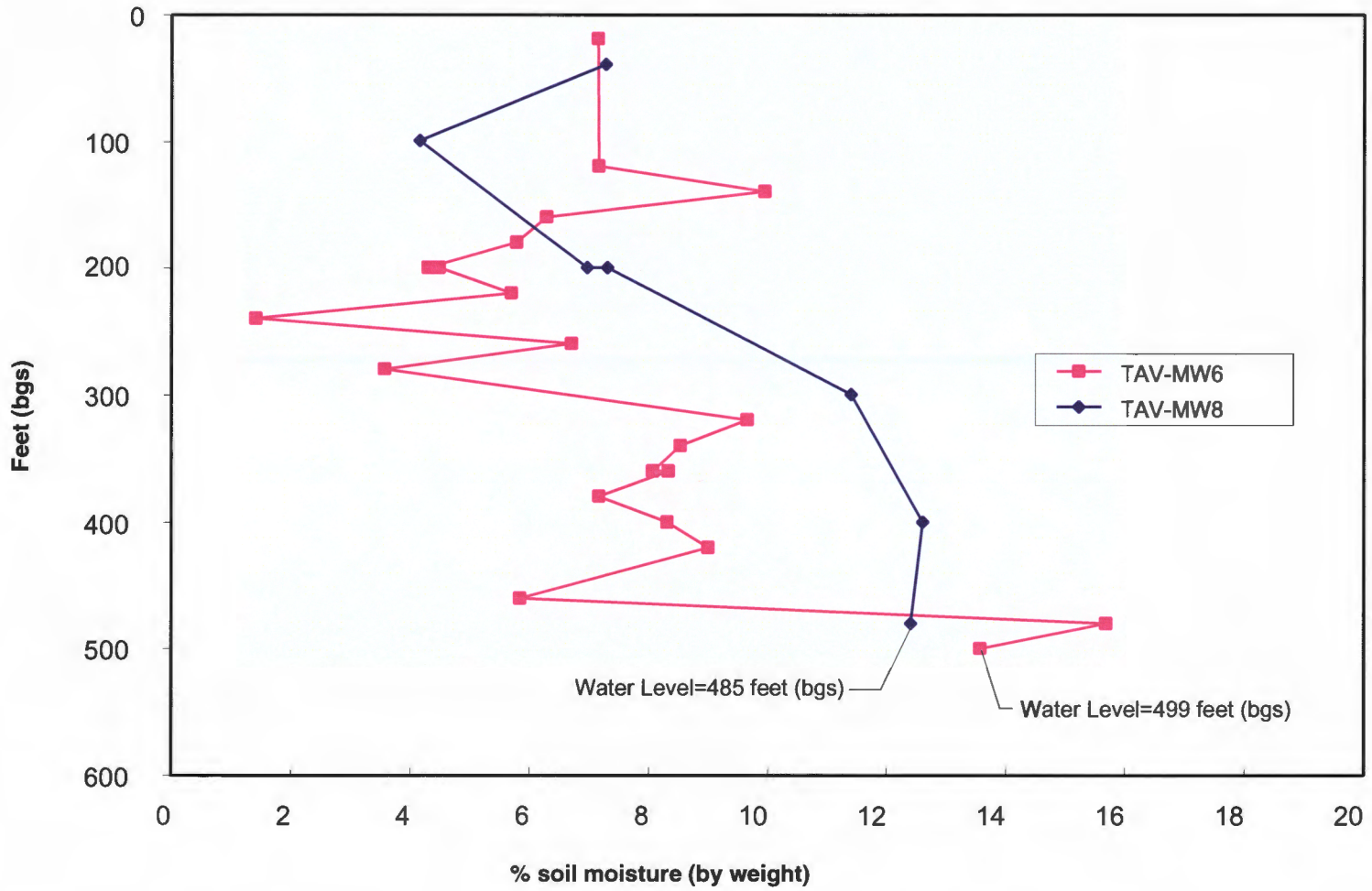
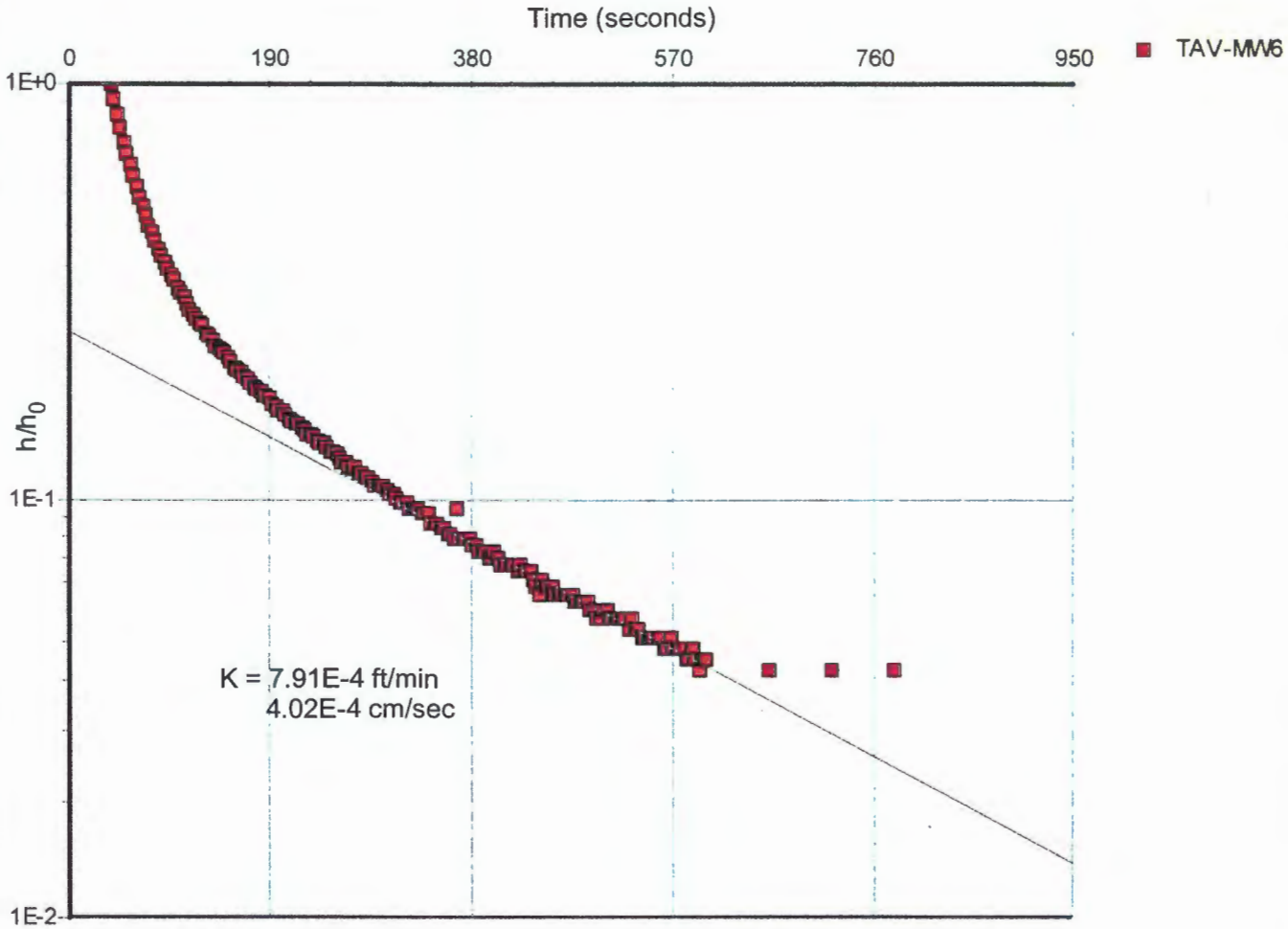


Figure 6
Soil Moisture versus Depth (off-site laboratory data)

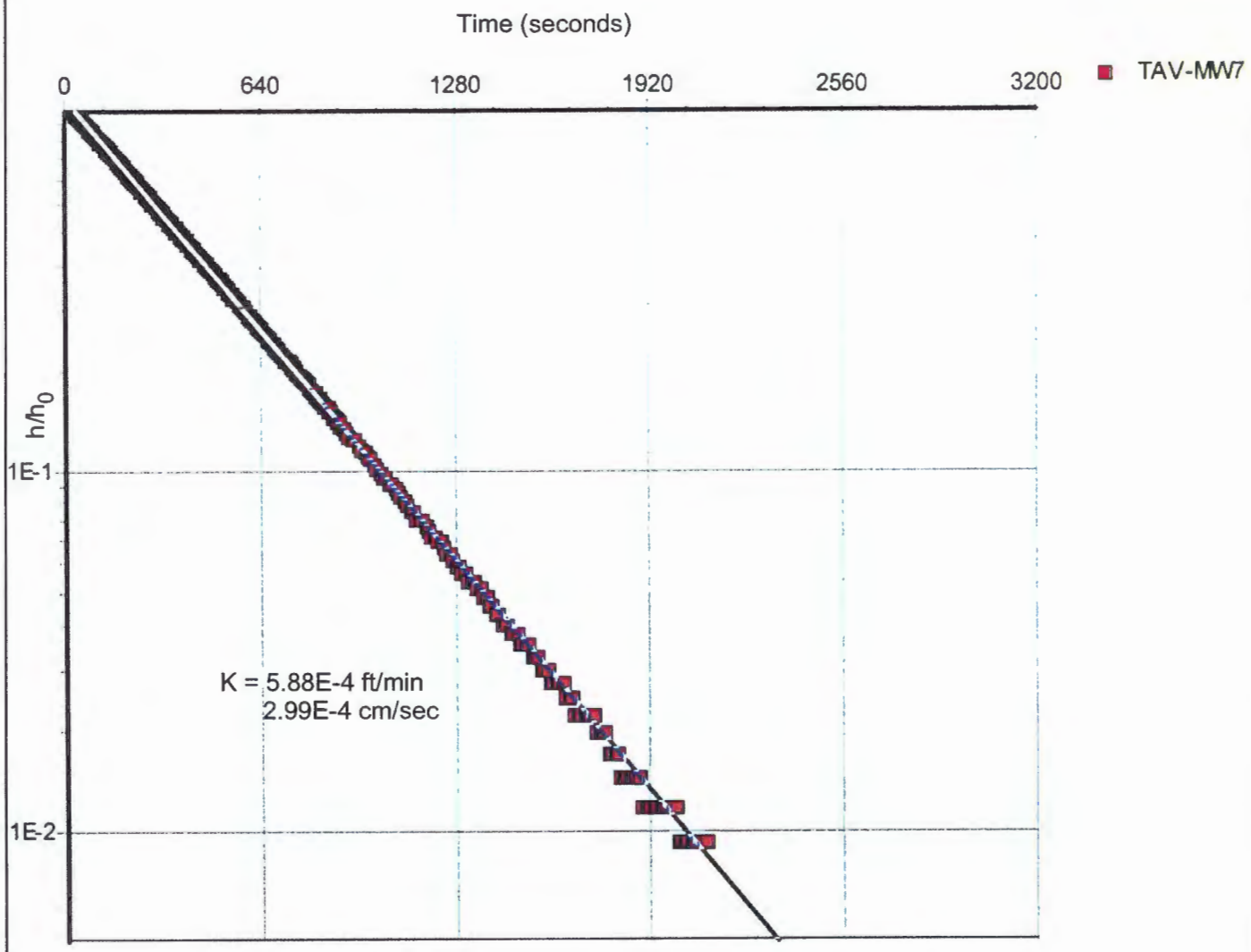
/gis/plots02/HvorslevTAV



cm/sec = Centimeters per second
ft/min = Feet per minute
h/h_0 = Hydraulic head/initial hydraulic head
K = Hydraulic conductivity
MW = Monitoring well
TA = Technical Area

Figure 7
Hvorslev Analysis of
TAV-MW-6 Slug Test

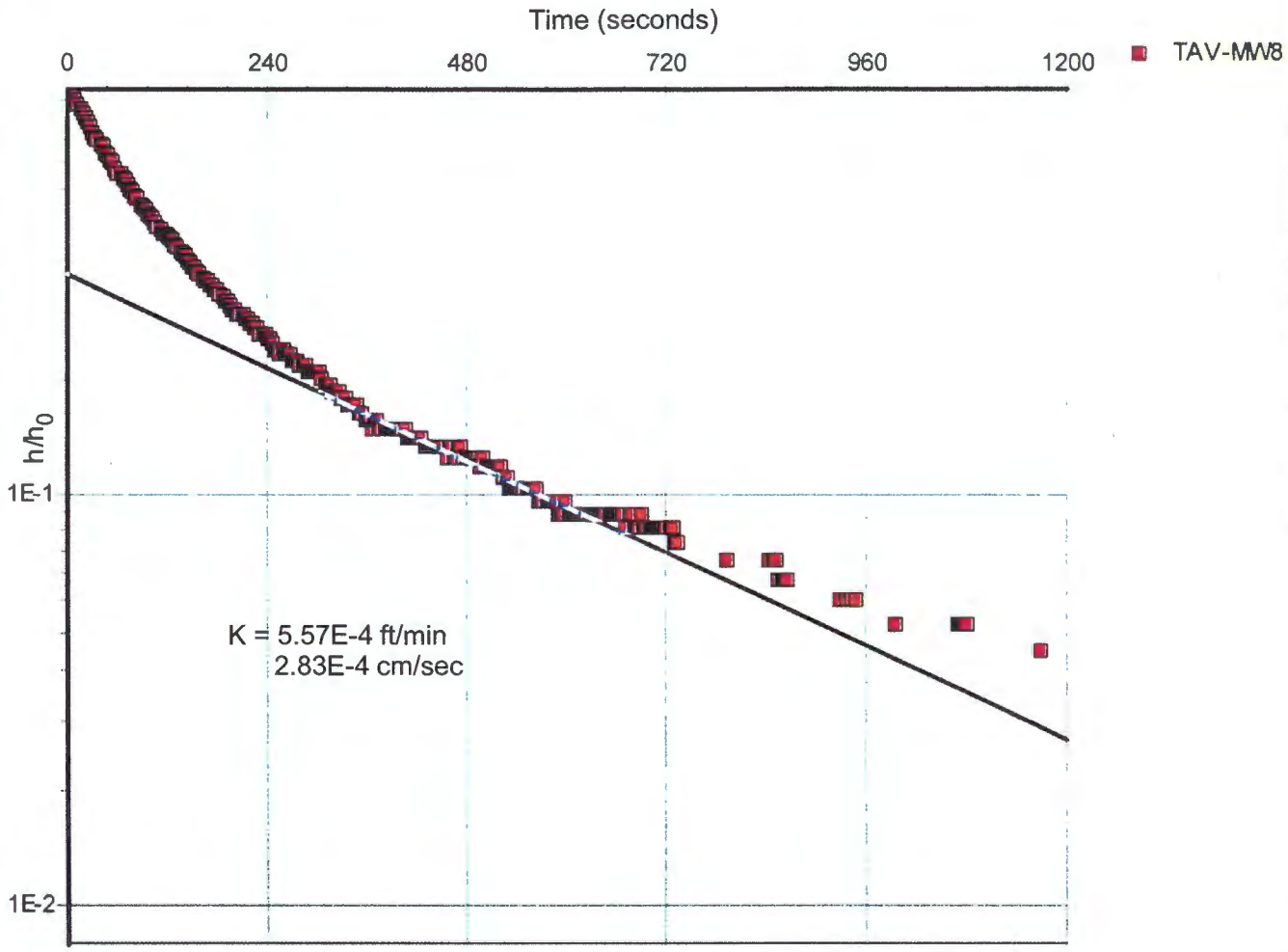
/gis/plots02/HvorslevTAV



cm/sec = Centimeters per second
ft/min = Feet per minute
h/h_0 = Hydraulic head/initial hydraulic head
K = Hydraulic conductivity
MW = Monitoring well
TA = Technical Area

Figure 8
Hvorslev Analysis of
TAV-MW-7 Slug Test

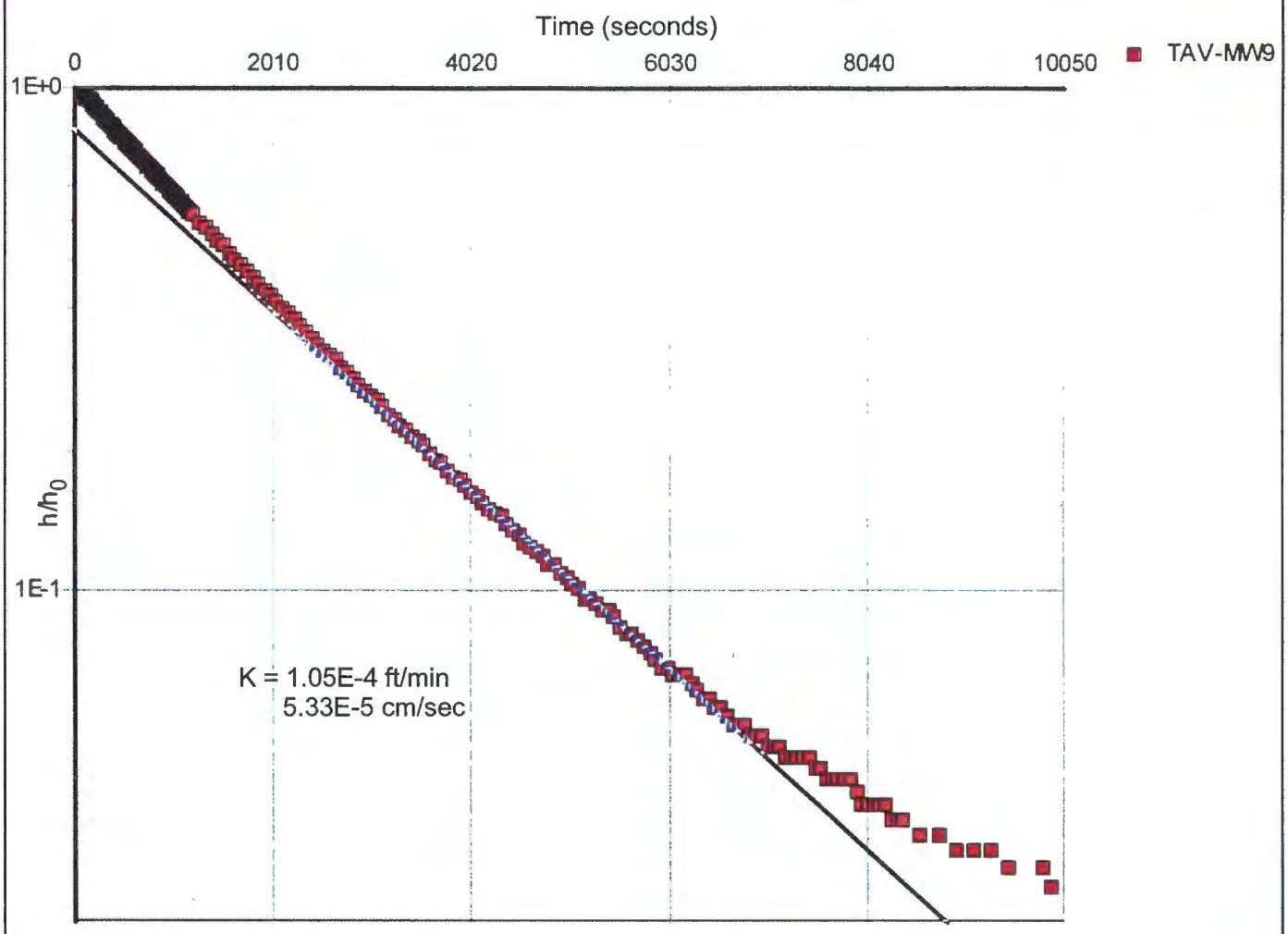
/gis/plots02/HvorslevTAV



cm/sec = Centimeters per second
ft/min = Feet per minute
h/h_0 = Hydraulic head/initial hydraulic head
K = Hydraulic conductivity
MW = Monitoring well
TA = Technical Area

Figure 9
Hvorslev Analysis of TAV-MW-8 Slug Test

/gis/plots02/HvorslevTAV



cm/sec = Centimeters per second
ft/min = Feet per minute
h/h_0 = Hydraulic head/initial hydraulic head
K = Hydraulic conductivity
MW = Monitoring well
TA = Technical Area

Figure 10
Hvorslev Analysis of TAV-MW-9 Slug Test

TABLES

Table 1
Soil and Soil-vapor Sample Summary and Analytical Suites for Samples Collected from the TAV-MW6 and TAV-MW8 Boreholes, TA-V
April 2001

Soil and Associated QA/QC Samples										Soil-vapor Samples
Record Number[a]	ER Sample ID	Date Sampled	Sample Depth (ft bgs)	TAL Metals (EPA Methods 6010B/7471A)	VOCs (EPA Method 8260)	Tritium (EPA Method 906.0)	Gamma Spectroscopy (EPA Method 901.1)	Volumetric Soil Moisture (wt. %)[b]	Volumetric Soil Moisture (wt. %)[c]	Soil-vapor VOCs (EPA Method 8260)
TAV-MW6 Borehole Samples										
604412[d]	TAV-BH-MW6-20-S,SG	4-17-01	20	X	X	X	X	X	X	X
604413[e]	TAV-BH-MW6-42-SG	4-17-01	42[f]	--	--	--	--	--	--	X
604414[g]	TAV-BH-MW6-60-SG	4-17-01	60[f]	--	--	--	--	--	--	X
	TAV-BH-MW6-80-S,SG	4-17-01	80[f]	X	X	--	X	--	--	X
	TAV-BH-MW6-100-S,SG	4-17-01	100[f]	X	X	--	X	--	--	X
	TAV-BH-MW6-20-TB	4-17-01	NA	--	X	--	--	--	--	--
604415[d]	TAV-BH-MW6-120-S,SG	4-18-01	120	X	X	X	X	X	X	X
604416[e]	TAV-BH-MW6-140-S,SG	4-18-01	140	X	X	X	X	X	X	X
604417[g]	TAV-BH-MW6-160-S,SG	4-18-01	160	X	X	X	X	X	X	X
	TAV-BH-MW6-160-DU	4-18-01	160	--	--	--	--	--	--	X
	TAV-BH-MW6-180-S,SG	4-18-01	180	X	X	X	X	X	X	X
	TAV-BH-MW6-120-TB	4-18-01	NA	--	X	--	--	--	--	--
604418[d]	TAV-BH-MW6-200-S,SG	4-19-01	200	X	X	X	X	X	X	X
604419[e]	TAV-BH-MW6-200-DU	4-19-01	200	X	X	X	X	X	--	--
604420[g]	TAV-BH-MW6-220-S,SG	4-19-01	220	X	X	X	X	X	X	X
	TAV-BH-MW6-240-S,SG	4-19-01	240	X	X	X	X	X	X	X
	TAV-BH-MW6-260-S,SG	4-19-01	260	X	X	X	X	X	X	X
	TAV-BH-MW6-280-S,SG	4-19-01	280	X	X	X	X	X	X	X
	TAV-BH-MW6-200-TB	4-19-01	NA	--	X	--	--	--	--	--

Refer to notes at end of table.

Table 1 (Continued)
Soil and Soil-vapor Sample Summary and Analytical Suites for Samples Collected from the TAV-MW6 and TAV-MW8 Boreholes, TA-V
April 2001

Soil and Associated QA/QC Samples										Soil-vapor Samples
Record Number[a]	ER Sample ID	Date Sampled	Sample Depth (ft bgs)	TAL Metals (EPA Methods 6010B/7471A)	VOCs (EPA Method 8260)	Tritium (EPA Method 906.0)	Gamma Spectroscopy (EPA Method 901.1)	Volumetric Soil Moisture (wt. %)[b]	Volumetric Soil Moisture (wt. %)[c]	Soil-vapor VOCs (EPA Method 8260)
604435[d]	TAV-BH-MW6-300-SG	4-20-01	300[f]	--	--	--	--	--	--	X
604436[e]	TAV-BH-MW6-320-S,SG	4-20-01	320	X	X	X	X	X	X	X
604437[g]	TAV-BH-MW6-340-S,SG	4-20-01	340	X	X	X	X	X	X	X
	TAV-BH-MW6-360-S,SG	4-20-01	360	X	X	X	X	X	X	X
	TAV-BH-MW6-360-DU	4-20-01	360	X	X	X	--	X	X	--
	TAV-BH-MW6-380-S,SG	4-20-01	380	X	X	X	X	X	X	X
	TAV-BH-MW6-380-DU	4-20-01	380	--	--	--	X	--	--	X
	TAV-BH-MW6-400-S,SG	4-20-01	400	X	X	X	X	X	X	X
	TAV-BH-MW6-320-TB	4-20-01	NA	--	X	--	--	--	--	--
	TAV-BH-MW6-380-EB	4-20-01	NA	X	X	X	--	--	--	--
604438[d]	TAV-BH-MW6-420-S,SG	4-21-01	420	X	X	X	X	X	X	X
604439[e]	None	4-21-01	440[f]	--	--	--	--	--	--	--
604440[g]	TAV-BH-MW6-460-S,SG	4-21-01	460	X	X	X	X	X	X	X
	TAV-BH-MW6-480-S,SG	4-21-01	480	X	X	X	X	X	X	X
	TAV-BH-MW6-500-S,SG	4-21-01	500	X	X	X	X	X	X	X
	TAV-BH-MW6-420-TB	4-21-01	NA	--	X	--	--	--	--	--

Refer to notes at end of table.

Table 1 (Concluded)
Soil and Soil-vapor Sample Summary and Analytical Suites for Samples Collected from the TAV-MW6 and TAV-MW8 Boreholes, TA-V
April 2001

Soil and Associated QA/QC Samples										Soil-vapor Samples
Record Number[a]	ER Sample ID	Date Sampled	Sample Depth (ft bgs)	TAL Metals (EPA Methods 6010/7000)	VOCs (EPA Method 8260)	Tritium (EPA Method 906.1)	Gamma Spectroscopy (EPA Method 901.1)	Volumetric Soil Moisture (wt. %)[b]	Volumetric Soil Moisture (wt. %)[c]	Soil-vapor VOCs (EPA Method 8260)
Borehole TAV-MW8 Samples										
604325[d]	TAV-BH-MW8-40-S,SG	4-8-01	40	X	X	X	X	X	X	X
604326[e]	TAV-BH-MW8-100-S,SG	4-8-01	100	X	X	X	X	X	X	X
604327[g]	TAV-BH-MW8-200-S,SG	4-8-01	200	X	X	X	X	X	X	X
	TAV-BH-MW8-200-DU	4-8-01	200	X	X	X	--	X	X	X
	TAV-BH-MW8-300-S,SG	4-8-01	300	X	X	X	X	X	X	X
	TAV-BH-MW8-40-TB	4-8-01	NA	--	X	--	--	--	--	--
604328[d]	TAV-BH-MW8-400-S,SG	4-9-01	400	X	X	X	X	X	X	X
604329[e]	TAV-BH-MW8-400-DU	4-9-01	400	--	--	--	--	--	--	X
604330[g]	TAV-BH-MW8-480-S,SG	4-9-01	480	X	X	X	X	X	X	X
	TAV-BH-MW8-400-TB	4-9-01	NA	--	X	--	--	--	--	--
	TAV-BH-MW8-400-EB	4-9-01	NA	X	X	X	--	--	--	--

[a]Analysis request/chain-of-custody record.
[b]Soil moisture from GEL by internal laboratory procedure GL-RAD-A-002.
[c]Soil moisture from ERCL by laboratory operating procedure LOP 97-11, Revision 0, Modified.
[d]Metals, VOC, and tritium soil samples, and soil moisture samples sent to GEL.
[e]Soil-vapor and soil moisture samples sent to ERCL.
[f]Incomplete or no analyses completed in interval due to inadequate or no soil or soil-vapor recovery.
[g]Gamma spectroscopy soil samples sent to RPSD.

BH = Borehole.
DU = Duplicate soil sample.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ERCL = ER Chemistry Laboratory.
bgs = Below ground surface.
GEL = General Engineering Laboratory, Inc.
ID = Identification.
ft = Foot (feet).
LOP = Laboratory operating procedure.
MW = Monitoring well.
NA = Not applicable.
QA/QC = Quality assurance/quality control.
RPSD = Radiation Protection Sample Diagnostics.
S = Soil sample.
SG = Soil gas (vapor) sample.
TAL = Target Analyte List.
TA = Technical Area.
TB = Trip blank.
VOC = Volatile organic compound.
wt. % = Weight percent.
X = Indicates that sample was collected from interval.
-- = Indicates that no sample was collected from interval.

Table 2
Summary of Soil Sampling Metals Analytical Results
TAV-MW6 Borehole
April 2001
(Off-site Laboratory)

Sample Attributes			Metals (EPA Method 6010B/7471A[a]) (mg/kg)							
Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	Arsenic	Barium	Beryllium	Cadmium	Total Chromium	Lead	Mercury	Selenium
604412	TAV-BH-MW6-20-S	20	**4.53**	162	0.491	ND (0.013)	12.7	6.85	ND (0.00455)	0.885
604412	TAV-BH-MW6-80-S	80	3.1	89.6	0.333 J (0.495)	**0.901**	14.4	7.49	ND (0.00455)	**1.27**
604412	TAV-BH-MW6-100-S	100	2.33	80	0.23 J (0.5)	0.11 J (0.5)	**24.3**	4.98	ND (0.00455)	0.894
604415	TAV-BH-MW6-120-S	120	3.11	127	0.442 J (0.467)	ND (0.013 J)	13	5.66	ND (0.00455)	**1.23**
604415	TAV-BH-MW6-140-S	140	3.73	84.1	0.642	ND (0.013)	12.6	7.7	ND (0.00455)	0.97
604415	TAV-BH-MW6-160-S	160	**4.97**	77.7	**0.692**	ND (0.013)	**19.6**	6.62	ND (0.00455)	0.846
604415	TAV-BH-MW6-180-S	180	3.25	67.6	0.523	ND (0.013)	12.6	5.38	ND (0.00455)	**1.03**
604418	TAV-BH-MW6-200-S	200	**5.39**	89.7	**0.684**	ND (0.013)	**18.6 J**	9.25	0.00838 J	0.495
604418	TAV-BH-MW6-200-DU	200	**4.71**	89.9	**0.653**	ND (0.013)	**17.1 J**	10.4	0.00867 J	0.519
604418	TAV-BH-MW6-220-S	220	**4.42**	48.4	0.491	ND (0.013)	11.6 J	6.4	0.00609 J	0.456 J (0.459)
604418	TAV-BH-MW6-240-S	240	4.05	140	0.427 J (0.49)	0.19 J (0.49)	**21 J**	7.47	0.00653 J	0.834
604418	TAV-BH-MW6-260-S	260	3.24	71.3	0.464 J (0.485)	ND (0.013)	9.77 J	6.26	ND (0.00455 J)	0.455 J (0.485)
604418	TAV-BH-MW6-280-S	280	3.62	108	0.488	ND (0.013)	13.5 J	6.1	ND (0.00455 J)	0.463 J (0.467)
604435	TAV-BH-MW6-320-S	320	2.97	140	**0.735**	ND (0.013)	10.5 J	7.29	ND (0.00455 J)	0.37 J (0.472)
604435	TAV-BH-MW6-340-S	340	**4.89**	72.3	**0.663**	ND (0.013)	13.5 J	7.77	ND (0.00455 J)	0.563
604435	TAV-BH-MW6-360-S	360	3.9	68	0.501	ND (0.013)	9.37 J	6.51	ND (0.00455 J)	0.32 J (0.5)
604435	TAV-BH-MW6-360-DU	360	3.65	194	0.472	ND (0.013)	12.1 J	6.4	ND (0.00455 J)	0.46
604435	TAV-BH-MW6-380-S	380	3.95	88.6	0.518	ND (0.013)	**21.8 J**	6.48	ND (0.00455 J)	0.779
604435	TAV-BH-MW6-400-S	400	3.4	67.8	0.493	ND (0.013)	9.29 J	6.34	ND (0.00455 J)	0.41 J (0.472)
604438	TAV-BH-MW6-420-S	420	3.46	127	0.629	0.205 J (0.495)	11.6	7.34	ND (0.00455)	ND (0.135)
604438	TAV-BH-MW6-460-S	460	3.37	180	0.619	0.217 J (0.467)	10.6	7.22	ND (0.00455)	ND (0.135)
604438	TAV-BH-MW6-480-S	480	3.09	71.4	0.648	0.178 J (0.481)	9.66	8.78	ND (0.00455)	ND (0.135)
604438	TAV-BH-MW6-500-S	500	3.07	86.8	**0.655**	0.177 J (0.467)	11	7.52	ND (0.00455)	0.268 J
Quality Assurance/Quality Control Sample (mg/L)										
604435	TAV-BH-MW6-380-EB		ND (0.00457)	0.00045 J (0.005)	ND (0.0002 J)	ND (0.00025)	ND (0.00078)	ND (0.00344)	ND (0.00007 J)	ND (0.00309 J)
Background soil concentrations—Southwest Area[c]			4.4	214	0.65	0.9	15.9	11.8	<0.1	<1

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

bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = The associated value is an estimated quantity, see data validation report (Annex B).
# J ( ) = Estimated value less than the laboratory reporting limit shown in parentheses, see data validation report (Annex B).
mg/kg = Milligram(s) per kilogram.
mg/L = Milligram(s) per liter.
MW = Monitoring well.
ND ( ) = Not detected above the method detection limit, shown in parentheses.
ND (# J) = Not detected, uncertainty in the detection limit shown in parentheses, see data validation report (Annex B).
S = Soil sample.
TA = Technical Area.

Table 3
Summary of Metals Analytical Method Detection Limits Used for
TAV-MW6 Borehole Sampling
April 2001
(Off-site Laboratory)

Analyte	Method Detection Limit for Soil Samples (mg/kg)	Method Detection Limit for Aqueous Samples (mg/L)
Aluminum	1.07	0.0343
Antimony	0.237	0.0038
Arsenic	0.137	0.00457
Barium	0.0148	0.00021
Beryllium	0.00767	0.0002
Cadmium	0.013	0.00025
Calcium	1.94	0.0375
Chromium	0.218	0.00078
Cobalt	0.0545	0.0003
Copper	0.0251	0.00267
Iron	1.96	0.0206
Lead	0.17	0.00344
Magnesium	0.308	0.00449
Manganese	0.0239	0.00294
Mercury	0.00455	0.00007
Nickel	0.0995	0.00074
Potassium	0.866	0.00707
Selenium	0.135	0.00309
Silver	0.0578	0.0002
Sodium	1.25	0.00813
Thallium	0.472	0.00413
Vanadium	0.0594	0.00109
Zinc	0.13	0.00281

mg/kg = Milligram(s) per kilogram.
mg/L = Milligram(s) per liter.
TA = Technical Area.
MW = Monitoring well.

Table 4
Summary of Soil Sampling VOC Analytical Results, TAV-MW6 Borehole
April 2001
(Off-site Laboratory)

Sample Attributes			VOCs (EPA Method 8260[a]) (µg/kg)					
Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	1,2-Dichloropropane	2-Butanone	4-methyl-, 2-Pentanone	Acetone	Methylene chloride	Toluene
604412	TAV-BH-MW6-20-S	20	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.3)[c]	**0.497 J**	ND (0.5)
604412	TAV-BH-MW6-80-S	80	ND (0.32)	ND (0.76)	ND (1.34)	ND (11.3)[c]	**0.691 J**	ND (0.5)
604412	TAV-BH-MW6-100-S	100	ND (0.32)	**10.7**	ND (1.34)	ND (11.8)[c]	**0.601 J**	**0.7 J (1)**
604415	TAV-BH-MW6-120-S	120	ND (0.32)	ND (0.76)	ND (1.34)	ND (11.5)[c]	**3.1 J**	ND (0.5)
604415	TAV-BH-MW6-140-S	140	ND (0.32)	**10.7**	ND (1.34)	ND (11.7)[c]	**3.55 J**	ND (0.5)
604415	TAV-BH-MW6-160-S	160	ND (0.32)	**10.2**	**2.18 J (5)**	ND (12.8)[c]	**1.5 J**	ND (0.5)
604415	TAV-BH-MW6-180-S	180	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.9)[c]	**1 J**	ND (0.5)
604418	TAV-BH-MW6-200-S	200	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.7)[c]	ND (5)[c]	ND (0.5)
604418	TAV-BH-MW6-200-DU	200	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.4)[c]	ND (5)[c]	ND (0.5)
604418	TAV-BH-MW6-220-S	220	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.4)[c]	ND (5)[c]	ND (0.5)
604418	TAV-BH-MW6-240-S	240	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.3)[c]	ND (5)[c]	ND (0.5)
604418	TAV-BH-MW6-260-S	260	ND (0.32)	ND (0.76)	ND (1.34)	ND (11)[c]	ND (5)[c]	ND (0.5)
604418	TAV-BH-MW6-280-S	280	ND (0.32)	ND (0.76)	ND (1.34)	ND (1)	ND (5)[c]	ND (0.5)
604435	TAV-BH-MW6-320-S	320	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.4)[c]	ND (5)[c]	ND (0.5)
604435	TAV-BH-MW6-340-S	340	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.7)[c]	ND (5)[c]	ND (0.5)
604435	TAV-BH-MW6-360-S	360	ND (0.32)	ND (0.76)	ND (1.34)	ND (11.1)[c]	ND (5)[c]	ND (0.5)
604435	TAV-BH-MW6-360-DU	360	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.4)[c]	ND (5)[c]	ND (0.5)
604435	TAV-BH-MW6-380-S	380	ND (0.32)	ND (0.76)	ND (1.34)	ND (10.8)[c]	ND (5)[c]	ND (0.5)
604435	TAV-BH-MW6-400-S	400	ND (0.32)	ND (0.76)	ND (1.34)	ND (11.4)[c]	ND (5)[c]	ND (0.5)
604438	TAV-BH-MW6-420-S	420	ND (0.32)	ND (0.76)	ND (1.34)	ND (1)	ND (5)[c]	ND (0.5)
604438	TAV-BH-MW6-460-S	460	ND (0.32)	ND (0.76)	ND (1.34)	ND (1)	ND (5)[c]	ND (0.5)
604438	TAV-BH-MW6-480-S	480	ND (0.32)	ND (0.76)	ND (1.34)	**10.7 J**	ND (5)[c]	ND (0.5)
604438	TAV-BH-MW6-500-S	500	ND (0.32)	ND (0.76)	ND (1.34)	**11.6 J**	ND (5)[c]	ND (0.5)
Quality Assurance/Quality Control Samples (µg/L)								
604412	TAV-BH-MW6-20-TB	NA	ND (0.16)	ND (0.81)	ND (0.7)	ND (0.82)	ND (0.63)	ND (0.22)
604415	TAV-BH-MW6-120-TB	NA	ND (0.16)	ND (0.81)	ND (0.7)	ND (0.82)	ND (0.63)	ND (0.22)
604418	TAV-BH-MW6-200-TB	NA	ND (0.16)	ND (0.81)	ND (0.7)	ND (0.82)	ND (5)[c]	ND (0.22)
604435	TAV-BH-MW6-320-TB	NA	**4.87**	ND (0.81)	ND (0.7)	ND (0.82)	ND (5)[c]	ND (0.22)
604435	TAV-BH-MW6-380-EB	NA	ND (0.16)	ND (0.81)	ND (0.7)	**10.9**	ND (5)[c]	ND (0.22)
604438	TAV-BH-MW6-420-TB	NA	ND (0.16)	ND (0.81)	ND (0.7)	ND (0.82)	ND (0.63)	ND (0.22)

Refer to footnotes at end of table.

Table 4 (Concluded)
Summary of Soil Sampling VOC Analytical Results, TAV-MW6 Borehole
April 2001
(Off-site Laboratory)

Note: Values in **bold** exceed the method detection limits.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
[c]Analyte was detected in method blank. Sample result less than 10 times the blank concentration, and greater than the reporting limit shown in parentheses. Samples are qualified nondetect at their respective concentrations.

bgs	= Below ground surface.
BH	= Borehole.
DU	= Duplicate sample.
EB	= Equipment blank.
EPA	= U.S. Environmental Protection Agency.
ER	= Environmental Restoration.
ft	= Foot (feet).
ID	= Identification.
J	= The associated value is an estimated quantity, see data validation report (Annex B).
# J ( )	= Estimated value less than the laboratory reporting limit shown in parentheses.
µg/kg	= Microgram(s) per kilogram.
µg/L	= Microgram(s) per liter.
MW	= Monitoring well.
NA	= Not applicable.
ND ( )	= Not detected above the method detection limit, shown in parentheses.
S	= Soil sample.
TA	= Technical Area.
TB	= Trip blank.
VOC	= Volatile organic compound.

Table 5
Summary of VOC Soil Sample Analytical Method Detection Limits Used for
TAV-MW6 Borehole
April 2001
(Off-site Laboratory)

Analyte	Method Detection Limit for Soil Samples (µg/kg)	Method Detection Limit for Aqueous Samples (µg/L)
1,1,1-Trichloroethane	0.29	0.18
1,1,2,2-Tetrachloroethane	0.3	0.15
1,1,2-Trichloroethane	0.36	0.11
1,1-Dichloroethane	0.41	0.07
1,1-Dichloroethene	0.262	0.28
1,2-Dichloroethane	0.27	0.14
1,2-Dichloropropane	0.32	0.16
2-Butanone	0.76	0.81
2-Hexanone	0.94	0.79
4-methyl-, 2-Pentanone	1.34	0.7
Acetone	1	0.82
Benzene	0.39	0.14
Bromodichloromethane	0.35	0.15
Bromoform	0.36	0.1
Bromomethane	0.31	0.24
Carbon disulfide	0.62	0.9
Carbon tetrachloride	0.26	0.16
Chlorobenzene	0.4	0.2
Chloroethane	0.28	0.32
Chloroform	0.47	0.17
Chloromethane	0.35	0.21
Dibromochloromethane	0.41	0.16
Ethyl benzene	0.35	0.15
Methylene chloride	0.44	0.63
Styrene	0.32	0.15
Tetrachloroethene	0.4	0.21
Toluene	0.5	0.22
Trichloroethene	0.72	0.21
Vinyl acetate	0.77	0.44
Vinyl chloride	0.3	0.26
Xylene	1.05	0.44
cis-1,2-Dichloroethene	0.41	0.18
cis-1,3-Dichloropropene	0.28	0.18
trans-1,2-Dichloroethene	0.37	0.31
trans-1,3-Dichloropropene	0.24	0.17

µg/kg = Microgram(s) per kilogram.
µg/L = Microgram(s) per liter.
MW = Monitoring well.
TA = Technical Area.
VOC = Volatile organic compound.

Table 6
Summary of Soil-Vapor Sampling VOC Analytical Results, TAV-MW6 Borehole
April 2001
(On-site Laboratory)

Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	(EPA Method 8260, Modified[a]) (ppmv)				
			Bromomethane	Chloromethane	Methylene chloride	Trichloroethene	Toluene
604413	TAV-BH-MW6-20-SG	20	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	**0.16 J**
604413	TAV-BH-MW6-42-SG	42	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	**0.23 J**
604413	TAV-BH-MW6-60-SG	60	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	**0.2 J**
604413	TAV-BH-MW6-80-SG	80	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	ND (0.16)
604413	TAV-BH-MW6-100-SG	100	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	ND (0.16)
604416	TAV-BH-MW6-120-SG	120	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	ND (0.16)
604416	TAV-BH-MW6-140-SG	140	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	**0.16 J**
604416	TAV-BH-MW6-160-SG	160	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	**0.2 J**
604416	TAV-BH-MW6-160-DU	160	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	**0.2 J**
604416	TAV-BH-MW6-180-SG	180	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.044)	**0.19 J**
604419	TAV-BH-MW6-200-SG	200	**0.96**	**0.89 J**	ND (0.17)	**0.048 J**	ND (0.16)
604419	TAV-BH-MW6-220-SG	220	**0.61**	**0.64 J**	**0.35 J**	ND (0.022)	ND (0.16)
604419	TAV-BH-MW6-240-SG	240	**0.68**	**0.66 J**	**0.93**	ND (0.022)	ND (0.16)
604419	TAV-BH-MW6-260-SG	260	**0.3 J**	ND (0.28)	**0.32 J**	ND (0.022)	ND (0.16)
604419	TAV-BH-MW6-280-SG	280	ND (0.15)	ND (0.28)	ND (0.17)	**0.06 J**	ND (0.16)
604436	TAV-BH-MW6-300-SG	300	**0.44 J**	ND (0.28)	ND (0.17)	ND (0.022)	ND (0.16)
604436	TAV-BH-MW6-320-SG	320	**0.7**	**0.48 J**	ND (0.17)	**0.17 J**	**0.29 J**
604436	TAV-BH-MW6-340-SG	340	**0.62**	ND (0.28)	ND (0.17)	**0.1 J**	ND (0.16)
604436	TAV-BH-MW6-360-SG	360	**0.9**	**0.72 J**	ND (0.17)	**0.15 J**	**0.19 J**
604436	TAV-BH-MW6-380-SG	380	**0.61**	**0.43 J**	ND (0.17)	**0.09 J**	ND (0.16)
604436	TAV-BH-MW6-380-DU	380	**0.69**	**0.48 J**	ND (0.17)	**0.07 J**	ND (0.16)
604436	TAV-BH-MW6-400-SG	400	**0.54 J**	**0.44 J**	ND (0.17)	**0.11 J**	**0.17 J**
604439	TAV-BH-MW6-420-SG	420	**0.43 J**	**0.4 J**	ND (0.17)	**0.12 J**	ND (0.16)
604439	TAV-BH-MW6-460-SG	460	**0.44 J**	ND (0.28)	ND (0.17)	ND (0.022)	ND (0.16)
604439	TAV-BH-MW6-480-SG	480	**0.2 J**	ND (0.28)	ND (0.17)	**0.08 J**	ND (0.16)
604439	TAV-BH-MW6-500-SG	500	**0.29 J**	ND (0.28)	ND (0.17)	**0.2**	**0.16 J**

Note: Values in **bold** exceed the method detection limits.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
bgs = Below ground surface.
DU = Duplicate sample.
BH = Borehole.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = The associated value is an estimated quantity, see data validation report (Annex B).
MW = Monitoring well.
ND ( ) = Not detected above the method detection limit, shown in parentheses.
ppmv = Part(s) per million by volume.
SG = Soil-gas (vapor) sample.
TAV = Technical Area.
VOC = Volatile organic compound.

Table 7
Summary of Soil-Vapor Sample VOC Analytical Method Detection Limits Used for TAV-MW6 Borehole
April 2001
(On-site Laboratory)

Analyte	Method Detection Limit (ppmv)
1,1,1-Trichloroethane	0.11
1,1,2,2-Tetrachloroethane	0.085
1,1,2-Trichloroethane	0.11
1,1-Dichloroethane	0.14
1,1-Dichloroethene	0.15
1,2-Dichloroethane	0.14
1,2-Dichloropropane	0.13
2-Butanone	0.2/4.4[a]
2-Hexanone	0.14
4-methyl-, 2-Pentanone	0.14
Acetone	2.5/3.4[a]
Benzene	0.18
Bromodichloromethane	0.087
Bromoform	0.057
Bromomethane	0.15
Carbon disulfide	0.19
Carbon tetrachloride	0.093
Chlorobenzene	0.13
Chloroethane	0.22
Chloroform	0.12
Chloromethane	0.28
Ethyl benzene	0.14
Methylene chloride	0.17
Styrene	0.14
Tetrachloroethene	0.086
Toluene	0.16
Trichloroethene	0.044/0.022[a]
Vinyl chloride	0.14/0.046[a]
m/p-Xylene	0.14
o-Xylene	0.14
cis-1,2-Dichloroethene	0.15
cis-1,3-Dichloropropene	0.13
trans-1,2-Dichloroethene	0.15
trans-1,3-Dichloropropene	0.13

[a]Second MDL listed applicable to AR/COCs 604419, 604436, and 604439 only.
AR/COC = Analysis request/chain-of-custody record.
MDL = Method detection limit.
MW = Monitoring well.
ppmv = Part(s) per million by volume.
TA = Technical Area.
VOC = Volatile organic compound.

Table 8
Summary of Soil Sampling Tritium Analytical Results, TAV-MW6 Borehole
April 2001
(Off-site Laboratory)

Sample Attributes			Tritium Activity (EPA Method 906.0[a]) (pCi/L)	
Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	Results	Minimum Detectable Activity
604412	TAV-BH-MW6-20-S	20	ND	88.9
604415	TAV-BH-MW6-120-S	120	412	88.4
604415	TAV-BH-MW6-140-S	140	145	87
604415	TAV-BH-MW6-160-S	160	235	88.1
604415	TAV-BH-MW6-180-S	180	ND	87.4
604418	TAV-BH-MW6-200-S	200	325	79.3
604418	TAV-BH-MW6-200-DU	200	292	78.5
604418	TAV-BH-MW6-220-S	220	263	78.4
604418	TAV-BH-MW6-240-S	240	375	77.4
604418	TAV-BH-MW6-260-S	260	**573**	76.9
604418	TAV-BH-MW6-280-S	280	347	77.7
604435	TAV-BH-MW6-320-S	320	171	76.4
604435	TAV-BH-MW6-340-S	340	143	76.7
604435	TAV-BH-MW6-360-S	360	200	76.6
604435	TAV-BH-MW6-360-DU	360	169	75.7
604435	TAV-BH-MW6-380-S	380	204	78.3
604435	TAV-BH-MW6-400-S	400	114	76.6
604438	TAV-BH-MW6-420-S	420	146	78.2
604438	TAV-BH-MW6-460-S	460	115	77.5
604438	TAV-BH-MW6-480-S	480	ND	78.8
604438	TAV-BH-MW6-500-S	500	ND	78
Quality Assurance/Quality Control Sample				
604435	TAV-BH-MW6-380-EB	NA	R	108
Background Soil Activity[c]			420	NA

Note: Values in **bold** exceed background soil tritium activity.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
[c]Tharp February 1999.
bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
MW = Monitoring well.
NA = Not applicable.
ND = Not detected above the minimum detectable activity.
pCi/L = Picocurie(s) per liter.
R = Rejected data, see data validation report (Annex B).
S = Soil sample.
TA = Technical Area.

Table 9
Summary of Soil Moisture Results, TAV-MW6 Borehole
April 2001
(Off- and On-site Laboratories)

Sample Attributes			Soil Moisture (% by weight)	
Record Number[a]	ER Sample ID	Sample Depth (ft bgs)	Off-site Laboratory[b]	On-site Laboratory[c]
604412	TAV-BH-MW6-20-S	20	7.15	6.34
604415	TAV-BH-MW6-120-S	120	7.16	9.98
604415	TAV-BH-MW6-140-S	140	9.94	9.32
604415	TAV-BH-MW6-160-S	160	6.29	10.00
604415	TAV-BH-MW6-180-S	180	5.79	5.62
604418	TAV-BH-MW6-200-S	200	4.30	5.77
604418	TAV-BH-MW6-200-DU	200	4.49	Sample not collected
604418	TAV-BH-MW6-220-S	220	5.70	4.79
604418	TAV-BH-MW6-240-S	240	1.42	1.55
604418	TAV-BH-MW6-260-S	260	6.71	7.69
604418	TAV-BH-MW6-280-S	280	3.57	3.11
604435	TAV-BH-MW6-320-S	320	9.65	9.78
604435	TAV-BH-MW6-340-S	340	8.53	8.97
604435	TAV-BH-MW6-360-S	360	8.07	8.43
604435	TAV-BH-MW6-360-DU	360	8.33	9.69
604435	TAV-BH-MW6-380-S	380	7.17	6.63
604435	TAV-BH-MW6-400-S	400	8.31	6.62
604438	TAV-BH-MW6-420-S	420	9.00	8.83
604438	TAV-BH-MW6-460-S	460	5.85	4.55
604438	TAV-BH-MW6-480-S	480	15.67	15.08
604438	TAV-BH-MW6-500-S	500	13.57	16.51

[a]Analysis request/chain-of-custody record.
[b]Cryogenic distillation by GEL internal laboratory procedure GL-RAD-A-002.
[c]ERCL LOP 97-11, Revision 0, Modified.
bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
ER = Environmental Restoration.
ERCL = ER Chemistry Laboratory.
ft = Foot (feet).
GEL = General Engineering Laboratories, Inc.
ID = Identification.
LOP = Laboratory operating procedure.
MW = Monitoring well.
S = Soil sample.
TA = Technical Area.
% = Percent.

Table 10
Summary of Soil Sampling Long-Lived Radionuclide Analytical Results, TAV-MW6 Borehole
April 2001
(On-site Laboratory)

Sample Attributes			Activity (EPA Method 901.1[a]) (pCi/g)											
			Cesium-137		Cobalt-60		Radium-226		Thorium-232		Uranium-235		Uranium-238	
Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	Result	Error[c]	Result	Error[c]	Result	Error[c]	Result	Error[c]	Result	Error[c]	Result	Error[c]
604414	TAV-BH-MW6-20-S	20	ND (0.0418)	--	ND (0.0487)	--	**2.24**	0.725	0.791	0.38	**ND (0.216)**	--	0.868	0.517
604414	TAV-BH-MW6-80-S	80	ND (0.0362)	--	ND (0.041)	--	1.09	0.496	0.456	0.245	**0.173**	0.156	ND (0.524)	--
604414	TAV-BH-MW6-100-S	100	ND (0.026)	--	ND (0.0276)	--	1.11	0.395	0.198	0.136	ND (0.144)	--	ND (0.388)	--
604417	TAV-BH-MW6-120-S	120	ND (0.039)	--	ND (0.0461)	--	**1.89**	0.715	0.772	0.368	ND (0.098)	--	ND (0.585)	--
604417	TAV-BH-MW6-140-S	140	ND (0.0456)	--	ND (0.0501)	--	1.61	0.74	**1.1**	0.524	**ND (0.231)**	--	ND (0.667)	--
604417	TAV-BH-MW6-160-S	160	ND (0.0345)	--	ND (0.0382)	--	1.27	0.526	0.704	0.345	**ND (0.19)**	--	ND (0.534)	--
604417	TAV-BH-MW6-180-S	180	ND (0.0376)	--	ND (0.0428)	--	1.37	0.539	0.537	0.28	**0.183**	0.173	ND (0.555)	--
604420	TAV-BH-MW6-200-S	200	ND (0.0288)	--	ND (0.0349)	--	1.29	0.459	0.54	0.27	ND (0.121)	--	ND (0.462)	--
604420	TAV-BH-MW6-200-DU	200	ND (0.0314)	--	ND (0.0353)	--	1.57	0.509	0.582	0.292	ND (0.094)	--	ND (0.497)	--
604420	TAV-BH-MW6-220-S	220	ND (0.0455)	--	ND (0.0486)	--	**1.77**	0.948	0.608	0.319	**ND (0.225)**	--	0.883	0.565
604420	TAV-BH-MW6-240-S	240	ND (0.0283)	--	ND (0.0371)	--	1.2	0.437	0.435	0.225	ND (0.159)	--	ND (0.426)	--
604420	TAV-BH-MW6-260-S	260	ND (0.0349)	--	ND (0.0405)	--	1.16	0.553	0.628	0.317	ND (0.0862)	--	ND (0.561)	--
604420	TAV-BH-MW6-280-S	280	ND (0.0334)	--	ND (0.0391)	--	1.39	0.522	0.446	0.243	**0.202**	0.158	0.415	0.219
604437	TAV-BH-MW6-320-S	320	ND (0.0317)	--	ND (0.0331)	--	1.12	0.59	0.697	0.334	**ND (0.212)**	--	ND (0.74)	--
604437	TAV-BH-MW6-340-S	340	ND (0.0284)	--	ND (0.0309)	--	1.41	0.497	0.65	0.308	**ND (0.21)**	--	ND (0.722)	--
604437	TAV-BH-MW6-360-S	360	ND (0.0298)	--	ND (0.0377)	--	1.42	0.512	0.74	0.349	ND (0.129)	--	ND (0.768)	--
604437	TAV-BH-MW6-380-S	380	ND (0.0279)	--	ND (0.0315)	--	0.982	0.467	0.611	0.292	**0.199**	0.161	ND (0.678)	--
604437	TAV-BH-MW6-380-DU	380	ND (0.0349)	--	ND (0.0399)	--	1.46	0.529	0.55	0.288	**ND (0.256)**	--	ND (0.863)	--
604437	TAV-BH-MW6-400-S	400	ND (0.0279)	--	ND (0.0323)	--	1.13	0.601	0.643	0.334	**ND (0.206)**	--	ND (0.708)	--
604440	TAV-BH-MW6-420-S	420	ND (0.0295)	--	ND (0.0359)	--	**2.29**	0.766	0.76	0.363	**ND (0.214)**	--	ND (0.743)	--
604440	TAV-BH-MW6-460-S	460	ND (0.0283)	--	ND (0.0313)	--	1.17	0.473	0.576	0.277	**ND (0.198)**	--	ND (0.691)	--
604440	TAV-BH-MW6-480-S	480	ND (0.0287)	--	ND (0.0294)	--	1.69	0.597	0.795	0.366	ND (0.0862)	--	ND (0.693)	--
604440	TAV-BH-MW6-500-S	500	ND (0.0288)	--	ND (0.0324)	--	1.62	0.517	0.816	0.383	**ND (0.218)**	--	ND (0.768)	--
Background Soil Activities—Southwest Area[d]			0.664	NA	NE	NA	1.76	NA	1.01	NA	0.16	NA	1.4	NA

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

[a]EPA November 1986.

[b]Analysis request/chain-of-custody record.

[c]Two standard deviations about the mean detected activity.

[d]Dinwiddie September 1997.

bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).

ID = Identification.
MW = Monitoring well.
NA = Not applicable.
ND ( ) = Not detected above the minimum detectable activity, shown in parentheses.
ND ( ) = Not detected but minimum detectable activity (shown in parentheses)exceeds background activity.
NE = Not established.
pCi/g = Picocurie(s) per gram.
S = Soil sample.
TA = Technical Area.
-- = Error not calculated for nondetectable results.

Table 11
Summary of Soil Sampling Metals Analytical Results, TAV-MW8 Borehole
April 2001
(Off-site Laboratory)

Sample Attributes			Metals (EPA Method 6010B/7471A[a]) (mg/kg)							
Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	Arsenic	Barium	Beryllium	Cadmium	Total Chromium	Lead	Mercury	Selenium
604325	TAV-BH-MW8-40-S	40	1.73 J	77.5	0.24	0.117	7.43	3.78	0.0478 J	ND (0.135)
604325	TAV-BH-MW8-100-S	100	3.64 J	40.3	0.287	0.0676	7.25	3.59	0.00464 J (0.00913)	0.256 J (0.459)
604325	TAV-BH-MW8-200-S	200	2.78 J	69.5	0.384	0.0386 J	7.67	4.6	ND (0.00455 J)	ND (0.135)
604325	TAV-BH-MW8-200-DU	200	2.82 J	50.7	0.375	0.0317 J	8.9	4.74	ND (0.00455 J)	ND (0.135)
604325	TAV-BH-MW8-300-S	300	3.2 J	75.2	0.53	0.0489J	10.8	6.82	ND (0.00455 J)	ND (0.135)
604328	TAV-BH-MW8-400-S	400	3.31 J	188	0.465	0.052 J	11.1	6.63	ND (0.00455 J)	0.364 J (0.463)
604328	TAV-BH-MW8-480-S	480	2.84 J	128	0.552	0.0478 J	9.87	6.5	ND (0.00455 J)	0.619
Quality Assurance/Quality Control Sample (mg/L)										
604328	TAV-BH-MW8-400-EB		ND (0.00457 J)	0.00064 J	ND (0.0002)	ND (0.00025 J)	0.00105 J (0.005)	ND (0.00344)	ND (0.00007)	ND (0.00309)
Background soil concentrations—Southwest Area[c]			4.4	214	0.65	0.9	15.9	11.8	<0.1	<1

[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
[c]Dinwiddie September 1997.

# J ( ) = Estimated value less than the laboratory reporting limit shown in parentheses, see data validation report (Annex B).
bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = The associated value is an estimated quantity, see data validation report (Annex B).
mg/kg = Milligram(s) per kilogram.
mg/L = Milligram(s) per liter.
MW = Monitoring well.
ND ( ) = Not detected above the method detection limit, shown in parentheses.
ND (# J) = Not detected, uncertainty in the detection limit shown in parentheses, see data validation report (Annex B).
S = Soil sample.
TA = Technical Area.

Table 12
Summary of Metals Analytical Method Detection Limits Used for
TAV-MW8 Borehole
April 2001
(Off-site Laboratory)

Analyte	Method Detection Limit for Soil Samples (mg/kg)	Method Detection Limit for Aqueous Samples (mg/L)
Aluminum	1.07	0.0343
Antimony	0.237	0.0038
Arsenic	0.137	0.00457
Barium	0.0148	0.00021
Beryllium	0.00767	0.0002
Cadmium	0.013	0.00025
Calcium	1.94	0.0375
Chromium, total	0.218	0.00078
Cobalt	0.0545	0.0003
Copper	0.0251	0.00267
Iron	1.96	0.0206
Lead	0.17	0.00344
Magnesium	0.308	0.00449
Manganese	0.0239	0.00294
Mercury	0.00455	0.00007
Nickel	0.0995	0.00074
Potassium	0.866	0.00707
Selenium	0.135	0.00309
Silver	0.0578	0.0002
Sodium	1.25	0.00813
Thallium	0.472	0.00413
Vanadium	0.0594	0.00109
Zinc	0.13	0.00281

mg/kg = Milligram(s) per kilogram.
mg/L = Milligram(s) per liter.
TA = Technical Area.
MW = Monitoring well.

Table 13
Summary of Soil Sampling VOC Analytical Results, TAV-MW8 Borehole
April 2001
(Off-site Laboratory)

Sample Attributes		VOCs (EPA Method 8260[a]) (µg/L)	
Record Number[b]	ER Sample ID	1,2-Dichloropropane	Acetone
Quality Assurance/Quality Control Samples			
604325	TAV-BH-MW8-40-TB	**7.04**	**2.94 J**
604328	TAV-BH-MW8-400-TB	**4.63**	ND (0.82 J)
604328	TAV-BH-MW8-400-EB	ND (0.16)	**2.68 J**

Note: Values in **bold** exceed the method detection limits.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.

BH = Borehole.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
J = The associated value is an estimated quantity, see data validation report (Annex B).
ID = Identification.
µg/L = Microgram(s) per liter.
MW = Monitoring Well.
ND ( ) = Not detected above the method detection limit, shown in parentheses.
ND (# J) = Not detected, uncertainty in the detection limit shown in parentheses, see data validation report (Annex B).
TA = Technical Area.
TB = Trip blank.
VOC = Volatile organic compound.

Table 14
Summary of VOC Soil Sample Analytical Method Detection Limits Used for
TAV-MW8 Borehole
April 2001
(Off-site Laboratory)

Analyte	Method Detection Limit for Soil Samples (µg/kg)	Method Detection Limit for Aqueous Samples (µg/L)
1,1,1-Trichloroethane	0.29	0.18
1,1,2,2-Tetrachloroethane	0.3	0.15
1,1,2-Trichloroethane	0.36	0.11
1,1-Dichloroethane	0.41	0.07
1,1-Dichloroethene	0.262	0.28
1,2-Dichloroethane	0.27	0.14
1,2-Dichloropropane	0.32	0.16
2-Butanone	0.76	0.81
2-Hexanone	0.94	0.79
4-methyl-, 2-Pentanone	1.34	0.7
Acetone	1	0.82
Benzene	0.39	0.14
Bromodichloromethane	0.35	0.15
Bromoform	0.36	0.1
Bromomethane	0.31	0.24
Carbon disulfide	0.62	0.1
Carbon tetrachloride	0.26	0.16
Chlorobenzene	0.4	0.2
Chloroethane	0.28	0.32
Chloroform	0.47	0.17
Chloromethane	0.35	0.21
Dibromochloromethane	0.41	0.16
Ethyl benzene	0.35	0.15
Methylene chloride	0.44	0.63
Styrene	0.32	0.15
Tetrachloroethene	0.4	0.21
Toluene	0.5	0.22
Trichloroethene	0.72	0.16
Vinyl acetate	0.77	0.44
Vinyl chloride	0.3	0.26
Xylene	1.05	0.44
cis-1,2-Dichloroethene	0.41	0.18
cis-1,3-Dichloropropene	0.28	0.18
trans-1,2-Dichloroethene	0.37	0.31
trans-1,3-Dichloropropene	0.24	0.17

µg/kg = Microgram(s) per kilogram.
µg/L = Microgram(s) per liter.
MW = Monitoring well.
TA = Technical Area.
VOC = Volatile organic compound.

Table 15
Summary of Soil-Vapor Sampling VOC Analytical Results, TAV-MW8 Borehole
April 2001
(On-site Laboratory)

Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	VOCs (EPA Method 8260, Modified[a]) (ppmv)			
			Bromomethane	Chloromethane	Methylene chloride	Toluene
604326	TAV-BH-MW8-40-SG	40	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.16)
604326	TAV-BH-MW8-100-SG	100	**1.6**	**1.2**	**0.41 J**	**0.29 J**
604326	TAV-BH-MW8-200-SG	200	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.16)
604326	TAV-BH-MW8-200-DU	200	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.16)
604326	TAV-BH-MW8-300-SG	300	ND (0.15)	ND (0.28)	ND (0.17)	ND (0.16)
604329	TAV-BH-MW8-400-SG	400	ND (0.15)	ND (0.28)	ND (0.17)	**0.23 J**
604329	TAV-BH-MW8-400-DU	400	ND (0.15)	ND (0.28)	ND (0.17)	**0.27 J**
604329	TAV-BH-MW8-480-SG	480	ND (0.15)	ND (0.28)	ND (0.17)	**0.17 J**

Note: Values in **bold** exceed the method detection limits.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = The associated value is an estimated quantity, see data validation report (Annex B).
MW = Monitoring well.
ND ( ) = Not detected above the method detection limit, shown in parentheses.
ppmv = Part(s) per million by volume.
SG = Soil-gas (vapor) sample.
TA = Technical Area.
VOC = Volatile organic compound.

Table 16
Summary of Soil-Vapor Sample VOC Analytical Method Detection Limits Used for TAV-MW8 Borehole
April 2001
(On-site Laboratory)

Analyte	Method Detection Limit for Soil-Vapor Samples (ppmv)
1,1,1-Trichloroethane	0.11
1,1,2,2-Tetrachloroethane	0.085
1,1,2-Trichloroethane	0.11
1,1-Dichloroethane	0.14
1,1-Dichloroethene	0.15
1,2-Dichloroethane	0.14
1,2-Dichloropropane	0.13
2-Butanone	0.2/4.4[a]
2-Hexanone	0.14
4-methyl-, 2-Pentanone	0.14
Acetone	2.5/3.4[a]
Benzene	0.18
Bromodichloromethane	0.087
Bromoform	0.057
Bromomethane	0.15
Carbon disulfide	0.19
Carbon tetrachloride	0.093
Chlorobenzene	0.13
Chloroethane	0.22
Chloroform	0.12
Chloromethane	0.28
Ethyl benzene	0.14
Methylene chloride	0.17
Styrene	0.14
Tetrachloroethene	0.086
Toluene	0.16
Trichloroethene	0.44/0.22[a]
Vinyl chloride	0.14/0.046[a]
m/p-Xylene	0.14
o-Xylene	0.14
cis-1,2-Dichloroethene	0.15
cis-1,3-Dichloropropene	0.13
trans-1,2-Dichloroethene	0.15
trans-1,3-Dichloropropene	0.13

[a]Second MDL listed for AR/COC 604326 only.
AR/COC = Analysis request/chain of custody.
MDL = Method detection limit.
MW = Monitoring well.
ppmv = Part(s) per million by volume.
TA = Technical Area.
VOC = Volatile organic compound.

Table 17
Summary of Soil Sampling Tritium Analytical Results, TAV-MW8 Borehole
April 2001
(Off-site Laboratory)

Sample Attributes			Tritium Activity (EPA Method 906.0[b]) (pCi/L)	
Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	Results	Minimum Detectable Activity
604325	TAV-BH-MW8-40-S	40	ND	105
604325	TAV-BH-MW8-100-S	100	138	99.6
604325	TAV-BH-MW8-200-S	200	ND	102
604325	TAV-BH-MW8-200-DU	200	ND	105
604325	TAV-BH-MW8-300-S	300	ND	105
604328	TAV-BH-MW8-400-S	400	ND	100
604328	TAV-BH-MW8-480-S	480	ND	103
Quality Assurance/Quality Control Sample				
604328	TAV-BH-MW8-400-EB	NA	ND	99.5
Background Soil Activities[c]			420	NA

[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
[c]Tharp February 1999.
bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
EB = Equipment blank.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
MW = Monitoring well.
NA = Not applicable.
ND = Not detected above the minimum detectable activity.
pCi/L = Picocurie(s) per liter.
S = Soil sample.
TA = Technical Area.

Table 18
Summary of Soil Moisture Results, TAV-MW8 Borehole
April 2001
(Off- and On-site Laboratories)

Sample Attributes			Soil Moisture (% by weight)	
Record Number[a]	ER Sample ID	Sample Depth (ft bgs)	Off-site Laboratory[b]	On-site Laboratory[c]
604325	TAV-BH-MW8-40-S	40	7.28	6.99
604325	TAV-BH-MW8-100-S	100	4.16	2.78
604325	TAV-BH-MW8-200-S	200	6.97	3.67
604325	TAV-BH-MW8-200-DU	200	7.31	3.62
604325	TAV-BH-MW8-300-S	300	11.4	9.06
604328	TAV-BH-MW8-400-S	400	12.6	9.17
604328	TAV-BH-MW8-480-S	480	12.4	8.18

[a]Analysis request/chain-of-custody record.
[b]Cryogenic distillation by GEL internal laboratory procedure GL-RAD-A-002.
[c]ERCL LOP 97-11, Revision 0, Modified.
bgs = Below ground surface.
BH = Borehole.
DU = Duplicate sample.
ER = Environmental Restoration.
ERCL = ER Chemistry Laboratory.
ft = Foot (feet).
GEL = General Engineering Laboratories.
ID = Identification.
LOP = Laboratory operating procedure.
MW = Monitoring well.
S = Soil sample.
TA = Technical Area.
% = Percent.

Table 19
Summary of Soil Sampling Long-Lived Radionuclide Analytical Results, TAV-MW8 Borehole
April 2001
(On-site Laboratory)

Sample Attributes			Activity (EPA Method 901.1[a]) (pCi/g)											
			Cesium-137		Cobalt-60		Radium-226		Thorium-232		Uranium-235		Uranium-238	
Record Number[b]	ER Sample ID	Sample Depth (ft bgs)	Result	Error[c]	Result	Error[c]	Result	Error[c]	Result	Error[c]	Result	Error[c]	Result	Error[c]
604327	TAV-BH-MW8-40-S	40	ND (0.0337)	--	ND (0.0415)	--	1.34	0.513	0.521	0.274	**ND (0.24)**	--	ND (0.826)	--
604327	TAV-BH-MW8-100-S	100	ND (0.0221)	--	ND (0.0262)	--	0.86	0.321	0.363	0.182	**ND (0.165)**	--	ND (0.547)	--
604327	TAV-BH-MW8-200-S	200	ND (0.0278)	--	ND (0.0303)	--	1.23	0.434	0.678	0.329	**ND (0.193)**	--	ND (0.646)	--
604327	TAV-BH-MW8-300-S	300	ND (0.0283)	--	ND (0.0314)	--	**1.83**	0.646	0.669	0.321	**ND (0.2)**	--	ND (0.703)	--
604330	TAV-BH-MW8-400-S	400	ND (0.0308)	--	ND (0.0338)	--	ND (0.648)	--	0.74	0.357	ND (0.108)	--	ND (0.777)	--
604330	TAV-BH-MW8-480-S	480	ND (0.0274)	--	ND (0.0313)	--	1.27	0.496	0.708	0.333	**ND (0.202)**	--	ND (0.685)	--
Background Soil Activities—Southwest Area[d]			0.664	NA	NE	NA	1.76	NA	1.01	NA	0.16	NA	1.4	NA

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

[a]EPA November 1986.

[b]Analysis request/chain-of-custody record.

[c]Two standard deviations about the mean detected activity.

[d]Dinwiddie September 1997.

bgs = Below ground surface.
BH = Borehole.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
MW = Monitoring well.
NA = Not applicable.
ND ( ) = Not detected above the minimum detectable activity, shown in parentheses.
ND ( ) = Not detected but minimum detectable activity (shown in parentheses) exceeds background activity.
NE = Not established.
pCi/g = Picocurie(s) per gram.
S = Soil sample.
TA = Technical Area.
-- = Error not calculated for nondetectable results.

Table 20
Summary of Hydraulic Conductivity Values for TA-V Monitoring Wells Installed in 2001

Well Name	Well Depth (ft bgs)	Static Water Level (ft bgs)	Slug Test Date	Hydraulic Conductivity (K)[a]	
				(ft/min)	(cm/sec)
TAV-MW6	532	499.98	7-12-01	7.91E-04	4.02E-04
TAV-MW7	622	502.06	7-12-01	5.88E-04	2.99E-04
TAV-MW8	516	485.48	7-10-01	5.57E-04	2.83E-04
TAV-MW9	607	488.73	7-11-01	1.05E-04	5.33E-05

[a]Hydraulic conductivity calculated with the Hvorslev analysis method using a solid slug withdrawal test.
cm/sec = Centimeters per second.
bgs = Below ground surface.
ft = Foot (feet).
ft/min = Feet per minute.
K = Hydraulic conductivity.
MW = Monitoring well.
TA = Technical Area.

APPENDIX A
Lithologic and Geophysical Logs with Well Construction Diagrams

Sandia National Laboratories/New Mexico
Environmental Restoration Department
TAV-MW6

Geologist: *Stacy Griffith*
Drilling Date: *April 17-21, 2001*
Well Installation Date: *April 22-23, 2001*

Well Completion Data

Asphalt (parking lot)
Concrete Pad

Casing Stickup (ft.): - 0.26'
Casing OD (in.): 5.5"
Casing ID (in.): 5.0"
Casing Material: Schedule 80 PVC

Grout/Backfill Interval: 2' - 492', Bentonite grout

Initial Water Level: 499.72' (7/10/01) ok

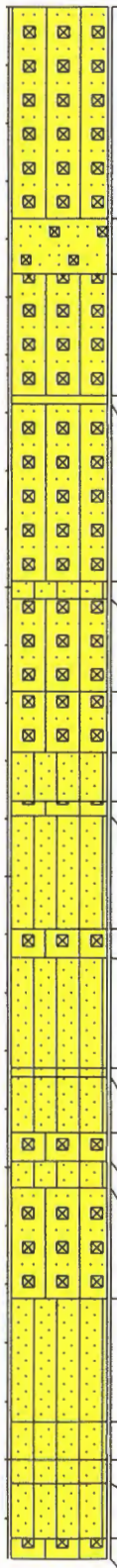
Seal Interval: 492' - 498', 3/8" Bentonite chips

Secondary Pack Interval: 498' - 502', 30/70 silica sand

Primary Pack Interval: 502' - 534', 10/20 silica sand

Screen Interval: 507' - 527', 20-slot schedule 80 PVC
Sump Interval: 527' - 532'
Plug Back Interval: 532' - 534', 10/20 silica sand

Depth (FBGS) | **Lithology** | **Lithologic Description**



0

GM, silty gravel, fine coarse sand, silt mixture. ~50% fine-coarse gravel, ~40% fine-coarse sand, ~10% silt.

GP, poorly graded gravel-sand mixture with little or no fines.

-100

GM, silty gravel, fine-coarse sand, silt mixture. ~50% fine-coarse gravel, ~40% fine-coarse sand, ~10% silt.

GP, poorly sorted gravel-sand mixture with little or no fines.

GM, silty gravel, fine-coarse sand, silt mixture. ~50% fine coarse gravel, ~40% fine coarse sand, ~10% silt.

-200

SM, silty sand. ~60% medium fine sand, ~40 % silt with trace gravel.

GM, silty gravel, sand, silt mixture. ~60% fine-coarse gravel, ~30% fine-coarse sand, ~10% silt.

GM, silty gravel, sand, silt mixture. Same as above with less gravel.

SM, silty sand, sand-silt mixture. ~50% fine medium sand, ~50% silt.

GM, silty gravel, sand, silt mixture. Same as 236' - 257'.

SM, silty sand, sand-silt mixture with trace gravel. ~50% fine medium sand, ~50% silt.

-300

GM, silty gravel, sand, silt mixture. Same as 236' - 257'.

SM, silty sand, sand-silt mixture with trace gravel. Same as 279' - 318'.

SM, silty sand, very fine sand, no gravel. ~40% very fine sand, ~60% silt.

SM, silty sand. Same as above with increase in grain size and trace gravel.

GM, silty gravel, coarse fine sand, silt mixture. ~40% coarse fine gravel, ~50% coarse fine sand, ~10% silt.

-400

SM, silty sand, no gravel. ~50% sand, ~50% silt.

GM, silty gravel. Same as 388' - 398'.

SM, silty sand. Same as 398' - 407'.

SM, silty sand mixture. ~50% fine sand, ~50% silt, no gravel.

-500

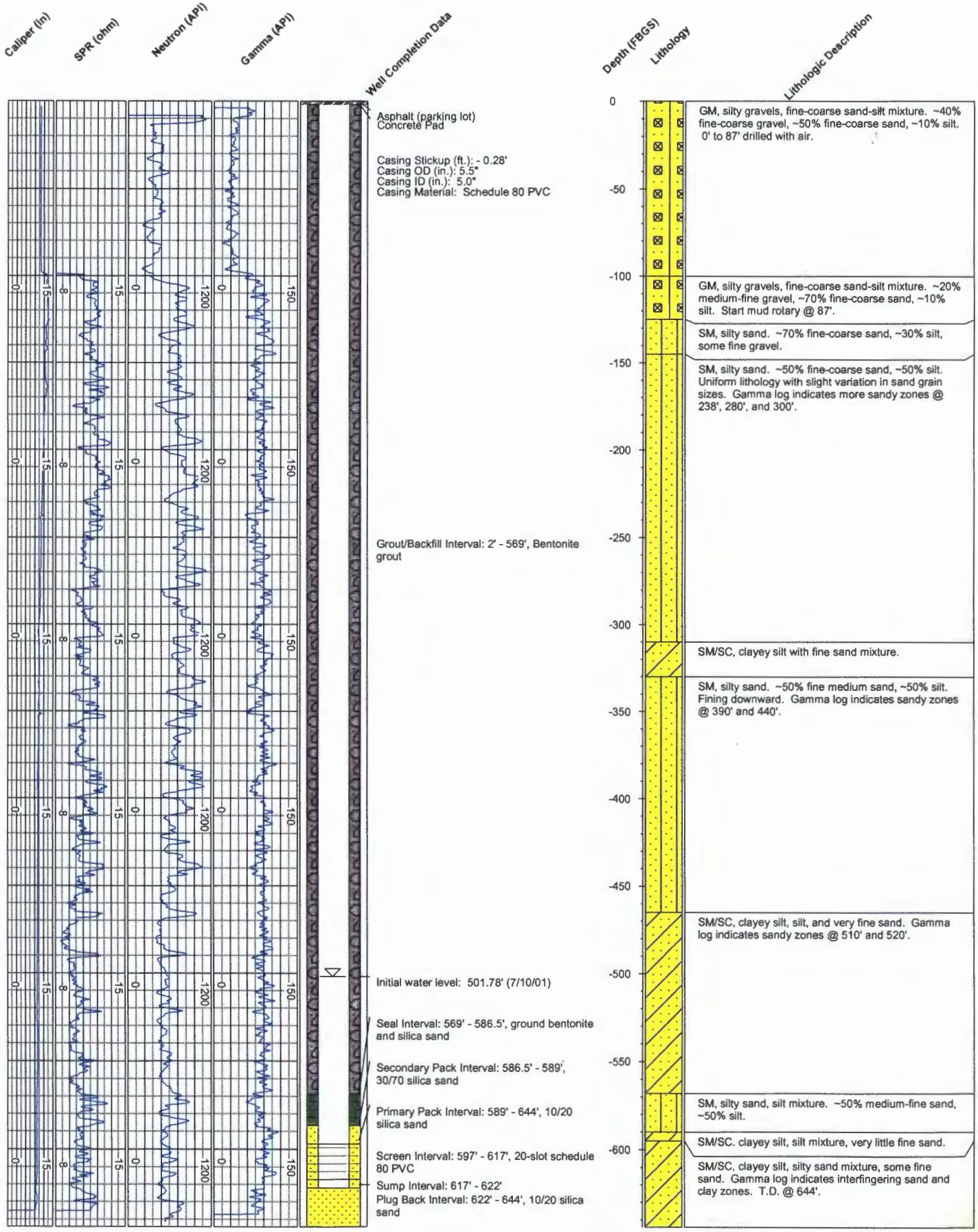
SM, silty sand mixture. ~70% medium-fine sand, 30% silt, no gravel.

SM, silty sand mixture. ~70% coarse-fine sand, ~30% silt, no gravel.

GM, Same as 388' - 398'. T.D. at 534'.

Sandia National Laboratories/New Mexico
Environmental Restoration Department
TAV-MW7

Geologist: ***Stacy Griffith***
Drilling Date: ***March 24-30, 2001***
Well Installation Date: ***March 31 - April 6, 2001***



Sandia National Laboratories/New Mexico
Environmental Restoration Department
TAV-MW8

Geologist: ***Mike Sanders***
Drilling Date: ***April 8-9, 2001***
Well Installation Date: ***April 10-11, 2001***

Well Completion Data

Asphalt (parking lot)
Concrete Pad

Casing Stickup (ft.): - 0.33'
Casing OD (in.): 5.5"
Casing ID (in.): 5.0"
Casing Material: Schedule 80 PVC

Grout/Backfill Interval: 2' - 471', Bentonite grout

Initial Water Level: 485.15' (7/10/01)

Seal Interval: 471' - 477', 3/8" Bentonite chips

Secondary Pack Interval: 477' - 482', 30/70 silica sand

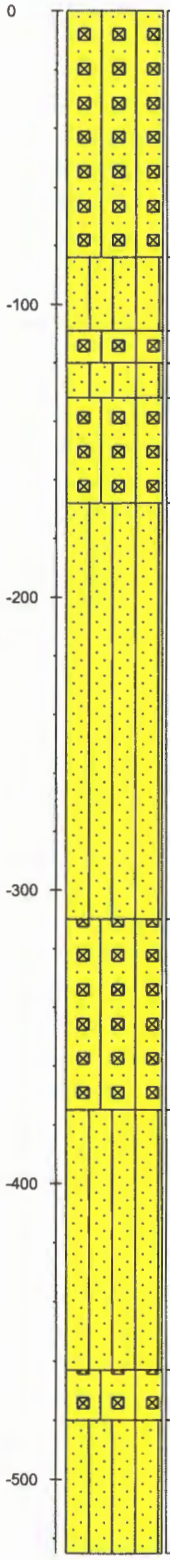
Primary Pack Interval: 482' - 516', 10/20 silica sand

Screen Interval: 491' - 511', 20-slot schedule 80 PVC

Sump Interval: 511' - 516'

Plug Back Interval: 516' - 525', 10/20 silica sand

Depth (FBGS) | **Lithology** | **Lithologic Description**



0

GM, gravel, sand, silt mixture. ~30% gravel, ~40% very fine-coarse sand, ~30% silt. Limestone gravel > 2" at 55'.

-100

SM, silty sand, medium brown. ~90% silty sand, ~10% coarse sand-very fine gravel.

GM, gravel, sand, silt mixture. ~10% fine gravel, ~40% very fine-very coarse sand, ~50% silt.

SM, silty sand, medium brown. Same as 84' - 109'.

GM, gravel, sand, silt mixture. ~10% fine gravel, ~40% very fine-very coarse sand, ~50% silt. Similar to 109' - 120'.

-200

SM, silty very fine sand. Very fine sand throughout interval, increase clay content at 228', and minor gravel from 228' - 238'.

-300

GM, gravel, sand, silt mixture. ~30% gravel, ~50% very fine-very coarse sand, ~20% silt. Variable throughout interval.

-400

SM, silty sand, medium brown. Coarse sand and fine gravel zones at 397', 408', 432', 442', 446', and 450' - 468'.

GM, gravel, sand, silt mixture. ~40% gravel, ~30% fine coarse sand, ~30% silt.

-500

SM, silt and sand mixture. ~50% very fine-very coarse sand, ~50% silt. T.D. at 525'.

Sandia National Laboratories/New Mexico
Environmental Restoration Department
TAV-MW9

Geologist: ***Mike Sanders***
Drilling Date: ***March 9-14, 2001***
Well Installation Date: ***March 15-22, 200***

ANNEX A
Analysis Request/Chain of Custody Forms

Corrections to the AR/COCs

AR/COC	Sample No.-Fraction	As Item appears on the AR/COC	Correction to the AR/COC
604418	054917-001	TAV-BH-MW6-200-S	TAV-BH-MW6-200-TB
604420	054895-004	TAV-BH-MW6-200-S	TAV-BH-MW6-200-DU
604437	054906-004	TAV-BH-MW6-360-DU	TAV-BH-MW6-380-DU
604438	054907-001	042001 (Date)	042101 (Date)
604438	054907-002	042001 (Date)	042101 (Date)
604438	054907-003	042001 (Date)	042101 (Date)
604326	054848-005	TAV-BH-MW8-40-S	TAV-BH-MW8-40-SG
604326	054849-005	TAV-BH-MW8-100-S	TAV-BH-MW8-100-SG
604326	054850-005	TAV-BH-MW8-200-S	TAV-BH-MW8-200-SG
604326	054852-005	TAV-BH-MW8-300-S	TAV-BH-MW8-300-SG
604329	054853-005	TAV-BH-MW8-400-S	TAV-BH-MW8-400-SG
604329	054855-005	TAV-BH-MW8-480-S	TAV-BH-MW8-480-SG

AR/COC = Analysis request/chain of custody.
BH = Borehole.
DU = Duplicate sample.
ID = Identification.
No. = Number.
MW = Monitoring well.
S = Soil sample.
SG =Soil gas (vapor) sample.
TAV = Technical Area Five.
TB = Trip blank.

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab: SMO

Batch No.: N/A SAR/WR No.:

AR/COC: 604325

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-10-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders TA III/VASGW	Carrier/Waybill No.	742746	Project/Task No.:	7219.01.00
Project Name:	~~TA-V Well Borehole~~	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	Doug Salmi
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	CF012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: ~~604327~~ Non Release

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054848-001	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	AG	4oz	None	G	SA	VOC (8260)	
054848-002	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	
054848-003	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	G	1L	None	G	SA	Tritium (906.0)	
054849-001	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	AG	2x4oz	None	G	SA + MS/MSD	VOC (8260)	
054849-002	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	G	250 ml	None	G	SA + MS/MSD	TAL metals (6010/7000)	
054849-003	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	G	2x1L	None	G	SA + MS/MSD	Tritium (906.0)	
054850-001	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	AG	4oz	None	G	SA	VOC (8260)	
054850-002	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	
054850-003	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	G	1L	None	G	SA	Tritium (906.0)	
054851-001	TAV-BH-MW8-200-DU	200	N/A	040801 1453	S	AG	4oz	None	G	DU	VOC (8260)	

RMMA ☐ Yes ☑ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day
Return Samples By: ☐ Negotiated TAT

Sample Tracking — Smo Use
Date Entered(mm/dd/yy) 04/12/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Maryann Sanchez	MS	Weston/6135/845-3267
	G Quintana	Gilbert Quintana	GQ	IT/6135/284-3309
	~~W Gobson~~			~~MDM/6133/845-3267~~

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Maryann Sanchez	Org. 6135	Date 4-10-01	Time 1000	4.Relinquished by	Org.	Date	Time
1. Received by Gilbert Quintana	Org. 6132	Date 4/10/01	Time 1000	4. Received by	Org.	Date	Time
2.Relinquished by Gilbert Quintana	Org. 6132	Date 4-10-01	Time 1130	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

CONTRACT LABORATORY

Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604325

Project Name: TA-V Well Borehole | Project/Task Manger: Lai/Sanders | Project/Task No.: 7219.01.05

Location: Tech Area

Building NA Room NA

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
054851-002	TAV-BH-MW8-200-DU	200	N/A	040801 1453	S	G	250 ml	None	G	DU	TAL metals (6010/7000)	
054851-003	TAV-BH-MW8-200-DU	200	N/A	040801 1453	S	G	1L	None	G	DU	Tritium (906.0)	
054852-001	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	AG	4oz	None	G	SA	VOC (8260)	
054852-002	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	
054852-003	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	G	2x1L	None	G	SA	Tritium (906.0)	
054871-001	TAV-BH-MW8-40-TB	N/A	N/A	040801 0915	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	

LAB USE

Abnormal Conditions on Receipt

Recipient Initials_____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. SAR/WR No.

AR/COC 604326

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	SMO USE	Contract No:	☐ Waste Characterization
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.		Project/Task No.: 7219.01.05	-RCRA Date=
Project Name:	TA-V Well Borehole	Lab Contact:	R Natha 505-284-3317	SMO Authorization:	☐ Send:Preliminary/report to
Record Center Code:	ER/1306/DAT	Lab Destination:	ERCL		☐ Validation Required
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		☑ Released by COC No.: 604327
Service Order No.	CFO 012-01	Send Report to SMO:	S Jensen 505-844-3184		Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800, MS-0154
Building NA	Room NA				Albuquerque, NM., 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve Alf@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054848-005	TAV-BH-MW8-40-SG	40	N/A	040801 0850	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054848-006	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	B	125ml	None	G	SA	Volumetric Soil Moisture	
054849-005	TAV-BH-MW8-100-SG	100	N/A	040801 1215	SG	B	2x1L	None	G	SA + MS/MSD	Soil Gas Vapors(8260)	
054849-006	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	B	2x125m	None	G	SA + MS/MSD	Volumetric Soil Moisture	
054850-005	TAV-BH-MW8-200-SG	200	N/A	040801 1436	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054850-006	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	B	125ml	None	G	SA	Volumetric Soil Moisture	
054851-005	TAV-BH-MW8-200-DU	200	N/A	040801 1436	SG	B	1L	None	G	DU	Soil Gas Vapors(8260)	
054851-006	TAV-BH-MW8-200-DU	200	N/A	040801 1453	S	B	125ml	None	G	DU	Volumetric Soil Moisture	
054852-005	TAV-BH-MW8-300-SG	300	N/A	040801 1701	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054852-006	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	B	125ml	None	G	SA	Volumetric Soil Moisture	

RMMA	☐ Yes ☑ No Ref. No.	**Sample Tracking** Smo Use	**Special Instructions/QC Requirements:**
Sample Disposal	☐ Return to Client ☑ Disposal by lab	Date Entered(mm/dd/yy)	EDD ☑ Yes ☐ No
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by:	Raw Data Package ☑ Yes ☐ No
Return Samples By:	☐ Negotiated TAT	QC inits.	*Please send report to:

Abnormal Conditions on Receipt

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	[illegible]	GQ	IT/6135/284-3309
	W Gibson			MDM/6133/845-3267

M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org 6133	Date 040801	Time 1208	4.Relinquished by	Org.	Date	Time
1. Received by Victoria P Pearson	Org 6132	Date 040901	Time 12:08	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

*7 & 15 Day Turnaround Time: ERCL requires prior notification.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page _1_ of _1_

Batch No. 100

SAR/WR No.

AR/COC 604327

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-10-01 SMO USE	Logged By:		☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Task No.:	7219.01.05	☐ Waste Characterization
Project Name:	TA-V Well Borehole	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination: RPSD	Location: N/A	Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building: N/A	Room: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab
					-This COC Number Releases Non Rel
					COC No(s): ~~604326 & 604326~~

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054848-004	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	M	16oz	None	G	SA	Gamma Spec
054849-004	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	M	16oz	None	G	SA	Gamma Spec
054850-004	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	M	16oz	None	G	SA	Gamma Spec
054852-004	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	M	16oz	None	G	SA	Gamma Spec

RMMA	☐ Yes ☑ No	Ref. No.	
Sample Disposal	☑ Return to Client	☐ Disposal by Lab	
Turnaround Time	☑ Normal	☐ Rush	
Sample Tracking	Smo Use		
Date Entered(mm/dd/yy)			
Entered by:			
Required Report Date		QC inits.	

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	[illegible]	GQ	IT/6135/284-3309
	~~W Gibson/6133/845-3267~~			

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1. Relinquished by	Margaret Sanchez	Org. 6135	Date 4/6/01	Time 0950	4. Relinquished by	Org.	Date	Time
1. Received by	[illegible]	Org. 6132	Date 4/10/01	Time 0950	4. Received by	Org.	Date	Time
2. Relinquished by		Org.	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

CONTRACT LABORATORY

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. N/A SAR/WR No.

AR/COC 604328

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-10-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders TA III/V Ass.	Carrier/Waybill No.	742746	Project/Task No.:	7219.01.05
Project Name:	~~TA-V Well Borehole~~ GW	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	CF012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☐ Released by COC No.:

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054853-001	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	AG	4oz	None	G	SA	VOC (8260)	
054853-002	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	
054853-003	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	G	1L	None	G	SA	Tritium (906.0)	
054855-001	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	AG	4oz	None	G	SA	VOC (8260)	
054855-002	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	
054855-003	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	G	1L	None	G	SA	Tritium (906.0)	
054873-001	TAV-BH-MW8-400-TB	N/A	N/A	040901 0827	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	
054872-001	TAV-BH-MW8-400-EB	N/A	N/A	040901 0948	DIW	G	3x40ml	HCl	G	EB	VOC (8260)	
054872-002	TAV-BH-MW8-400-EB	N/A	N/A	040901 0948	DIW	P	500ml	HNO3	G	EB	TAL metals (6010/7000)	
054872-003	TAV-BH-MW8-400-EB	N/A	N/A	040901 0948	DIW	AG	250ml	None	G	EB	Tritium (906.0)	

RMMA ☐ Yes ☑ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day ☐ Negotiated TAT
Return Samples By:

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 04/12/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Packag ☑ Yes ☐ No

Abnormal Conditions on Receipt

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	M Sanchez	MS	Weston/6135/845-3267
	G Quintana	Arthur R Quintana	AQ	IT/6135/284-3309
	~~W Gobson~~			~~MBM/6133/845-3267~~

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4/10/01	Time 0930	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6172	Date 4/10/01	Time 0930	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6132	Date 4/10/01	Time 1130	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

Turnaround Time: ERCL requires prior notification.

CONTRACT LABORATORY

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. SAR/WR No.

AR/COC 604329

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	SMO USE	Contract No:	☐ Waste Characterization
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.		Project/Task No.: 7219.01.05	-RCRA Date=
Project Name:	TA-V Well Borehole	Lab Contact:	R Natha 505-284-3317	SMO Authorization:	☐ Send:Preliminary/report to
Record Center Code:	ER/1306/DAT	Lab Destination:	ERCL		☐ Validation Required
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		☐ Released by COC No.:
Service Order No.	CFO 012-01	Send Report to SMO:	S Jensen 505-844-3184		Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154
Location	Tech Area				
Building NA	Room NA				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054853-005	TAV-BH-MW8-400-S	400	N/A	040901 0805	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054853-006	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	B	125ml	None	G	SA	Volumetric Soil Moisture	
054854-005	TAV-BH-MW8-400-DU	400	N/A	040901 0805	SG	B	1L	None	G	DU	Soil Gas Vapors(8260)	
054854-006	TAV-BH-MW8-400-DU	400	N/A	040901 0827	S	B	125ml	None	G	DU	Volumetric Soil Moisture	
054855-005	TAV-BH-MW8-480-S	480	N/A	040901 1335	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054855-006	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	B	125ml	None	G	SA	Volumetric Soil Moisture	

RMMA	☐ Yes ☐ No Ref. No.	**Sample Tracking** Smo Use	**Special Instructions/QC Requirements:**
Sample Disposal	☐ Return to Client ☑ Disposal by lab	Date Entered(mm/dd/yy)	EDD ☑ Yes ☐ No
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by:	Raw Data Packag ☑ Yes ☑ No
Return Samples By:	☐ Negotiated TAT	QC inits.	*Please send report to: M Sanders 284-2486 MS1089/Org 6135 mrsande@sandia.gov

Abnormal Conditions on Receipt

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	M Sanchez	MS	Weston/6135/845-3267
	G Quintana	G Quintana	GQ	IT/6135/284-3309
	~~W Gibson~~			~~MDM/6133/845-3267~~

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org. 6133	Date 04/10/01	Time 9:03	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/10/01	Time 9:03	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

*7, 8, 15 Day Turnaround Time: ERCL requires prior notification.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page 1 of 1

Batch No. 100

SAR/WR No.

AR/COC 604330

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-10-01 SMO USE	Logged By:		☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Task No.:	7219.01.05	☐ Waste Characterization
Project Name:	TA-V Well Borehole	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination: RPSD	Location: N/A	Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building: N/A	Room: N/A	☐ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☐ Release to Off-Site Lab

-This COC Number Releases COC No(s).: NON-RELEASE

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054853-004	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	M	16oz	None	G	SA	Gamma Spec
054855-004	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	M	16oz	None	G	SA	Gamma Spec

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

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

QC inits.

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	[illegible]	GQ	IT/6135/284-3309
	~~W Gibson~~			~~MDM/6133/845-3267~~

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org 6133	Date 04/10/01	Time 0930	4.Relinquished by	Org.	Date	Time
1. Received by [illegible]	Org 6132	Date 4/10/01	Time 0930	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

~~41550A~~ 41150A S 44553

Page 1 of 1

AR/COC 604412

Internal Lab

Batch No. 100634 SAR/WR No.

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-23-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	743 179	Project/Task No.:	7219.01.05
Project Name:	TA-V Well Borehole	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	CF012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: 604414

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location	Tech Area
Building NA	Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054885-001 ✓	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	AG	4oz	None	G	SA	VOC (8260)	005
054885-002 ✓	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	G	250ml	None	G	SA	TAL metals (6010/7000)	012
054885-003 ✓	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	G	2x1L	None	G	SA	Tritium (906.0)	019
054888-001 ✓	TAV-BH-MW6-80-S	80	TAV	041701 1637	S	AG	4oz	None	G	SA	VOC (8260)	006
054888-002 ✓	TAV-BH-MW6-80-S	80	TAV	041701 1637	S	G	250ml	None	G	SA	TAL metals (6010/7000)	013
054889-001 ✓	TAV-BH-MW6-100-S	100	TAV	041701 1747	S	AG	4oz	None	G	SA	VOC (8260)	007
054889-002 ✓	TAV-BH-MW6-100-S	100	TAV	041701 1747	S	G	250ml	None	G	SA	TAL metals (6010/7000)	014
054915-001	TAV-BH-MW6-20-TB	20	TAV	041701 0953	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	415002

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☐ Return to Client ☑ Disposal by lab	Date Entered(mm/dd/yy)	
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by	
Return Samples By:	☐ Negotiated TAT	QC inits	

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt: 3.0 ± 4.0°C

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	Margaret Sanchez		Weston/6135/845-3267
	~~O Quintana~~			~~H/6135/284-3309~~
	W Gobson	William J Gobson	WJG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RPD review OK [illegible] 4/23

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org. 6135	Date 04/20/01	Time 10:50	4.Relinquished by	Org.	Date	Time
1. Received by [illegible]	Org. 6132	Date 4-19-01	Time 10:50	4. Received by	Org.	Date	Time
2.Relinquished by [illegible]	Org. 6132	Date 4-23-01	Time 11:30	5.Relinquished by	Org.	Date	Time
2. Received by Patricia Baker	Org. 661	Date 4-24-01	Time 08:30	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

ON-SITE LABORATORY (RPSD)
ANALYSIS REQUEST AND CHAIN OF CUSTODY

RUSH

ernal Lab

itch No. 100634 SAR/WR No.

AR/COC 604414

ept. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-19-01	SMO USE	Logged By:	
oject/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC		Project/Task No.: 7219.01.05	
oject Name:	TA-V Well Borehole	Lab Contact:	R Reese 505-844-7683	SMO Authorization:	
ecord Center Code:	ER/1306/DAT	Lab Destination:	RPSD	Location	Tech Area:
ogbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110	Building:	Room:
ervice Order No.:	CFO 012-01				

☐ Characterization Only
☐ Waste Characterization
-RCRA Date =
-Send preliminary/copy report to:
☑ Release to ERCL On-Site Lab
☑ Release to Off-Site Lab
-This COC Number Releases
COC No(s): 604412 604413

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054885-004	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	M	500 ml	None	G	SA	
01											Gamma Spec
054888-004	TAV-BH-MW6-80-S	80	TAV	041701 1637	S	M	500 ml	None	G	SA	Gamma Spec
02											
054889-004	TAV-BH-MW6-100-S	100	TAV	041701 1747	S	M	500 ml	None	G	SA	Gamma Spec
03											
LCS 04											

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	
Turnaround Time	☑ Normal ☐ Rush	Entered by:	
	Required Report Date	QC inits.	

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN FOR BACKGROUND LEVEL

Please list as separate report.

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana		MQ	IT/6135/284-3309
	W Gibson	William J Gibson	WJG	MDM/6133/845-3267

1.Relinquished by	Org 6135	Date 4/19/01	Time 1045	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4-19-01	Time 1045	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6132	Date 4-19-01	Time 1055	5.Relinquished by	Org.	Date	Time
2. Received by	Org. 7132	Date 4-19-01	Time 1055	5. Received by	Org.	Date	Time
3.Relinquished by	Org. 7132	Date 4/23/01	Time 0838	6.Relinquished by	Org.	Date	Time
	Org. 6132	Date 4/23/01	Time 0838	6. Received by	Org.	Date	Time

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. 100635 SAR/WR No. 544555 544561

AR/COC 604415

Dept. No./Mail Stop:	~~6135/1089~~ 6133/1087	Date Samples Shipped:	04-23-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders TA III/V Assesm	Carrier/Waybill No.	743179	Project/Task No.:	7219.01.05
Project Name:	~~TA-V Well Borehole~~ GW Mon	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	~~CF012-01~~ CF0012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: 604417

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location	Tech Area
Building NA	Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054890-001	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	AG	2x4oz	None	G	SA + QC	VOC (8260)	
054890-002	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	G	250ml	None	G	SA + QC	TAL metals (6010/7000)	
054890-003	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	G	4x1L	None	G	SA +QC	Tritium (906.0)	
054891-001	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	AG	4oz	None	G	SA	VOC (8260)	
054891-002	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054891-003	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	G	2X1L	None	G	SA	Tritium (906.0)	
054892-001	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	AG	4oz	None	G	SA	VOC (8260)	
054892-002	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054892-003	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	G	2x1L	None	G	SA	Tritium (906.0)	
054893-001	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	AG	4oz	None	G	SA	VOC (8260)	

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 04/26/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Return Samples By:

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	~~C Quintana~~			IT/6135/284-3309
	W Gobson	William Gobson	WG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RAW REVIEW OK EDD 4/25/01

*Please list as separate report.

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4/19/01	Time 1035	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/19/01	Time 1035	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6132	Date 4-23-01	Time 1140	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
	Org.	Date	Time	6. Received by	Org.	Date	Time

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604415

Project Name: TA-V Well Borehole | Project/Task Manger: LaVSanders | Project/Task No.: 7219.01.05

Location: Tech Area
Building NA Room NA

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
054893-002	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054893-003	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	G	2x1L	None	G	SA	Tritium (906.0)	
054916-001	TAV-BH-MW6-120-TB	120	TAV	041801 0919	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	

LAB USE

Abnormal Conditions on Receipt

Recipient Initials _____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Batch No. SAR/WR No. AR/COC 604416

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	SMO USE	Contract No:	☐ Waste Characterization
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.		Project/Task No.: 7219.01.05	-RCRA Date=
Project Name:	TA-V Well Borehole	Lab Contact:	R Natha 505-284-3317	SMO Authorization:	☐ Send:Preliminary/report to
Record Center Code:	ER/1306/DAT	Lab Destination:	ERCL		☐ Validation Required
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		☑ Released by COC No.:604417
Service Order No.	CFO 012-01	Send Report to SMO:	S Jensen 505-844-3184		Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800, MS-0154
Building NA	Room NA				Albuquerque, NM., 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054890-005	TAV-BH-MW6-120-SG	120	TAV	041801 0740	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054890-006	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	B	2x1L	None	G	SA + MS/MSD	Volumetric Soil Moisture	
054891-005	TAV-BH-MW6-140-SG	140	TAV	041801 1333	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054891-006	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054892-005	TAV-BH-MW6-160-SG	160	TAV	041801 1427	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054892-006	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054895-005	TAV-BH-MW6-160-DU	160	TAV	041801 1427	SG	B	1L	None	G	DU	Soil Gas Vapors(8260)	
054895-006	TAV-BH-MW6-160-DU	160	TAV	041801 1457	S	B	1L	None	G	DU	Volumetric Soil Moisture	
054893-005	TAV-BH-MW6-180-SG	180	TAV	041801 1635	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054893-006	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	B	1L	None	G	SA	Volumetric Soil Moisture	

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☐ Return to Client ☑ Disposal by lab	Date Entered(mm/dd/yy)	
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by:	
Return Samples By:	☐ Negotiated TAT	QC Inits.	

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	~~G Quintana~~			~~IT/6135/284-3300~~
	W Gibson	Wilkon J. Gibson	WJG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org 6133	Date 04/9/01	Time 1130	4.Relinquished by	Org.	Date	Time
1. Received by Bryan Natha	Org 6132	Date 04/9/01	Time 1130	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

*7 & 15 Day Turnaround Time: ERCL requires prior notification.

ON-SITE LABORATORY (RPSD)
ANALYSIS REQUEST AND CHAIN OF CUSTODY

RUSH

mal Lab
ch No. 100635

SAR/WR No

AR/COC 604417

ol. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-19-01 SMO USE	Logged By		☐ Characterization Only
ect/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Project/Task No: 7219.01.05		☐ Waste Characterization
ject Name:	TA-V Well Borehole	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
cord Center Code:	ER/1306/DAT	Lab Destination: RPSD	Location: N/A	Tech Area: N/A	-Send preliminary/copy report to:
gbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building: N/A	Room: N/A	☑ Release to ERCL On-Site Lab
rvice Order No.:	CFO 012-01				☑ Release to Off-Site Lab

-This COC Number Releases COC No(s): 604415 & 604416

ample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054890-004	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	M	500 ml	None	G	SA	
01											Gamma Spec
054891-004	TAV-BH-MW6-140-S	140	TAV	041800 1441	S	M	500 ml	None	G	SA	Gamma Spec
02											
054892-004	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	M	500 ml	None	G	SA	Gamma Spec
03											
054893-004	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	M	500 ml	None	G	SA	Gamma Spec
04											

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☑ Return to Client ☐ Disposal by Lab
Turnaround Time ☑ Normal ☐ Rush

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

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Required Report Date
QC inits

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	~~G Quintana~~			~~IT/6136/284-3309~~
	W Gibson	William J Gibson	WJG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN FOR BACKGROUND LEVEL

Please list as separate report.

1 Relinquished by	Margaret Sanchez	Org 6135	Date 4-19-01	Time 1035	4 Relinquished by	Org	Date	Time
1. Received by	[illegible]	Org 6132	Date 4/19/01	Time 1055	4 Received by	Org	Date	Time
2 Relinquished by	[illegible]	Org 6132	Date 4-19-01	Time 1055	5 Relinquished by	Org	Date	Time
2. Received by	[illegible]	Org 7132	Date 4-19-01	Time 1055	5 Received by	Org	Date	Time
3 Relinquished by	[illegible]	Org 7132	Date 4/23/01	Time 0838	6 Relinquished by	Org	Date	Time
3 Received by	[illegible]	Org 6132	Date 4-23-01	Time 0838	6 Received by	Org	Date	Time

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 1 of 2

Internal Lab Batch No. 100651 SAR/WR No. 544600 544628

AR/COC 604418

Dept. No./Mail Stop:	~~6135/1089~~ 6133/1087	Date Samples Shipped:	4-25-01	SMO USE Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders TA-III/V Assessment	Carrier/Waybill No.	743181	Project/Task No.:	7219.01.05
Project Name:	~~TA-V Well Borehole~~ Groundwater MON	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	L. M. Collect
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	~~CF012-01~~ CF0012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.:604420

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054894-001	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	AG	4oz	None	G	SA	VOC (8260)	
054894-002	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054894-003	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	G	2x1L	None	G	SA	Tritium (906.0)	
054895-001	TAV-BH-MW6-200-DU	200	TAV	041901 0851	S	AG	4oz	None	G	DU	VOC (8260)	
054895-002	TAV-BH-MW6-200-DU	200	TAV	041901 0851	S	G	250ml	None	G	DU	TAL metals (6010/7000)	
054895-003	TAV-BH-MW6-200-DU	200	TAV	041901 0851	S	G	2x1L	None	G	DU	Tritium (906.0)	
054896-001	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	AG	4oz	None	G	SA	VOC (8260)	
054896-002	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054896-003	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	G	2x1L	None	G	SA	Tritium (906.0)	
054897-001	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	AG	4oz	None	G	SA	VOC (8260)	

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☑ Return to Client ☐ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 04/30/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Return Samples By:

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	[illegible]	GQ	IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

*Please list as separate report.

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4-27-01	Time 1100	4.Relinquished by	Org.	Date	Time
1. Received by [illegible]	Org. 6132	Date 4/27/01	Time 1100	4. Received by	Org.	Date	Time
2.Relinquished by [illegible]	Org. 6137	Date 4/27/01	Time 1200	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
				6. Received by	Org.	Date	Time

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604418

Project Name: TA-V Well Borehole | Project/Task Manger: Lal/Sanders | Project/Task No.: 7219.01.05

Location: Tech Area
Building NA Room NA

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
054897-002	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054897-003	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	G	2x1L	None	G	SA	Tritium (906.0)	
054898-001	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	AG	4oz	None	G	SA	VOC (8260)	
054898-002	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054898-003	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	G	2x1L	None	G	SA	Tritium (906.0)	
054899-001	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	AG	4oz	None	G	SA	VOC (8260)	
054899-002	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054899-003	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	G	2x1L	None	G	SA	Tritium (906.0)	
054917-001	TAV-BH-MW6-200-S	200	TAV	041901 0851	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	
			gvc									

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

...nal Lab

Batch No. SAR/WR No. AR/COC 604419

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	SMO USE	Contract No:	☐ Waste Characterization
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.		Project/Task No.: 7219.01.05	-RCRA Date=
Project Name:	TA-V Well Borehole	Lab Contact:	R Natha 505-284-3317	SMO Authorization:	☐ Send:Preliminary/report to
Record Center Code:	ER/1306/DAT	Lab Destination:	ERCL		☐ Validation Required
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		☑ Released by COC No.: 604420
Service Order No.	CFO 012-01	Send Report to SMO:	S Jensen 505-844-3184		Bill To: Sandia National Labs (Accounts Payable) P.O. Box 5800, MS-0154 Albuquerque, NM., 87185-0154
Location	Tech Area				
Building NA	Room NA				

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054894-005	TAV-BH-MW6-200-SG	200	TAV	041901 0811	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054894-006	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054896-005	TAV-BH-MW6-220-SG	220	TAV	041901 1035	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054896-006	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054897-005	TAV-BH-MW6-240-SG	240	TAV	041901 1240	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054897-006	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054898-005	TAV-BH-MW6-260-SG	260	TAV	041901 1459	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054898-006	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054899-005	TAV-BH-MW6-280-SG	280	TAV	041901 1637	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054899-006	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	B	1L	None	G	SA	Volumetric Soil Moisture	

RMMA	☑ Yes ☐ No Ref. No.	**Sample Tracking** Smo Use	**Special Instructions/QC Requirements:**
Sample Disposal	☑ Return to Client ☐ Disposal by lab	Date Entered(mm/dd/yy)	EDD ☑ Yes ☐ No
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by:	Raw Data Package ☑ Yes ☐ No
Return Samples By:	☐ Negotiated TAT	QC inits.	*Please send report to: M Sanders 284-2486 MS1089/Org 6135 mrsande@sandia.gov

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	[illegible]	[illegible]	IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org 6135	Date 04/23/01	Time 1000	4.Relinquished by	Org.	Date	Time
1. Received by [illegible]	Org. 6132	Date 4/23/01	Time 10:00	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

*7 & 15 Day Turnaround Time: ERCL requires prior notification.

ON-SITE LABORATORY (RPSD)

ANALYSIS REQUEST AND CHAIN OF CUSTODY

AR/COC 604420

Internal Lab

Batch No. 100651

SAR/WR No.

Dept. No./Mail Stop:	~~6135/1089~~ 6133/1087	Date Samples Shipped:	4-23-01	SMO USE Logged By:	☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	HC	Project/Task No.: 7219.01.05	☐ Waste Characterization
Project Name:	~~TA-V Well Borehole~~ TA III/V Assessment Groundwater Nov	Lab Contact:	R Reese 505-844-7683	SMO Authorization:	-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination:	RPSD	Location: N/A Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110	Building: N/A Room: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab

-This COC Number Releases COC No(s): 604419 & ~~604420~~ 604418

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054894-004	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	M	500 ml	None	G	SA	Gamma Spec LAB 01
01				782.79							
054895-004	TAV-BH-MW6-200-~~S~~ DU	200	TAV	041901 0851	S	M	500 ml	None	G	DU	Gamma Spec
02				702.29							
054896-004	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	M	500 ml	None	G	SA	Gamma Spec
03				534.29							
054897-004	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	M	500 ml	None	G	SA	Gamma Spec
04				831.39							

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking / Smo Use	Special Instructions/QC Requirements
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy) 04/27/01	EDD ☑ Yes ☐ No
Turnaround Time	☑ Normal ☐ Rush	Entered by: JAC	Raw Data Package ☑ Yes ☐ No
	Required Report Date	QC inits.	*Please send report to:

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Gilbert Quintana	GQ	IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN BACKGROUND PLEASE

Please list as separate report.

1. Relinquished by	Org. 6135	Date 4-27-01	Time 1050	4. Relinquished by	Org. 6132	Date 4/26/01	Time 0732
1. Received by	Org. 6132	Date 4/27/01	Time 1050	4. Received by	Org. 6133	Date 4-26-01	Time 73[illegible]
2. Relinquished by	Org. 6132	Date 4/27/01	Time 1604	5. Relinquished by	Org.	Date	Time
2. Received by	Org. 7132	Date 4/27/01	Time 1604	5. Received by	Org.	Date	Time
3. Relinquished by	Org. 7132	Date 4/25/01	Time 0840	6. Relinquished by	Org.	Date	Time
3. Received by	Org. 6132	Date 4/25/01	Time 0840	6. Received by	Org.	Date	Time

ON-SITE LABORATORY
Analysis Request And Chain Of Custody (Continuation)

100651

AR/COC- 604420

Project Name | Project/Task Manger | Case No

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No / Sample Mass	Date/Time (hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Analysis Request
054898-004	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	M	500 ml	None	G	SA	Gamma Spec LAB01
05				623.89							
054899-004	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	M	500 ml	None	G	SA	Gamma Spec
06				698.4							
LCS											
07											

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

S 44655

Internal Lab

Batch No. 100652 SAR/WR No.

AR/COC 604435

Dept. No./Mail Stop:	~~6135/1089~~ 4133/1087	Date Samples Shipped:	4-25-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/~~Sanders~~ TA-III/V Assessment	Carrier/Waybill No.	743181	Project/Task No.:	~~7210-01-05~~
Project Name:	~~TA-V Well Borehole~~ Groundwater Mon	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	~~GF012-01~~ CF0012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.:604437

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location: Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054901-001	TAV-BH-MW6-320-S	320	TAV	042001 1004	S	AG	4oz	None	G	SA	VOC (8260)	
054901-002	TAV-BH-MW6-320-S	320	TAV	042001 1004	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054901-003	TAV-BH-MW6-320-S	320	TAV	042001 1004	S	G	2x1L	None	G	SA	Tritium (906.0)	
054902-001	TAV-BH-MW6-340-S	340	TAV	042001 1159	S	AG	4oz	None	G	SA	VOC (8260)	
054902-002	TAV-BH-MW6-340-S	340	TAV	042001 1159	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054902-003	TAV-BH-MW6-340-S	340	TAV	042001 1159	S	G	2x1L	None	G	SA	Tritium (906.0)	
054903-001	TAV-BH-MW6-360-S	360	TAV	042001 1447	S	AG	4oz	None	G	SA	VOC (8260)	
054903-002	TAV-BH-MW6-360-S	360	TAV	042001 1447	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054903-003	TAV-BH-MW6-360-S	360	TAV	042001 1447	S	G	2x1L	None	G	SA	Tritium (906.0)	
054906-001	TAV-BH-MW6-360-DU	360	TAV	042001 1447	S	AG	4oz	None	G	DU	VOC (8260)	

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 05/02/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Return Samples By:

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez			Weston/6135/845-3267
	G Quintana			IT/6135/284-3309
	W Gibson			MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
See copy of COC 604437
RAD REVIEW OK

*Please list as separate report.

1.Relinquished by	Org. 6135	Date 4/28/01	Time 1350	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/28/01	Time 1350	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6172	Date 4-28-01	Time 1100	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
	Org.	Date	Time	6. Received by	Org.	Date	Time

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604435

Project Name: TA-V Well Borehole | Project/Task Manger: Lai/Sanders | Project/Task No.: 7219.01.05

Location Tech Area

Building NA Room NA

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use Lab Sample ID
054906-002	TAV-BH-MW6-360-DU	360	TAV	042001 1447	S	G	250ml	None	G	DU	TAL metals (6010/7000)	
054905-003	TAV-BH-MW6-360-DU	360	TAV	042001 1447	S	G	2x1L	None	G	DU	Tritium (906.0)	
054904-001	TAV-BH-MW6-380-S	380	TAV	042001 1644	S	AG	4oz	None	G	SA	VOC (8260)	
054904-002	TAV-BH-MW6-380-S	380	TAV	042001 1644	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054904-003	TAV-BH-MW6-380-S	380	TAV	042001 1644	S	G	2x1L	None	G	SA	Tritium (906.0)	
054905-001	TAV-BH-MW6-400-S	400	TAV	042101 1827	S	AG	4oz	None	G	SA	VOC (8260)	
054905-002	TAV-BH-MW6-400-S	400	TAV	042101 1827	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054905-003	TAV-BH-MW6-400-S	400	TAV	042101 1827	S	G	2x1L	None	G	SA	Tritium (906.0)	
054920-001	TAV-BH-MW6-320-TB	320	TAV	042001 1004	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	
054920-001	TAV-BH-MW6-380-EB	380	TAV	042001 1547	DIW	G	3x40ml	HCl	G	EB	VOC (8260)	
054921-002	TAV-BH-MW6-380-EB	380	TAV	042001 1547	DIW	P	~~250ml~~ 500ml	HNO3	G	EB	TAL metals (6010/7000)	
054921-003	TAV-BH-MW6-380-EB	380	TAV	042001 1547	DIW	G	~~500ml~~ ~~125ml~~ 250ml	None	G	EB	Tritium (906.0)	

Abnormal Conditions on Receipt LAB USE

Recipient Initials_____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

ernal Lab

Batch No. SAR/WR No. AR/COC 604436

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	SMO USE	Contract No:	☐ Waste Characterization
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.		Project/Task No.: 7219.01.05	-RCRA Date=
Project Name:	TA-V Well Borehole	Lab Contact:	R Natha 505-284-3317	SMO Authorization:	☐ Send:Preliminary/report to
Record Center Code:	ER/1306/DAT	Lab Destination:	ERCL		☐ Validation Required
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		☑ Released by COC No.: 604437
Service Order No.	CFO 012-01	Send Report to SMO:	S Jensen 505-844-3184		Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800, MS-0154
Building NA	Room NA				Albuquerque, NM., 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054901-005	TAV-BH-MW6-320-SG	320	TAV	042001 0935	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054901-006	TAV-BH-MW6-320-S	320	TAV	042001 1004	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054902-005	TAV-BH-MW6-340-SG	340	TAV	042001 1137	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054902-006	TAV-BH-MW6-340-S	340	TAV	042001 1159	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054903-005	TAV-BH-MW6-360-SG	360	TAV	042001 1353	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054903-006	TAV-BH-MW6-360-S	360	TAV	042001 1447	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054904-005	TAV-BH-MW6-380-SG	380	TAV	042001 1625	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054904-006	TAV-BH-MW6-380-S	380	TAV	042001 1644	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054906-005	TAV-BH-MW6-380-DU	380	TAV	042001 1625	SG	B	1L	None	G	SA	Soil Gas Vapors(8260) (leaking)	
054906-006	TAV-BH-MW6-380-DU	380	TAV	042001 1644	S	B	1L	None	G	SA	Volumetric Soil Moisture	

RMMA	☑ Yes ☐ No Ref. No.	**Sample Tracking** Smo Use	**Special Instructions/QC Requirements:**
Sample Disposal	☐ Return to Client ☑ Disposal by lab	Date Entered(mm/dd/yy)	EDD ☑ Yes ☐ No
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by:	Raw Data Package ☑ Yes ☐ No
Return Samples By:	☐ **Negotiated TAT**	QC inits.	*Please send report to:

Abnormal Conditions on Receipt

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	[illegible]	GQ	IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org 6133	Date 04/23/01	Time 1453	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/23/01	Time 14:53	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

*7 & 15 Day Turnaround Time: ERCL requires prior notification.

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604436

Project Name: TA-V Well Borehole | Project/Task Manger: Lal/Sanders | Project/Task No.: 7219.01.05

Location Tech Area

Building NA Room NA

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
054905-005	TAV-BH-MW6-400-SG	400	TAV	042001 1809	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054905-006	TAV-BH-MW6-400-S	400	TAV	042001 1827	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054900-005	TAV-BH-MW6-300-SG	300	TAV	042001 0736	SG	B	1L	None	G	SA	Soil Gas Vapors(8260) (Flat)	

Abnormal Conditions on Receipt LAB USE

Recipient Initials_____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

SMO Tech review
< 2nCi/g MWL 9/25/01
No H-3 concerns per generator

Internal Lab

Page 1 of 2

Batch No. 100652 SAR/WR No.

AR/COC 604437

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-23-01 SMO USE	Logged By:	☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	HC	Project/Task No.: 7219 01.05	☐ Waste Characterization
Project Name:	TA-V Well Borehole	Lab Contact:	R Reese 505-844-7683	SMO Authorization:	-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination:	RPSD	Location: N/A Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110	Building: N/A Room: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab
					-This COC Number Releases COC No(s).: 604435 604436

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054901-004	TAV-BH-MW6-320-S	320	TAV	042001 1004	S	M	500 ml	None	G	SA	Gamma Spec LAB 02
01				625.19							
054902-004	TAV-BH-MW6-340-S	340	TAV	042001 1159	S	M	500 ml	None	G	SA	Gamma Spec
02				629.59							
054903-004	TAV-BH-MW6-360-S	360	TAV	042001 1447	S	M	500 ml	None	G	SA	Gamma Spec
03				564.59							
054906-004	TAV-BH-MW6-360-DU	380	TAV	042001 1447	S	M	500 ml	None	G	DU	Gamma Spec
04				485.59							

RMMA	☑ Yes ☐ No	Ref. No.	Sample Tracking / Smo Use
Sample Disposal	☑ Return to Client	☐ Disposal by Lab	Date Entered(mm/dd/yy)
Turnaround Time	☑ Normal	☐ Rush	Entered by:

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Required Report Date QC Inits.

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN FOR BACKGROUND LEVEL

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	[signature]	MS	Weston/6135/845-3267
	G Quintana	[signature]	GQ	IT/6135/284-3309
	W Gibson	[signature]	WG	MDM/6133/845-3267

Please list as separate report.

1. Relinquished by [signature]	Org 6135	Date 4/25/01	Time 1345	4. Relinquished by	Org.	Date	Time
1. Received by [signature]	Org 6135	Date 4/25/01	Time 1345	4. Received by	Org.	Date	Time
2. Relinquished by [signature]	Org 6135	Date 4/25/01	Time 1605	5. Relinquished by	Org.	Date	Time
2. Received by [signature]	Org. 7132	Date 4/25/01	Time 1605	5. Received by	Org.	Date	Time
3. Relinquished by [signature]	Org 7132	Date 4/23/01	Time 08:40	6. Relinquished by	Org.	Date	Time
3. Received by [signature]	Org. 1132	Date 4/25/01	Time 0840	6. Received by	Org.	Date	Time

ON-SITE LABORATORY

Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604437

Sample No./Fraction / RPSD No./Fraction	LR Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	LR Sample No. / Sample Mass	Date/Time Collected / Sample Quantity	Reference COV (available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054904-004	TAV-BH-LW6-380-S	380	TAV	04/001 1611	S	M	500 ml	None	G	SA	Gamma Spec LAB 02
05				692.79							
054905-004	TAV-BH-LW6-400-S	400	TAV	04/001 1627	S	M	500 ml	None		SA	Gamma Spec
06				617.39							
LCS											
07											

Abnormal Conditions on Receipt

LAB USE

Recipient Initials _____

$44665

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. 100650 SAR/WR No.

AR/COC 604438

Dept. No./Mail Stop:	~~6135/1089~~ 6133/1087	Date Samples Shipped:	4-24-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/~~Sanders~~ TA III/V Assessor	Carrier/Waybill No.	743180	Project/Task No.:	7219.01.05
Project Name:	~~TA-V Well Borehole~~ MON	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	~~CF012-01~~ CF0012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: 604440

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054907-001	TAV-BH-MW6-420-S	420	TAV	042001 0842	S	AG	4oz	None	G	SA	VOC (8260)	
054907-002	TAV-BH-MW6-420-S	420	TAV	042001 0842	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054907-003	TAV-BH-MW6-420-S	420	TAV	042001 0842	S	G	2x1L	None	G	SA	Tritium (906.0)	
054909-001	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	AG	4oz	None	G	SA	VOC (8260)	
054909-002	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054909-003	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	G	2x1L	None	G	SA	Tritium (906.0)	
054910-001	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	AG	4oz	None	G	SA	VOC (8260)	
054910-002	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054910-003	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	G	2x1L	None	G	SA	Tritium (906.0)	
054911-001	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	AG	4oz	None	G	SA	VOC (8260)	

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 04/30/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Return Samples By:

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Gilbert Quintana	GQ	IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by	Margaret Sanchez	Org. 6135	Date 4/23/01	Time 1338	4.Relinquished by	Org.	Date	Time
1. Received by	[illegible]	Org. 6157	Date 4/23/01	Time 1335	4. Received by	Org.	Date	Time
2.Relinquished by	[illegible]	Org. 6152	Date 4/24/01	Time 1045	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
		Org.	Date	Time	6. Received by	Org.	Date	Time

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC 604438

Project Name:	TA-V Well Borehole	Project/Task Manger:	Lal/Sanders	Project/Task No.:	7219.01.05
Location	Tech Area				
Building NA	Room NA	Reference LOV (available at SMO)			

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
054911-002	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054911-003	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	G	2x1L	None	G	SA	Tritium (906.0)	
054918-001	TAV-BH-MW6-420-TB	420	TAV	042101 0842	DIW	~~3x40ml~~ G	3x40ml	HCl	G	TB	VOC (8260)	

Abnormal Conditions on Receipt LAB USE

Recipient Initials_____

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. SAR/WR No.

AR/COC 604439

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	SMO USE	Contract No:	☐ Waste Characterization
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.		Project/Task No.: 7219.01.05	-RCRA Date=
Project Name:	TA-V Well Borehole	Lab Contact:	R Natha 505-284-3317	SMO Authorization:	☐ Send: Preliminary/report to
Record Center Code:	ER/1306/DAT	Lab Destination:	ERCL		☐ Validation Required
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		☑ Released by COC No.: 604440
Service Order No.	CFO 012-01	Send Report to SMO:	S Jensen 505-844-3184		Bill To: Sandia National Labs (Accounts Payable)
Location	Tech Area				P.O. Box 5800, MS-0154
Building NA	Room NA				Albuquerque, NM., 87185-0154

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054907-005	TAV-BH-MW6-420-SG	420	TAV	042101 0819	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054907-006	TAV-BH-MW6-420-S	420	TAV	042101 0842	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054909-005	TAV-BH-MW6-460-SG	460	TAV	042101 1113	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054909-006	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054910-005	TAV-BH-MW6-480-SG	480	TAV	042101 1351	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054910-006	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	B	1L	None	G	SA	Volumetric Soil Moisture	
054911-005	TAV-BH-MW6-500-SG	500	TAV	042101 1630	SG	B	1L	None	G	SA	Soil Gas Vapors(8260)	
054911-006	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	B	1L	None	G	SA	Volumetric Soil Moisture	

RMMA	☑ Yes ☐ No Ref. No.	**Sample Tracking** Smo Use	**Special Instructions/QC Requirements:**
Sample Disposal	☑ Return to Client ☐ Disposal by lab	Date Entered(mm/dd/yy)	EDD ☑ Yes ☐ No
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by:	Raw Data Package ☑ Yes ☐ No
Return Samples By:	☐ Negotiated TAT	QC inits.	*Please send report to:

Abnormal Conditions on Receipt

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	Margaret Hawley	MH	Weston/6135/845-3267
	G Quintana	Walt Quintana	GQ	IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Hawley	Org 6135	Date 04/23	Time 1445	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/23/01	Time 14:45	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

*7 & 15 Day Turnaround Time: ERCL requires prior notification.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

RUSH 4/24 0930

Page 1 of 1

Internal Lab

Batch No. 100650

SAR/WR No.

AR/COC 604440

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-23-01 (SMO USE)	Logged By:	
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	HC	Project/Task No.:	7219 01.05
Project Name:	TA-V Well Borehole	Lab Contact:	R Reese 505-844-7683	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	RPSD	Location: N/A	Tech Area: N/A
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110	Building: N/A	Room: N/A
Service Order No.:	CFO 012-01				

☐ Characterization Only
☐ Waste Characterization
-RCRA Date = _____
-Send preliminary/copy report to:

☑ Release to ERCL On-Site Lab
☑ Release to Off-Site Lab
-This COC Number Releases COC No(s): 6044438 & 604439

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054907-004	TAV-BH-MW6-420-S	420	TAV	042101 0842	S	M	500ml	None	G	SA	
01				620.9							Gamma Spec
054909-004	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	M	500ml	None	G	SA	Gamma Spec
02			666.79								
054910-004	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	M	500ml	None	G	SA	Gamma Spec
03				717.79							
054911-004	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	M	500ml	None	G	SA	Gamma Spec
04				625.39							

RMMA	☑ Yes ☐ No Ref. No	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	
Turnaround Time	☑ Normal ☐ Rush	Entered by:	

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Required Report Date

QC Inits.

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN BACKGROUND PLEASE

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Robert Quintana	RQ	IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

Please list as separate report.

1. Relinquished by	Margaret Sanchez	Org 6135	Date 4-23-01	Time 1330	4. Relinquished by		Org 06133	Date 4/24/01	Time 0926
1. Received by		Org 6137	Date 4/23/01	Time 1330	4. Received by		Org 6172	Date 4/24/01	Time 0926
2. Relinquished by		Org 6137	Date 4/23/01	Time 1600	5. Relinquished by		Org	Date	Time
2. Received by		Org 7132	Date 4/23/01	Time 1600	5. Received by		Org	Date	Time
3. Relinquished by		Org 7132	Date 4-24-01	Time 0837	6. Relinquished by		Org	Date	Time
3. Received by		Org 6135	Date 4-24-01	Time 0837	6. Received by		Org	Date	Time

ANNEX B
Data Validation Reports

Sample Findings Summary

Site: TA 3/5 Assessment GWM **AR/COC:** 604325/604328 **Data Type:** Organic, Inorganic, and Rad

Sample ID	Method/CAS Number (Analysis/Analyte)														
	67-64-1 (Acetone)	75-35-4 (1, 1-Dichloroethene)	79-01-6 (Trichloroethene)												
054848-001 / TAV-BH-MW8-40-S		UJ, A2	UJ, A2												
054849-001 / TAV-BH-MW8-100-S		UJ, A2	UJ, A2												
054850-001 / TAV-BH-MW8-200-S		UJ, A2	UJ, A2												
054851-001 / TAV-BH-MW8-200-DU		UJ, A2	UJ, A2												
054852-001 / TAV-BH-MW8-300-S		UJ, A2	UJ, A2												
054853-001 / TAV-BH-MW8-400-S		UJ, A2	UJ, A2												
054855-001 / TAV-BH-MW8-480-S		UJ, A2	UJ, A2												
054871-001 / TAV-BH-MW8-40-TB	J		UJ												
054873-001 / TAV-BH-MW8-400-TB	UJ		UJ												
054872-001 / TAV-BH-MW8-400-EB	J		UJ												
	7429-90-5 (Aluminum)	7440-43-9 (Cadmium)	7440-70-2 (Calcium)	7440-50-8 (Copper)	7439-89-6 (Iron)	7439-96-5 (Manganese)	7440-02-0 (Nickel)	7440-09-7 (Potassium)	7440-66-6 (Zinc)	7440-38-2 (Arsenic)	7440-36-0 (Antimony)	7439-97-6 (Mercury)	7440-39-3 (Barium)		
054848-002 / TAV-BH-MW8-40-S	J, P1		J, P1	J, P1	J	J	J, P1	J, A2		J, P1	UJ, A2	J,P1			
054849-002 / TAV-BH-MW8-100-S	J, P1		J, P1	J, P1	J	J	J, P1	J, A2		J, P1	UJ, A2	J, B3, P1			
054850-002 / TAV-BH-MW8-200-S	J, P1	J, B3	J, P1	J, P1	J	J	J, P1	J, A2	J	J, P1	UJ, A2	UJ, B3, P1			
054851-002 / TAV-BH-MW8-200-DU	J, P1	J, B3	J, P1	J, P1	J	J	J, P1	J, A2	J	J, P1	UJ, A2	UJ, B3, P1			
054852-002 / TAV-BH-MW8-300-S	J, P1	J, B3	J, P1	J, P1	J	J	J, P1	J, A2	J	J, P1	UJ, A2	UJ, B3, P1			
054853-002 / TAV-BH-MW8-400-S	J, P1	J, B3	J, P1	J, P1	J	J	J, P1	J, A2	J	J, P1	UJ, A2	UJ, B3, P1			
054855-002 / TAV-BH-MW8-480-S	J, P1	J, B3	J, P1	J, P1	J	J	J, P1	J, A2	J	J, P1	UJ, A2	UJ, B3, P1			
054872-002 / TAV-BH-MW8-400-EB		UJ, B3					UJ, B3	J, B, B3		UJ, B3		UJ, B3	J, B		

Validated By: Kevin A. Lambert **Date:** 05/18/01

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MEMORANDUM

DATE: May 18, 2001

TO: File

FROM: Kevin Lambert

SUBJECT: Inorganic Data Review and Validation – SNL
T/A 3/5 Assessment GWM, AR/COC No. 604325/604328, SDG No. 40709A&B/40711 (GEL), and Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified methods (ICP – EPA6010B and CVAA – EPA7470A/7471A). All parameters were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. ICP Analysis – Equipment Blank (EB): The initial calibration blank (CCB) absolute values for cadmium, nickel, and arsenic were greater than (>) the detection limit (DL) but less than (<) the reporting limit (RL). Sample results were non-detect and are qualified "UJ, B3."

2. ICP Analysis – EB: The continuing calibration blank (CCB) absolute value for arsenic was > the DL but < the RL. The arsenic result was non-detect and is qualified "UJ, B3." The CCB value for potassium was > the DL. The potassium result was < 5x the CCB value and is qualified "J, B3."

3. ICP Analysis – EB: The method blank (MB) values for barium and potassium were > the DL. The barium and potassium results were < 5x the MB values and are qualified "J, B."

4. CVAA Analysis– EB: The CCB absolute value for mercury was > the DL but < the RL. The mercury result was non-detect and is qualified "UJ, B3."

5. ICP Analysis – Soil: The CCB absolute value for cadmium was > the DL but < the RL. Sample results for 40709-008 and –011 were > 5x the DL and no data are qualified as a result. Sample results for 40709-009, -010, -012, -013, and –014 were < 5x the DL and are qualified "J, B3."

6. ICP Analysis – Soil: The matrix spike (MS) percent recovery (%R) for potassium (178%) and antimony (64%) were outside QC limits (146% and 75% respectively). Potassium results were detect and are qualified "J, A2." Antimony results were non-detect and are qualified "UJ, A2."

7. ICP Analysis - Soil: The replicate relative percent difference (RPD) for aluminum (19%), calcium (55%), copper (64%), and nickel (37%) were outside QC limits (18%, 31%, 29%, and 27% respectively). Sample results were detect and are qualified "J, P1." For arsenic the difference between the original and replicate result was > the RL. Arsenic results for were detect and are qualified "J, P1."

8. ICP Analysis - Soil: The serial dilution RPD for aluminum (11%), calcium (12%), iron (11%), potassium (20%), manganese (11%), and zinc (14%) were outside QC limits (10%). Aluminum, calcium, iron and manganese results were > 50x the RL and are qualified "J." Potassium results for 40709-008, -009, -010, -011, and –014 were > 50x the RL and are qualified "J." Zinc results for 40709-009, -010, -012, -013, and –014 were > 50x the RL and are qualified "J." Potassium results for 40709-012 and –013, and zinc results for 40709-008 and -011 were < 50x the RL and no data are qualified as a result.

9. CVAA Analysis– Soil: The CCB absolute value for mercury was > the DL but < the RL. Sample result for 40709-011 was > 5x the DL and no data is qualified as a result. Sample results for 40709-009, -010, -012, -013, and -014 were non-detect and are qualified "UJ, B3." Sample result for 40709-008 was < 5x the DL and is qualified "J, B3."

10. CVAA Analysis– Soil: The difference between the original and replicate mercury result was > the RL. Sample results for 40709-008 and –011 were detect and are qualified "J, P1." Sample results for 40709-009, -010, -012, -013, and -014 were non-detect and are qualified "UJ, P1."

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

Holding Times

ICP and CVAA Analysis – EB and Soil: The samples were analyzed within the prescribed holding times.

Calibration

ICP and CVAA Analysis – EB and Soil: Initial and continuing calibration verification data met QC acceptance criteria.

Blanks

ICP Analysis - EB: No target analytes were detected in the ICB except for cadmium, calcium, nickel, and arsenic. Cadmium, nickel, and arsenic are qualified as noted above in the summary section. The ICB absolute value for calcium was > the DL but < the RL. The calcium result was > 5x the DL; no data is qualified as a result.

ICP Analysis - EB: No target analytes were detected in the CCB except for aluminum, copper, iron, magnesium, potassium, selenium, sodium, and arsenic. Potassium and arsenic results are qualified as noted above in the summary section. Sodium absolute CCB value was > the DL but < the RL. The sodium result was > 5x the DL; no data is qualified as a result. Aluminum, copper, iron, magnesium, and selenium CCB values were > the DL. Aluminum, iron, and magnesium results were > 5x the CCB value; no data are qualified as a result. Copper and selenium results were non-detect; no data are qualified as a result.

ICP Analysis - EB: No target analytes were detected in the MB except for barium, potassium, and silver. Barium and potassium results are qualified as noted above in the summary section. The silver result was non-detect; no data is qualified as a result.

CVAA Analysis - EB: Mercury was not detected in the ICB and MB. Mercury was detected in the CCB and is qualified as noted above in the summary section.

ICP Analysis - Soil: No target analytes were detected in the ICB except for cadmium, calcium, nickel, and arsenic. Cadmium is qualified as noted above in the summary section. The ICB absolute values for calcium, nickel, and arsenic was > the DL but < the RL. Calcium, nickel, and arsenic results were > 5x the DL; no data are qualified as a result.

ICP Analysis - Soil: No target analytes were detected in the CCB except for aluminum, copper, iron, magnesium, nickel, potassium, sodium, lead, and arsenic. Aluminum, magnesium, nickel, sodium, lead, and arsenic absolute CCB values were > the DL but < the RL. Aluminum, magnesium, nickel, sodium, lead, and arsenic results were > 5x the DL; no data are qualified as a result. Copper, iron, and potassium CCB values were > the DL. Copper, iron, and potassium results were > 5x the CCB value; no data are qualified as a result.

ICP Analysis - Soil: No target analytes were detected in the MB except for barium, calcium, chromium, copper, iron, manganese, potassium, and zinc. The sample results were > 5x the MB values; no data are qualified as a result.

CVAA Analysis - Soil: Mercury was not detected in the ICB and MB. Mercury was detected in the CCB and is qualified as noted above in the summary section.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analyses

ICP Analysis – EB: The LCS met QC acceptance criteria. No LCSD was run on this sample delivery group (SDG). The MS and replicate analysis in the batch met QC criteria.

CVAA Analysis – EB: The LCS/LCSD met QC acceptance criteria.

ICP and CVAA Analysis - Soil: The LCS/LCSD met QC acceptance criteria.

Matrix Spike (MS) Analyses

ICP and CVAA Analysis – EB: No MS was run on this SDG. An MS was run on another SDG in the batch and met QC acceptance criteria.

ICP Analysis –Soil: The MS met QC acceptance criteria except for potassium and antimony. Potassium and antimony are qualified as noted above in the summary section.

CVAA Analysis -Soil: The MS met QC acceptance criteria.

Replicate Analyses

ICP and CVAA Analysis – EB: No replicate was run on this SDG. A replicate was run on another SDG in the batch and met QC acceptance criteria.

ICP Analysis – Soil: The replicate analyses met QC acceptance criteria except for aluminum, calcium, copper, nickel, and arsenic. Aluminum, calcium, copper, nickel, and arsenic are qualified as noted above in the summary section.

CVAA Analysis - Soil: The replicate analyses did not meet QC acceptance criteria for mercury. Mercury results are qualified as noted above in the summary section.

ICP Interference Check Sample (ICS) Analysis

ICP Analysis – EB and Soil: The ICS data met QC acceptance criteria.

ICP Serial Dilution

ICP Analysis - EB: No serial dilution was run on this SDG. A serial dilution was run on another SDG in the batch and met QC acceptance criteria.

ICP Analysis - Soil: The serial dilution met QC acceptance criteria except for aluminum, calcium, iron, manganese, potassium, zinc, chromium, cobalt, copper, sodium, vanadium, and lead. Aluminum, calcium, iron, manganese, potassium, and zinc are qualified as noted above in the summary section. The RPDs for chromium, cobalt, copper, sodium, vanadium, and lead were > 10% but the sample results were < 50x RL; no data are qualified as a result.

Other QC

ICP and CVAA Analysis - EB: Not Applicable

ICP Analysis - Soil: No target analytes were detected in the EB except for aluminum, barium, calcium, chromium, iron, magnesium, potassium, sodium, and zinc. Sample results were > 5x the EB values; no data are qualified as a result. No field blank (FB) was submitted on the ARCOC. Field duplicate pair was submitted, however there are no "required" review criteria for field duplicate analyses comparability.

CVAA Analysis - Soil: No target analytes was detected in the EB. No field blank (FB) was submitted on the ARCOC. Field duplicate pair was submitted, however there are no "required" review criteria for field duplicate analyses comparability.

No other specific issues were identified which affect data quality.

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

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MEMORANDUM

DATE: May 18, 2001

TO: File

FROM: Kevin Lambert

SUBJECT: Organic Data Review and Validation - SNL
T/A 3/5 Assessment GWM, AR/COC No. 604325/604328, SDG No. 40709A&B/40711 (GEL), and Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified methods (VOC – EPA8260B). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. VOC Analysis - Trip Blanks (TBs) and Equipment Blank (EB): The calibration response factor (RF) for trichloroethene (0.235) was less than (<) the specified minimum RF (0.30) but greater than (>) 0.01. Sample results were non-detect and are qualified "UJ."

2. VOC Analysis – TBs and EB: The continuing calibration verification percent difference (CCV %D) for acetone (38%) was > 20% but < 40%. Samples 40711-002 and –003) were detect and are qualified "J." Sample 40711-001 was non-detect and is qualified "UJ."

3. VOC Analysis - Soil: The calibration RF for trichloroethene (0.25) was < the specified minimum RF (0.30) but > 0.01. Sample results were non-detect and are qualified "UJ."

4. VOC Analysis - Soil: The matrix spike/matrix spike duplicate (MS/MSD) relative percent difference (RPD) for 1,1-dichloroethene (28%) and trichloroethene (30%) were outside QC acceptance criteria (20%). Sample results were non-detect and are qualified "UJ, A2."

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

Holding Times

VOC Analysis: The samples were extracted and analyzed within the prescribed holding times.

Calibration

VOC Analysis: The initial calibration data met QC acceptance criteria except for trichloroethene. Trichloroethene is qualified as noted above in the summary section.

VOC Analysis – TBs and EB: The continuing calibration data met QC acceptance criteria except for acetone, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone. Acetone is qualified as noted above in the summary section. The CCV %D for 2-butanone (34%), 4-methyl-2-pentanone (24%), and 2-hexanone (36%) were > 20% but < 40%. Sample results were non-detect and as a result based on professional judgment no data are qualified.

VOC Analysis – Soil: The continuing calibration data met QC acceptance criteria except for chloromethane, bromomethane, bromoform, 4-methyl-2-pentanone, and vinyl acetate. The CCV %D for chloromethane (28%), bromomethane (36%), bromoform (-23%), 4-methyl-2-pentanone (-29%), and vinyl acetate (23%) were > 20% but < 40%. Sample results were non-detect and as a result based on professional judgment no data are qualified.

Blanks

VOC Analysis: No target analytes were detected in the method blank (MB).

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analyses

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

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

VOC Analysis – TBs and EB: The MS/MSD met QC acceptance criteria.

VOC Analysis – Soil: The MS/MSD met QC acceptance criteria except for benzene, 1,1-dichloroethene, and trichloroethene. 1,1-Dichloroethene and trichloroethene are qualified as noted above in the summary section. The MS/MSD RPD for benzene (20%) was slightly outside QC acceptance criteria (19%). All other QC met criteria and sample results were non-detect. As a result based on professional judgement no data are qualified.

Surrogates

VOC Analysis: The surrogate recoveries met QC acceptance criteria.

Internal Standards

VOC Analysis: Internal standards data met QC acceptance criteria.

Other QC

VOC Analysis: No target analytes were detected in the TB except for acetone and 1,2-dichloropropene. Sample results were non-detect; no data are qualified. No target analytes were detected in the EB except for acetone and dibromochloromethane. Sample results were non-detect; no data are qualified. Field duplicate pair was submitted, however there are no "required" review criteria for field duplicate analyses comparability.

No other specific issues were identified which affect data quality.

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

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MEMORANDUM

DATE: May 18, 2001

TO: File

FROM: Kevin Lambert

SUBJECT: Radiochemical Data Review and Validation – SNL T/A 3/5 Assessment GWM, AR/COC No. 604325/604328, SDG No. 40709A&B/40711 (GEL), and Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified method (Tritium – EPA906.0). All analytes were successfully analyzed. No problems were identified with the data package that result in the qualification of data.

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

Holding Times

Tritium: The samples were analyzed within the prescribed holding times.

Calibration

Tritium: Case narrative states all initial and continuing calibration requirements were met.

Blanks

Tritium: No target analytes were detected in the method blank (MB).

Laboratory Control Sample (LCS) Analyses

Tritium: The LCS met QC acceptance criteria.

Matrix Spike (MS) Analyses

Tritium – Equipment Blank (EB): No replicate was run on this SDG. A replicate was run on another SDG in the batch and met QC criteria.

Tritium - Soil: The MS met QC acceptance criteria.

Replicate Analyses

Tritium - EB: No MS was run on this sample delivery group (SDG). An MS was run on another SDG in the batch and met QC criteria.

Tritium - Soil: Replicate analyses met QC acceptance criteria.

Tracer Recovery

Tritium: Not Applicable.

Other QC

Tritium: No tritium was detected in the EB. No field blank (FB) was submitted on the ARCOC. Field duplicate pair was submitted, however there are no "required" review criteria for field duplicate analyses comparability.

No other specific issues were identified which affect data quality.

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

Data Validation Summary

Site/Project: TA 3/5 Assessment GWM Project/Task #: 7219.01.05 # of Samples: 26 Matrix: 5 Aqueous, 21 soil

AR/COC #: 604325 / 604328 Laboratory Sample IDs: 40709-001 to -021 (soil)

Laboratory: GEL 40711-001 to -005 (Aqueous)

Laboratory Report #: 40709A/B, 40711

QC Element	Analysis									
	Organics				Inorganics				H^3 RAD	Other
	VOC	SVOC	Pesticide/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN		
1. Holding Times/Preservation	✓	NA	NA	NA	✓	NA	✓	NA	✓	NA
2. Calibrations	UJ	↓	↓	↓	J	↓	J	↓	✓	↓
3. Method Blanks	✓	↓	↓	↓	✓	↓	✓	↓	✓	↓
4. MS/MSD	UJ	↓	↓	↓	J, UJ	↓	✓	↓	✓	↓
5. Laboratory Control Samples	✓	↓	↓	↓	✓	↓	✓	↓	✓	↓
6. Replicates		↓	↓	↓	J	↓	J, UJ	↓	✓	↓
7. Surrogates	✓	↓	↓	↓		↓		↓		↓
8. Internal Standards	✓	↓	↓	↓		↓		↓		↓
9. TCL Compound Identification	✓	↓	↓	↓		↓		↓		↓
10. ICP Interference Check Sample		↓	↓	↓	✓	↓		↓		↓
11. ICP Serial Dilution		↓	↓	↓	J	↓		↓		↓
12. Carrier/Chemical Tracer Recoveries		↓	↓	↓		↓		↓	NA	↓
13. Other QC	UJ, J	↓	↓	↓	UJ, J	↓	UJ, J	↓	✓	↓

J = Estimated
U = Not Detected
UJ = Not Detected, Estimated
R = Unusable

Check (√) = Acceptable
Shaded Cells = Not Applicable (also "NA")
NP = Not Provided
Other: _____

Reviewed By: Kevin A Lambert Date: 05/19/01

Inorganic Metals

Site/Project: TA3/5 Assessment GWMR/COC #: 604325/604328 Laboratory Sample IDs: 40711-004 (EB)

Laboratory: GEL Laboratory Report #: 40709A/B, 40711

Methods: EPA 6010B, EPA 7470A

# of Samples: 1 Matrix: Aqueous Batch #s: 73700 (ICP), 73531 (CVAA)

CAS #/ Analyte	QC Element																			
	TAL	ICV	CCV	ICB ① ug/l	CCB ② ug/l	Method Blanks mg/l	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	Rep. RPD	ICS AB	Serial Dilu-tion	Field Dup. RPD	Equip. Blanks	Field Blanks		
7429-90-5 Al	✓	✓	✓	✓	11.2J	✓	✓							✓			NA	NA		
7440-39-3 Ba	✓				✓	0.00021J	✓													
7440-41-7 Be	✓					✓	✓													
7440-43-9 Cd	✓			-0.292J		✓	✓													
7440-70-2 Ca	✓			-5.61J		✓	✓													
7440-47-3 Cr	✓			✓		✓	✓													
7440-48-4 Co	✓					✓	✓													
7440-50-8 Cu	✓				0.931J	✓	✓													
7439-89-6 Fe	✓				4.97J	✓	✓													
7439-95-4 Mg	✓				7.20J	✓	✓													
7439-96-5 Mn	✓				✓	✓	✓													
7440-02-0 Ni	✓			-0.882J	✓	✓	✓													
7440-09-7 K	✓			✓	13.7J	0.0149J	✓													
7440-22-4 Ag	✓				✓	0.000509J	✓													
7440-23-5 Na	✓				-28.3J	✓	✓													
7440-62-2 V	✓				✓	✓	✓													
7440-66-6 Zn	✓				✓	✓	✓													
7439-92-1 Pb	✓				✓	✓	✓													
7782-49-2 Se	✓			✓	4.61J	✓	✓													
7440-38-2 As	✓			-2.94J	-4.24J	✓	✓													
7440-36-0 Sb	✓			✓	✓	✓	✓													
7440-28-0 Tl	✓			✓	✓	✓	✓													
7439-97-6 Hg	✓	✓	✓	✓	-0.120J	✓	✓	✓	✓					NA						
Cyanide CN																				

Not Run on this SDG. Run on another SDG in the batch and met QC criteria

Not Run on this SDG. Run on another SDG in the batch and met QC criteria

No "Reason" Reason Criteria

Notes: Shaded rows are RCRA metals. Solids-to-aqueous conversion: mg / kg = µg / g : [(µg / g) x (sample mass (g) / sample vol. (ml)) x (1000 ml / 1 liter)] / Dilution Factor = µg / l

Comments: NA - Not Applicable

SEE OTHER PAGE

Reviewed By: Kevin A Lambert Date: 05/18/01

CoC#: 604325/604328 INORGANIC METALS

Site: TA 3/5 Assessment GWM

GEL

Lab#: 40709A/B, 40711

① ICB:

✓Cd => Absolute ICB value > DL but < RL; Sample result was ND and is qualified "UJ, B3."
Ca => " " " " " " ; Sample result > 5x DL, NO data qualified as a result
✓Ni => " " " " " " ; Sample result was ND and is qualified "UJ, B3"
✓As => " " " " " " ; " " " " " " " "

② CCB:

Al => CCB value > DL; sample result was > 5x CCB value, NO data qualified as a result
Cu => " " " ; Sample result was ND, NO data qualified as a result
Fe => " " " ; sample result was > 5x CCB value, NO data qualified as a result
Mg => " " " ; " " " " " " " , " " " " " "
✓K => " " " ; " " " < 5x " " and is qualified "J, B3"
Se => " " " ; sample result was ND, NO data qualified as a result
Na => Absolute CCB value > DL but < RL; Sample result > 5x DL, NO data qualified as a result
✓As => " " " " " " ; Sample result was ND and is qualified "UJ, B3"
✓Hg => " " " " " " ; " " " " " " " "

③ Method Blanks

✓Ba => MB value > DL; Sample result was < 5x MB value and is qualified "J, B"
✓K => " " " ; " " " " " " " " " " "
Ag => " " " ; Sample result was ND, NO data qualified as a result

KHL 05/18/01

Inorganic Metals

Site/Project: TA 3/5 Assessment GWMR/COC #: 604325/604328 Laboratory Sample IDs: 40709-008, -009, -010, -011, -012, -013 & -014

Laboratory: GEL Laboratory Report #: 40709A/B, 40711

Methods: EPA 6010B, EPA 7471A

# of Samples: 7 Matrix: soil Batch #s: 73649 (ICP), 74183 (CVAA)

CAS #/ Analyte	TAL	ICV	CCV	ICB (1) ug/L	CCB (2) ug/L	Method Blanks (3) mg/kg	LCS	LCSD	LCSD RPD	MS (5)	MSD	MSD RPD	Rep. RPD (6)	ICS AB	Serial Dilution (7)	Field Dup. RPD	40711-004 Equip. Blanks (4) ug/L	Field Blanks		
7429-90-5 Al	✓	✓	✓	✓	-10.4J	✓	✓	✓	✓	N/A	NA	NA	19 (18)	✓	11 (10)		0.0655	NA		
7440-39-3 Ba	✓			✓	✓	0.0489J	✓	✓	✓	✓			✓		✓		0.000636J			
7440-41-7 Be	✓			✓	✓	✓	✓	✓	✓	✓			✓		✓		✓			
7440-43-9 Cd	✓			-0.292J	✓	✓	✓	✓	✓	✓			✓		✓		✓			
7440-70-2 Ca	✓			-5.61J	✓	4.66J	✓	✓	✓	N/A			55 (31)		12 (10)		3.24			
7440-47-3 Cr	✓			✓	✓	0.444J	✓	✓	✓	✓			✓		13 (10)		0.00105J			
7440-48-4 Co	✓			✓	✓	✓	✓	✓	✓	✓			✓		14 (10)		✓			
7440-50-8 Cu	✓			✓	0.616J	0.0779J	✓	✓	✓	✓			64 (29)		12 (10)		✓			
7439-89-6 Fe	✓			✓	3.90J	4.12J	✓	✓	✓	N/A			✓		11 (10)		0.0416J			
7439-95-4 Mg	✓			✓	-3.82J	✓	✓	✓	✓	N/A			✓		13 (10)		0.0357			
7439-96-5 Mn	✓			✓	✓	0.0787J	✓	✓	✓	N/A			✓		11 (10)		✓			
7440-02-0 Ni	✓			-0.882J	-1.03J	✓	✓	✓	✓	✓			37 (27)		✓		✓			
7440-09-7 K	✓			✓	10.8J	2.86J	✓	✓	✓	178 (146)			✓		20 (10)		0.0499J			
7440-22-4 Ag	✓			✓	✓	✓	✓	✓	✓	✓			✓		✓		✓			
7440-23-5 Na	✓			✓	-33.7J	✓	✓	✓	✓	✓			✓		18 (10)		0.594			
7440-62-2 V	✓			✓	✓	✓	✓	✓	✓	✓			✓		11 (10)		✓			
7440-66-6 Zn	✓			✓	✓	0.297J	✓	✓	✓	✓			✓		14 (10)		0.00512			
7439-92-1 Pb	✓			✓	-1.79J	✓	✓	✓	✓	✓			✓		20 (10)		✓			
7782-49-2 Se	✓			✓	✓	✓	✓	✓	✓	✓			✓		✓		✓			
7440-38-2 As	✓			-2.94J	-2.51J	✓	✓	✓	✓	✓			Δ>RL		✓		✓			
7440-36-0 Sb	✓			✓	✓	✓	✓	✓	✓	64 (75)			✓		✓		✓			
7440-28-0 Tl	✓			✓	✓	✓	✓	✓	✓	✓			✓		✓		✓			
7439-97-6 Hg	✓		✓	✓	-0.0868J	✓	✓	✓	✓	✓	NA	NA	Δ>RL	NA	NA		✓			
Cyanide CN																				

10 -14

5

Notes: Shaded rows are RCRA metals. Solids-to-aqueous conversion: mg / kg = µg / g : [(µg / g) x (sample mass (g) / sample vol. (ml)) x (1000 ml / 1 liter)] / Dilution Factor = µg / l

Comments: NA - Not Applicable
N/A - Spike recovery limits do not apply, Sample [c] > 4x spike [c].

Reviewed By: Kevin A Lambert Date: 05/19/01

SEE OTHER PAGES

COC#: 604325/604328 INORGANIC METALS

Site: TA 3/5 Assessment GWM

GEL Lab#: 40709A/B, 40711

1) ICB:

Cd => Absolute ICB value > DL but < RL; Sample results for 40709-008 & -011 were > 5x DL, No data are qualified as a result. Sample results for 40709-009, -010, -012, -013, & -014 were < 5x DL and data are qualified "J, B3"

Ca => Absolute ICB value > DL but < RL; Sample results were > 5x DL, No data are qualified as a result

Ni => " " " " " " ; " " " " " " " " " " " " " "

As => " " " " " " ; " " " " " " " " " " " " " "

2) CCB:

Al => Absolute CCB value > DL but < RL; Sample results were > 5x DL, No data are qualified as a result

Mg => " " " " " " ; " " " " " " " " " " " " " "

Ni => " " " " " " ; " " " " " " " " " " " " " "

Na => " " " " " " ; " " " " " " " " " " " " " "

Pb => " " " " " " ; " " " " " " " " " " " " " "

As => " " " " " " ; " " " " " " " " " " " " " "

Hg => " " " " " " ; Sample result for 40709-011 was > 5x DL, No data is qualified as a result; sample results for 40709-009, -010, -012, -013, & -014 were ND and are qualified "UJ, B3". Sample result for 40709-008 was < 5x DL and is qualified "J, B3"

Cu => CCB value > DL; sample results were > 5x CCB value, No data are qualified as a result

Fe => " " " ; " " " " " " " " " " " " " "

K => " " " ; " " " " " " " " " " " " " "

3) Method Blank:

Ba => MB value > DL; sample results were > 5x MB value, No data are qualified as a result

Ca => " " " ; " " " " " " " " " " " " " "

Cr => " " " ; " " " " " " " " " " " " " "

Cu => " " " ; " " " " " " " " " " " " " "

Fe => " " " ; " " " " " " " " " " " " " "

Mn => " " " ; " " " " " " " " " " " " " "

K => " " " ; " " " " " " " " " " " " " "

Zn => " " " ; " " " " " " " " " " " " " "

KAL 05/18/01

COC# 604323/607320 INORGANIC METALS
Site: TA 3/5 Assessment GWM

GEL Lab# 40709A/B, 40711

4) Eq. Blank:

Al => EB value > DL; Sample results were > 5x EB value, No data are qualified as a result
Ba => " " " ; " " " " " " , " " " " " " "
Ca => " " " ; " " " " " " , " " " " " " "
Cr => " " " ; " " " " " " , " " " " " " "
Fe => " " " ; " " " " " " , " " " " " " "
Mg => " " " ; " " " " " " , " " " " " " "
K => " " " ; " " " " " " , " " " " " " "
Na => " " " ; " " " " " " , " " " " " " "
Zn => " " " ; " " " " " " , " " " " " " "

5) MS %R:

✓K => %R (178) > upper limit (146); Sample results were detect and are qualified "J, A2"
✓Sb => " (64) < lower " (75), " " " ND " " " "UJ, A2"

6) Rep RPD:

✓Al => RPD (19) was outside acceptance criteria (18); Sample results were detect and are qualified "J, P1
✓Ca => " (55) " " " " (31) " " " " " " " "
✓Cu => " (64) " " " " (29) " " " " " " " "
✓Ni => " (37) " " " " (27); " " " " " " " "
✓As => The difference between original & replicate results was > RL; Sample result were detect and are qualified "J, P1"
✓Hg => The difference between original & replicate result was > RL; Detects (40709-008 & -011) are qualified "J, P1", ND (40709-009, -010, -012, -013, & -014) are qualified "UJ, P1"

7) Serial Dilution:

✓Al, Ca, Fe, Mn => RPDs were > 10% and Sample results > 50x RL; data are qualified "J"
✓K => RPD was > 10%; Sample results for 40709-008, -009, -010, -011, & -014 were > 50x RL and are qualified "J"; Sample results for 40709-012 & -013 < 50x RL and No data are qualified
✓Zn => RPD was > 10%; Sample results for 40709-008, -009, -010, -011, -012, -013 & -014 were > 50x RL and are qualified "J"; Sample results for remaining sample < 50x RL and No data qualified as a result
Co, Cr, Cu, Na & Pb => RPDs were ≤ 10% but sample results < 50x RL, No data are

KAL 03/18/01

Volatile Organics (SW 846 Method 8260)

Site/Project: TA 3/5 Assessment GW/MAR/COC #: 604325/604328 # of Samples: 3 Matrix: Aqueous

Laboratory: GEL Laboratory Report #: 40709A/B, 40711 Laboratory Sample IDs: 40711-001, -002, & -003 (TB, EB, & TB)

Methods: EPA 8260B Batch #s: 73958

IS	CAS #	Name	TCL	Min. RF	Intercept	(1) Calib. RF >.05	Calib. RSD/ R^2 <20% / 0.99	(2) CCV %D 20%	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Trip Blanks		
1	74-87-3	Chloromethane	✓	0.10		✓	✓	✓	✓							NA	NA	NA		
1	74-83-9	Bromomethane	✓	0.10		✓	✓													
1	75-01-4	vinyl chloride	✓	0.10		✓	✓													
1	75-00-3	Chloroethane	✓	0.01		✓	✓													
1	75-09-2	methylene chloride (10xblk)	✓	0.01	✓	✓	✓													
1	67-64-1	acetone(10xblk)	✓	0.01		✓	✓	38												
1	75-15-0	carbon disulfide	✓	0.10		✓	✓	✓												
1	75-35-4	1,1-dichloroethene	✓	0.20		✓	✓			✓	✓	✓	✓	✓	✓					
1	75-34-3	1,1-dichloroethane	✓	0.10		✓	✓													
1	67-66-3	Chloroform	✓	0.20		✓	✓													
1	107-06-2	1,2-dichloroethane	✓	0.10		✓	✓													
1	78-93-3	2-butanone(10xblk)	✓	0.01		✓	✓	34												
2	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓	✓												
2	56-23-5	carbon tetrachloride	✓	0.10		✓	✓													
2	75-27-4	Bromodichloromethane	✓	0.20		✓	✓													
2	78-87-5	1,2-dichloropropane	✓	0.01		✓	✓													
2	10061-01-5	cis-1,3-dichloropropene	✓	0.20		✓	✓													
2	79-01-6	Trichloroethene	✓	0.30		0.235	✓			✓	✓	✓	✓	✓	✓					
2	124-48-1	Dibromochloromethane	✓	0.10		✓	✓													
2	79-00-5	1,1,2-trichloroethane	✓	0.10		✓	✓													
2	71-43-2	Benzene	✓	0.50		✓	✓			✓	✓	✓	✓	✓	✓					
2	10061-02-6	trans-1,3-dichloropropene	✓	0.10		✓	✓													
2	75-25-2	Bromoform	✓	0.10		✓	✓													
3	108-10-1	4-methyl-2-pentanone	✓	0.10		✓	✓	24												
3	591-78-6	2-hexanone	✓	0.01		✓	✓	36												
3	127-18-4	Tetrachloroethene	✓	0.20		✓	✓	✓												
3	79-34-5	1,1,2,2-tetrachloroethane	✓	0.30		✓	✓													
3	108-88-3	toluene(10xblk)	✓	0.40		✓	✓			✓	✓	✓	✓	✓	✓					
3	108-90-7	Chlorobenzene	✓	0.50		✓	✓			✓	✓	✓	✓	✓	✓					
3	100-41-4	Ethylbenzene	✓	0.10		✓	✓													
3	100-42-5	Styrene	✓	0.30		✓	✓													
3	1330-20-7	xylenes(total)	✓	0.30		✓	✓													
	540-59-0	1,2-dichloroethylene(total)	✓	0.01		✓	✓													
	110-75-8	2-chloroethyl vinyl ether																		
	108-05-4	vinyl acetate	✓			✓	✓	✓	✓											

Comments:

Notes: Shaded rows are RCRA compounds.

Reviewed By: Kevin A Lambert Date: 05/18/01

Data Validation Summary

Site/Project: TA 3/5 Assessment + GWM Project/Task #: 7219.01.05 # of Samples: 41 Matrix: 5 aqueous, 36 soil

AR/COC #: 604418 / 604435 Laboratory Sample IDs: 41320-001 to -036 (soil)

Laboratory: GEL 41322-001 to -005 (TB, EB)

Laboratory Report #: 41320 / 41322

QC Element	Analysis									
	Organics				Inorganics				RAD	Other
	VOC	SVOC	Pesticide/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN		
1. Holding Times/Preservation	✓				✓	NA	✓	NA	✓	NA
2. Calibrations	UJ				J		J, UJ		✓	
3. Method Blanks	U		Not		✓		✓		✓	
4. MS/MSD	NA				J, UJ		✓		NA	
5. Laboratory Control Samples	✓		Applicable		✓		✓		✓	
6. Replicates					J		✓		NA	
7. Surrogates	✓									
8. Internal Standards	✓									
9. TCL Compound Identification	✓									
10. ICP Interference Check Sample					✓					
11. ICP Serial Dilution					J					
12. Carrier/Chemical Tracer Recoveries									NA	
13. Other QC	U, UJ				J, UJ	↓	UJ	↓	R	↓

J = Estimated
U = Not Detected
UJ = Not Detected, Estimated
R = Unusable

Check (√) = Acceptable
Shaded Cells = Not Applicable (also "NA")
NP = Not Provided
Other: _____

Reviewed By: Kevin A Lambert Date: 06/28/01

Inorganic Metals

Site/Project: TA 3/5 Assessment GWM AR/COC #: 604418/604435 Laboratory Sample IDs: 41322-004 (EB)

Laboratory: GEL Laboratory Report #: 41320/41322

Methods: EPA 6010B, EPA 7470A

# of Samples: 1 Matrix: Aqueous Batch #s: 75258 (ICP), 75903 (CVAA)

CAS #/ Analyte	QC Element																		
	TAL	ICV	CCV	ICB ① µg/l	CCB ② µg/l	Method Blanks ③ µg/l	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	Rep. RPD	ICS AB	Serial Dilution	Field Dup. RPD	Equip. Blanks	Field Blanks		
7429-90-5 Al	✓	✓	✓	✓	26.5J	✓	✓	✓	✓					✓	NA	NA	NA	NA		
7440-39-3 Ba	✓				✓															
7440-41-7 Be	✓				-0.345J															
7440-43-9 Cd	✓				✓															
7440-70-2 Ca	✓				-9.17J															
7440-47-3 Cr	✓				✓															
7440-48-4 Co	✓																			
7440-50-8 Cu	✓																			
7439-89-6 Fe	✓																			
7439-95-4 Mg	✓																			
7439-96-5 Mn	✓																			
7440-02-0 Ni	✓				✓															
7440-09-7 K	✓				-28.5J	✓														
7440-22-4 Ag	✓			✓	4.76J	0.00184J														
7440-23-5 Na	✓			-12.8J	-37.2J	✓														
7440-62-2 V	✓			✓	✓															
7440-66-6 Zn	✓																			
7439-92-1 Pb	✓				✓															
7782-49-2 Se	✓				-2.89J															
7440-38-2 As	✓			✓	4.64J															
7440-36-0 Sb	✓			4.58J	5.25J															
7440-28-0 Tl	✓			✓	✓															
7439-97-6 Hg	✓				-0.121J	✓	✓	✓	✓					NA	NA					
		✓	✓	✓																
Cyanide CN																				

Not Run on this SDG. Run on another SNL SDG in the Batch and met QC Criteria

Notes: Shaded rows are RCRA metals. **Solids-to-aqueous conversion:** mg / kg = µg / g : [(µg / g) x (sample mass {g} / sample vol. {ml}) x (1000 ml / 1 liter)] / Dilution Factor = µg / l

Comments: NA - Not Applicable

SEE OTHER PAGE

Reviewed By: Kevin A Lambert Date: 06/28/01

Inorganic Metals

Site/Project: TA3/5 Assessment GWM AR/COC #: 604418/604435 Laboratory Sample IDs: 41320-013 to -024

Laboratory: GEL Laboratory Report #: 41320/41322

Methods: EPA 6010B, EPA 7471A

# of Samples: 12 Matrix: soil Batch #s: 75375 (ICP), 75698 (CVAA)

CAS #/ Analyte	QC Element																			
	TAL	ICV	CCV	(1) ICB ug/l	(2) CCB ug/l	(3) mg/kg Method Blanks	LCS	(4) LCSD	(4) LCSD RPD	(5) MS ug/l	MSD	MSD RPD	(5) Rep. RPD	ICS AB	(6) Serial Dilu-tion	Field Dup. RPD	(7) mg/l Equip. Blanks	Field Blanks		
7429-90-5 Al	✓	✓	✓	✓	33.4 J	✓	✓	✓	✓	N/A	NA	NA	✓	✓	✓		0.0443 J	NA		
7440-39-3 Ba	✓				✓	0.0912 J	✓	✓	✓	✓			✓				0.000145 J			
7440-41-7 Be	✓				✓	✓	✓	✓	✓	✓			✓				✓			
7440-43-9 Cd	✓			✓	✓	✓	✓	✓	✓	✓			✓				✓			
7440-70-2 Ca	✓			-5.33 J	17.2 J	11.4	✓	✓	✓	N/A			✓				0.0961 J			
7440-47-3 Cr	✓			✓	✓	✓	✓	✓	✓	151 (139)			30 (28)				✓			
7440-48-4 Co	✓				0.437 J		✓	✓	✓	✓			40 (23)				✓			
7440-50-8 Cu	✓				✓		✓	✓	✓	✓			✓				✓			
7439-89-6 Fe	✓				13.3 J		✓	✓	✓	N/A			✓				0.0477 J			
7439-95-4 Mg	✓				20.8		✓	✓	✓	N/A			✓				0.0208			
7439-96-5 Mn	✓				✓		✓	✓	✓	N/A			✓				✓			
7440-02-0 Ni	✓				0.847 J		✓	✓	✓	✓			✓				0.000821 J			
7440-09-7 K	✓				-15.0 J		✓	✓	✓	N/A			✓		23.6 (10)		0.102			
7440-22-4 Ag	✓			✓	✓		✓	✓	✓	✓			✓		✓		0.00265 J			
7440-23-5 Na	✓			-22.3 J	-43.0 J		✓	✓	✓	✓			✓		11.6 (10)		0.391			
7440-62-2 V	✓			✓	✓		✓	✓	✓	✓			✓		✓		✓			
7440-66-6 Zn	✓			-1.18 J	-1.66 J		✓	133 (127)	21 (20)	✓			✓							
				✓																
7439-92-1 Pb					1.87 J		✓	✓	✓	✓			✓							
7782-49-2 Se	✓				✓		✓	✓	✓	✓			✓							
7440-38-2 As	✓			✓	✓	✓	✓	✓	✓	✓			✓							
7440-36-0 Sb	✓			4.38 J	4.75 J	0.568 J	✓	✓	✓	44 (75)			✓							
7440-28-0 Tl	✓			✓	✓	✓	✓	✓	✓	✓			✓							
			✓								✓	✓								
7439-97-6 Hg	✓		✓	-0.0781 J	-2.15 J	✓	✓	✓	✓	✓	NA	NA	✓							
		✓												✓	✓		✓			
Cyanide CN																				

Notes: Shaded rows are RCRA metals. **Solids-to-aqueous conversion:** mg / kg = µg / g : [(µg / g) x (sample mass {g} / sample vol. {ml}) x (1000 ml / 1 liter)] / Dilution Factor = µg / l

Comments: NA - Not Applicable

N/A - Spike %R do not apply, Sample [c] > 4x spike [c]

Reviewed By: Kevin A Lambert Date: 06/28/01

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No Required Reviewer Criteria

Metals

41322-004 COC# 604418/604435

1) Na ⇒ ICB absolute value > DL but < RL; sample result was > 5x DL, No data is qualified as a result
Sb ⇒ ICB value > DL; sample result was ND and is not qualified as a result

2) Al ⇒ CCB value > DL; sample result was < 5x CCB value and is qualified "J, B3"
Ag ⇒ " " " ; " " " " " " " "
As ⇒ " " " ; " " " ND and is not qualified as a result.
Sb ⇒ " " " ; " " " " " " " " " " "
Be ⇒ CCB absolute value > DL but < RL; sample result was ND and is qualified "UJ, B3"
Se ⇒ " " " " " " ; " " " " " " " "
Hg ⇒ " " " " " " ; sample result was < 5x the DL and is qualified "J, B3"
Ca ⇒ " " " " " " ; " " " > 5x the DL and No data is qualified as a result
K ⇒ " " " " " " ; " " " " " " " " " " " "
Na ⇒ " " " " " " ; " " " " " " " " " " " "

3) Ag ⇒ Sample result was < 5x MB value and is qualified "J, B"

41320-013 to -024

1) Sb ⇒ ICB value > DL; sample results ND except 41320-024 and are not qualified as a result. Sample 41320-024 was < 5x ICB value and is qualified "J, B3"
Ca ⇒ ICB absolute value > DL but < RL; sample results > 5x DL, No data are qualified as a result
Na ⇒ " " " " " " ; " " " " , " " " " " " "
Zn ⇒ " " " " " " ; Sample results < 5x DL or ND, detects are qualified "J, B3 and ND
Hg ⇒ " " " " " " and qualified "UJ, B3".

2) Al ⇒ CCB value > DL; Sample results were > 5x CCB value, No data are qualified as a result.
Ca ⇒ " " " ; " " " " " " / " " " " " " "
Co ⇒ " " " ; " " " " " " / " " " " " " "
Fe ⇒ " " " ; " " " " " " / " " " " " " "
Mg ⇒ " " " ; " " " " " " / " " " " " " "
Ni ⇒ " " " ; " " " " " " / " " " " " "
Pb ⇒ " " " ;
Sb ⇒ See 1) above
K ⇒ CCB absolute value > DL but < RL; sample results were > 5x DL, No data are qualified as a result
Na ⇒ " " " " " " ; " " " " " " , " " " " " " "
Zn ⇒ " " " " " " ;
Hg ⇒ See 1) above

KM [illegible]

Site: IR 3/5 Assessment GW-1 Metals
COC# 604418/604435

413.20-013 to -024

(3) Ba => Sample results were > 5x MB value, No data are qualified as a result
Ca => " " " " " " ; " " " " " " "
Sb => " " were ND ; " " " " " " "

(4) Zn => LCSD %R (133) was > upper limit (127) and RPD (21) was outside acceptance criteria (20);
KH 6/28/01 ~~Sample results~~ LCS %R met QC criteria, and MS %R and Rep RPD met QC criteria; As a result based on professional judgment No data are qualified

(5) Cr => MS %R (151) was > upper limit (139) and Rep RPD (30) was outside acceptance criteria (28); Samp results were detect and are qualified "J, A2, P1"
Co => Rep RPD (40) was outside acceptance criteria (23); Sample results were detect and are qualifie "J, P1"
Sb => MS %R (44) was < lower limit (75); Sample results were ND except 413.20-024 which is qualified "J," KH 6/28/01 and are qualified "UJ, A2".

(6) K => Serial dilution RPD (23.6) was > 10%; Sample results were > 50x RL for 413.20-013, -014, -01 -018 to -024 and are qualified "J"
Na => Serial Dilution RPD (12) was > 10%; Sample results were < 50x RL, No data are qualified as a result.

(7) Al => Sample results were > 5x EB value; No data are qualified as a result
Ba => " " " " " " ; " " " " " " "
Ca => " " " " " " ; " " " " " " "
Fe => " " " " " " ; " " " " " " "
Mg => " " " " " " ; " " " " " " "
Ni => " " " " " " ; " " " " " " "
K => " " " " " " ; " " " " " " "
Ag => " " " ND ; " " " " " " "
Na => " " " > 5x EB value ; " " " " " " "

KH 06/28/01

Volatile Organics (SW 846 Method 8260)

Site/Project: TA3/5 Assessment GW MAR/COC #: 604418/604435 # of Samples: 3 Matrix: Aqueous

Laboratory: GEL Laboratory Report #: 41320/41322 Laboratory Sample IDs: 41322-001 to -003 (2TBs, EB)

Methods: EPA 8260A Batch #s: 75940

IS	CAS #	Name	TCL	Min. RF	Intercept	Calib. RF >.05	Calib. RSD/ R^2 <20% / 0.99	CCV %D 20%	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Trip Blanks		
1	74-87-3	Chloromethane	✓	0.10	✓	✓	✓	✓	✓							NA	NA	NA		
1	74-83-9	Bromomethane	✓	0.10	✓	✓	✓	63												
1	75-01-4	vinyl chloride	✓	0.10		✓	✓	✓												
1	75-00-3	Chloroethane	✓	0.01		✓	✓													
1	75-09-2	methylene chloride (10xblk)	✓	0.01	✓	✓	✓		1.93											
1	67-64-1	acetone(10xblk)	✓	0.01	✓	✓	✓		✓											
1	75-15-0	carbon disulfide	✓	0.10	✓	✓	✓							Not						
1	75-35-4	1,1-dichloroethene	✓	0.20		✓	✓			✓	✓	✓								
1	75-34-3	1,1-dichloroethane	✓	0.10		✓	✓							Applicable						
1	67-66-3	Chloroform	✓	0.20		✓	✓													
1	107-06-2	1,2-dichloroethane	✓	0.10		✓	✓													
1	78-93-3	2-butanone(10xblk)	✓	0.01	✓	✓	✓													
2	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓													
2	56-23-5	carbon tetrachloride	✓	0.10		✓	✓													
2	75-27-4	Bromodichloromethane	✓	0.20		✓	✓													
2	78-87-5	1,2-dichloropropane	✓	0.01		✓	✓													
2	10061-01-5	cis-1,3-dichloropropene	✓	0.20		✓	✓													
2	79-01-6	Trichloroethene	✓	0.30		✓	✓			✓	✓	✓								
2	124-48-1	Dibromochloromethane	✓	0.10		✓	✓													
2	79-00-5	1,1,2-trichloroethane	✓	0.10		✓	✓													
2	71-43-2	Benzene	✓	0.50	✓	✓	✓			✓	✓	✓								
2	10061-02-6	trans-1,3-dichloropropene	✓	0.10		✓	✓													
2	75-25-2	Bromoform	✓	0.10		✓	✓													
3	108-10-1	4-methyl-2-pentanone	✓	0.10		✓	✓													
3	591-78-6	2-hexanone	✓	0.01		✓	✓													
3	127-18-4	Tetrachloroethene	✓	0.20		✓	✓													
3	79-34-5	1,1,2,2-tetrachloroethane	✓	0.30		✓	✓													
3	108-88-3	toluene(10xblk)	✓	0.40		✓	✓			✓	✓	✓								
3	108-90-7	Chlorobenzene	✓	0.50		✓	✓			✓	✓	✓								
3	100-41-4	Ethylbenzene	✓	0.10	✓	✓	✓													
3	100-42-5	Styrene	✓	0.30		✓	✓													
3	1330-20-7	xylenes(total)	✓	0.30	✓	✓	✓													
	540-59-0	1,2-dichloroethylene(total)	✓	0.01		✓	✓													
	110-75-8	2-chloroethyl vinyl ether																		
108-05-4	vinyl acetate	✓			✓	✓	74													

Comments: NA - Not Applicable **Notes:** Shaded rows are RCRA compounds.

Reviewed By: Kevin A Lambert Date: 06/28/01

Volatile Organics

Site/Project: TA 3/5 Assessment ~~GW~~ AR/COC #: 60418/604435 Batch #s: 75940

Laboratory: GEL Laboratory Report #: 41320/41322 # of Samples: 3 Matrix: Aqueous

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

Sample	SMC 1	SMC 2	SMC 3	IS 1 area	IS 1 RT	IS 2 area	IS 2 RT	IS 3 area	IS 3 RT
		Met				Met			
		Criteria				Criteria			

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

IS 1: Bromochloromethane
IS 2: 1,4-Difluorobenzene
IS 3: Chlorobenzene-d5

Comments:

KAL 6/26/01

~~(1) Bromomethane & Vinyl Acetate => The CCV %Ds (63 & 74) were > 60%. Sample results were ND and are qualified "R".~~

(2) Methylene chloride => Was detected in MB. Sample results were < the RL and < 10x the MB value; Data are qualified ND at the RL (5U, B)

(1) Bromomethane & Vinyl Acetate => CCV %Ds were > 60%; Bias is considered high and sample results were ND, Based on professional judgment data are qualified "UJ"

Volatile Organics (SW 846 Method 8260)

Site/Project: TA3/5 Assessment GWRA R/COC #: 604418/604435 # of Samples: 12 Matrix: soil

Laboratory: GEL Laboratory Report #: 41320/41322 Laboratory Sample IDs: 41320-001 to -012

Methods: EPA 8260A Batch #s: 75430

IS	CAS #	Name	TCL	Min. RF	Intercept	Calib. RF >.05	Calib. RSD/ R^2 <20%/ 0.99	CCV %D (1) 20%	Method Blks (2)	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks (3) 41322-003	Trip Blanks (4) 604418 41322-001	TB 604435 (4) 41322-002
1	74-87-3	Chloromethane	✓	0.10	✓	✓	✓	-45	✓								✓	✓	✓
1	74-83-9	Bromomethane	✓	0.10	✓	✓	✓	✓											
1	75-01-4	vinyl chloride	✓	0.10		✓	✓												
1	75-00-3	Chloroethane	✓	0.01		✓	✓												
1	75-09-2	methylene chloride (10xblk)	✓	0.01	✓	✓	✓										0.895	2.02	2.22
1	67-64-1	acetone(10xblk)	✓	0.01	✓	✓	✓		9.85								10.8	✓	✓
1	75-15-0	carbon disulfide	✓	0.10	✓	✓	✓		✓								✓		
1	75-35-4	1,1-dichloroethene	✓	0.20		✓	✓			✓	✓	✓							
1	75-34-3	1,1-dichloroethane	✓	0.10		✓	✓												
1	67-66-3	Chloroform	✓	0.20		✓	✓												
1	107-06-2	1,2-dichloroethane	✓	0.10		✓	✓												
1	78-93-3	2-butanone(10xblk)	✓	0.01	✓	✓	✓												
2	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓												
2	56-23-5	carbon tetrachloride	✓	0.10		✓	✓												
2	75-27-4	Bromodichloromethane	✓	0.20		✓	✓												
2	78-87-5	1,2-dichloropropane	✓	0.01		✓	✓												4.87
2	10061-01-5	cis-1,3-dichloropropene	✓	0.20		✓	✓												✓
2	79-01-6	Trichloroethene	✓	0.30		✓	✓			✓	✓	✓							
2	124-48-1	Dibromochloromethane	✓	0.10		✓	✓												
2	79-00-5	1,1,2-trichloroethane	✓	0.10		✓	✓												
2	71-43-2	Benzene	✓	0.50	✓	✓	✓			✓	✓	✓							
2	10061-02-6	trans-1,3-dichloropropene	✓	0.10		✓	✓												
2	75-25-2	Bromoform	✓	0.10		✓	✓												
3	108-10-1	4-methyl-2-pentanone	✓	0.10		✓	✓												
3	591-78-6	2-hexanone	✓	0.01		✓	✓												
3	127-18-4	Tetrachloroethene	✓	0.20		✓	✓												
3	79-34-5	1,1,2,2-tetrachloroethane	✓	0.30		✓	✓												
3	108-88-3	toluene(10xblk)	✓	0.40		✓	✓			✓	✓	✓							
3	108-90-7	Chlorobenzene	✓	0.50		✓	✓			✓	✓	✓							
3	100-41-4	Ethylbenzene	✓	0.10	✓	✓	✓												
3	100-42-5	Styrene	✓	0.30		✓	✓												
3	1330-20-7	xylenes(total)	✓	0.30	✓	✓	✓												
	540-59-0	1,2-dichloroethylene(total)	✓	0.01		✓	✓												
	110-75-8	2-chloroethyl vinyl ether	✓																
	108-05-4	vinyl acetate	✓			✓	✓	68											

Not Run on this SDG. Run on another SMC SDG in the batch and met QC criteria.

"Rejected" Review Criteria

Comments: NA - Not Applicable **Notes:** Shaded rows are RCRA compounds.

(1) Vinyl Acetate => CCV % D was > 60%; The bias is considered high and sample results were ND. Based on professional judgement data are qualified "UJ"

Reviewed By: Kevin A Lambert Date: 06/28/01

Volatile Organics

Site/Project: TA3/5 Assessment GWM AR/COC #: 604418/604435 Batch #s: 75430

Laboratory: GEL Laboratory Report #: 41320/41322 # of Samples: 12 Matrix: soil

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

Sample	SMC 1	SMC 2	SMC 3	IS 1 area	IS 1 RT	IS 2 area	IS 2 RT	IS 3 area	IS 3 RT
		Met				Met			
		Criteria				Criteria			

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

IS 1: Bromochloromethane
IS 2: 1,4-Difluorobenzene
IS 3: Chlorobenzene-d5

Comments:

① Chloromethane ⇒ CCV %D (-45) was > 40% but < 60%; Sample results were ND and are qualified "UJ."

~~① Vinyl acetate ⇒ CCV %D was > 60%; Sample results were ND and are qualified "R."~~ KHL 6/26/01

② Acetone ⇒ was detected in MB. Sample 41320-006 was ND and no data is qualified as a result. Samples 41320-001 to -005 and 41320-007 to -012 were > the RL but < 10x MB value, Data are qualified ND at the reported values (RV U, B).

③ ~~Acetone~~ & Methylene Chloride ⇒ were detected in EB; Acetone was already qualified due to MB contamination. No further qualification necessary. The descriptive flag "B2" is included where appropriate. Methylene chloride was ~~< the RL and < 10x EB value, Data are qualified ND at the RL (5 U)~~ > the RL and > 10x EB value; No data are qualified as a result.

~~④ Methylene chloride ⇒ was~~ KHL 6/26/01

④ Methylene chloride ⇒ was detected in TBs. Sample results were < the RL and less than 10x TB values. Data are qualified ND at the RL (5 U, B1)

[illegible] TB < [illegible] ND and no data are qualified as a result

Radiochemistry

Site/Project: TA 3/5 Assessment GWM
AR/COC #: 604418/604435
Laboratory Sample IDs: 41320-025 & -036
Laboratory: GEL
Laboratory Report #: 41320/41322
Methods: EPA 906.0
# of Samples: 12
Matrix: Soil
Batch #s: 75538

Analyte	QC Element												
	Method Blanks	LCS	MS	Rep RER	Equip. Blanks	Field Dup. RER	Field Blanks	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105
H3	✓	✓	NA	NA	NA	NO	NA						
U-238						Required							
U-234						Review							
U-235/-236						Criteria							
Th-232													
Th-228													
Th-230													
Pu-239/-240													
Gross Alpha													
Nonvolatile Beta													
Ra-226													
Ra-28													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Comments:

Reviewed By: Kevin A Lambert Date: 06/28/01

Radiochemistry

Site/Project: TA 3/5 Assessment GWM AR/COC #: 604418/604435 Laboratory Sample IDs: 41322-005 (EB)

Laboratory: GEL Laboratory Report #: 41320/41322

Methods: EPA 906.0

# of Samples: 1 Matrix: Aqueous Batch #s: 76295

Analyte	QC Element												
	Method Blanks	LCS	MS	Rep RER	Equip. Blanks	Field Dup. RER	Field Blanks	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105
H3	✓	✓	✓	✓	NA	NA	NA						
U-238													
U-234													
U-235/-236													
Th-232													
Th-228													
Th-230													
Pu-239/-240													
Gross Alpha													
Nonvolatile Beta													
Ra-226													
Ra-28													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Comments:

Negative sample result => The absolute sample result was > the RL; sample result is qualified "R".

Reviewed By: Kim A Lambert Date: 06/28/01

Contract Verification Review (CVR)

Project Leader LAI | Project Name TA 3/5 ASSESSMENT GWM | Case No. 7219_01.05

AR/COC No. 604418 & 604435 | Analytical Lab GEL | SDG No. 41320A & B

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

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L_c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples		X	ZINC FAILED RECOVERY LIMITS FOR LCD
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	ANTIMONY & CHROMIUM FAILED RECOVERY LIMITS FOR MARTIX SPIKE
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	RPD FOR CHROMIUM & COBALT OUTSIDE ACCEPTANCE LIMITS
b) Matrix spike duplicate RPD data reported and met for all organic samples	NA		
3.5 Blank data a) Method or reagent blank data reported and met for all samples		X	ACETONE DETECTED IN VOC METHOD BLANK CALCIUM DETECTED IN METALS BLANK
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	1,2 DICHLOROPROPANE & METHYLENE CHLORIDE DETECTED IN VOC TRIP BLANK ACETONE & METHYLENE CHLORIDE DETECTED IN VOC EQUIPMENT BLANK MAGNESIUM, POTASSIUM & SODIUM DETECTED IN EQUIPMENT BLANK
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"-analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.)			
a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010 and 8082)			
a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) Instrument run logs provided	NA		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	X		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? ❑ Yes ❑ No

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

If no, provide: nonconformance report or correction request number _____ and date correction request was submitted:_____

Reviewed by:_____ Date: 6-4-2001 Closed by:_____Date:_____

CONTRACT LABORATORY

ANALYSIS REQUEST AND CHAIN OF CUSTODY

41320A

Page 1 of 2

Internal Lab Batch No. 100651 SAR/WR No. 544600 544628

AR/COC 604418

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-25-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lal/Sanders	Carrier/Waybill No.	743181	Project/Task No.:	7219.01.05
Project Name:	TA-V Well Borehole	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	L.M. Collect
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	CF012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.:604420

Bill To: Sandia National Labs (Accounts Payable), P.O. Box 5800, MS-0154, Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054894-001	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	AG	4oz	None	G	SA	VOC (8260)	41320-001
054894-002	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	G	250ml	None	G	SA	TAL metals (6010/7000)	013
054894-003	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	G	2x1L	None	G	SA	Tritium (906.0)	025
054895-001	TAV-BH-MW6-200-DU	200	TAV	041901 0851	S	AG	4oz	None	G	DU	VOC (8260)	002
054895-002	TAV-BH-MW6-200-DU	200	TAV	041901 0851	S	G	250ml	None	G	DU	TAL metals (6010/7000)	014
054895-003	TAV-BH-MW6-200-DU	200	TAV	041901 0851	S	G	2x1L	None	G	DU	Tritium (906.0)	026
054896-001	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	AG	4oz	None	G	SA	VOC (8260)	003
054896-002	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	G	250ml	None	G	SA	TAL metals (6010/7000)	015
054896-003	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	G	2x1L	None	G	SA	Tritium (906.0)	027
054897-001	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	AG	4oz	None	G	SA	VOC (8260)	004

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☑ Return to Client ☐ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day
Return Samples By: ☐ **Negotiated TAT**

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

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
see COC 604470
RAD Review OK 4/25/01

Please list as separate report.

Abnormal Conditions on Receipt
Temp
4.4, 3.4

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Gabriel Quintana	GQ	IT/6135/284-3309
	W Gibson	William J Gibson	WJG	MDM/6133/845-3267

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4-27-01	Time 1100	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/27/01	Time 1100	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6137	Date 4/27/01	Time 1200	5.Relinquished by	Org.	Date	Time
2. Received by Yvette Kirlow	Org. GEL	Date 4/26/01	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

*7 & 15 Day Turnaround Time: ERCL requires prior notification.

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604418

Project Name: TA-V Well Borehole | Project/Task Manger: Lal/Sanders | Project/Task No.: 7219.01.05

Location: Tech Area

Building NA Room NA

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
054897-002	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	G	250ml	None	G	SA	TAL metals (6010/7000)	016
054897-003	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	G	2x1L	None	G	SA	Tritium (906.0)	023
054898-001	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	AG	4oz	None	G	SA	VOC (8260)	025
054898-002	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	G	250ml	None	G	SA	TAL metals (6010/7000)	017
054898-003	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	G	2x1L	None	G	SA	Tritium (906.0)	029
054899-001	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	AG	4oz	None	G	SA	VOC (8260)	026
054899-002	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	G	250ml	None	G	SA	TAL metals (6010/7000)	018
054899-003	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	G	2x1L	None	G	SA	Tritium (906.0)	030
054917-001	TAV-BH-MW6-200-S	200	TAV	041901 0851	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	41322001

Abnormal Conditions on Receipt LAB USE

Recipient Initials MK

Sample Findings Summary

Site: TA3/5 Assessment GWM **AR/COC:** 604438 **Data Type:** Radiochemical

Sample ID	Method/CAS Number (Analysis/Analyte)
	All QC acceptance criteria were met.
	No sample data were qualified.

Validated By: Mr. Kenneth Salaz **Date:** 7/25/01

Sample Findings Summary

Site: TA3/5 Assessment GWM **AR/COC:** 604438 **Data Type:** Organic

Sample ID	Method/CAS Number (Analysis/Analyte)														
	67-64-1 (acetone)	75-09-2 (methylene chloride)	79-01-6 (trichloroethene)	108-05-4 (vinyl acetate)											
054907-001 TAV-BH-MW6-420-S		5U,B	UJ	R											
054909-001 TAV-BH-MW6-460-S		5U,B	UJ	R											
054910-001 TAV-BH-MW6-480-S	J	5U,B	UJ	R											
054911-001 TAV-BH-MW6-500-S	J	5U,B	UJ	R											
054918-001 TAV-BH-MW6-420-TB			UJ	R											

Validated By: Mr. Kenneth Salaz **Date:** 7/25/01

Sample Findings Summary

Site: TA3/5 Assessment GWM **AR/COC:** 604438 **Data Type:** Inorganic

Sample ID	Method/CAS Number (Analysis/Analyte)														
	7440-23-5 (Na)	7440-36-0 (Sb)	7782-49-2 (Se)												
054907-002 TAV-BH-MW6-420-S	J,B3	UJ,A2													
054909-002 TAV-BH-MW6-460-S		UJ,A2													
054910-002 TAV-BH-MW6-480-S		UJ,A2													
054911-002 TAV-BH-MW6-500-S		UJ,A2	J,B3												

Validated By: Mr. Kenneth Salaz **Date:** 7/25/01

Analytical Quality Associates, Inc.
616 Maxine NE
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MEMORANDUM

DATE: July 25, 2001

TO: File

FROM: Kenneth Salaz

SUBJECT: Inorganic Data Review and Validation - SNL TA3/5 Assessment GWM, ARCOC #604438, GEL SDG #41231, Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with approved procedures using methods EPA6010B ICP-AES and EPA7471A CVAA. Problems were identified with the data package that result in the qualification of data.

1. ICP Analysis: In the initial calibration blank (ICB), sodium (Na) and selenium (Se) were detected. The associated Na result of sample 41231-005 and the Se result of sample -008 were detects, less than (<) 5X the blank concentrations, and will be qualified "J,B3."

2. ICP Analysis: The MS percent recovery (%R) of antimony (Sb) was <75% but greater than (>) 30%. All associated sample results were non-detect (ND) and will be qualified "UJ,A2."

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

Holding Times/Preservation

All Analyses: All samples were analyzed within the prescribed holding times and properly preserved except as noted above in the summary section.

Calibration

ICP Analysis: The initial and continuing calibrations met all QC acceptance criteria except for the following. The continuing calibration verification (CCV) %R of silver (Ag) at the end of the sample run was slightly <90% (89%). However, the beginning and intermediate CCVs met QC acceptance criteria. Thus, no sample data were qualified.

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

Blanks

ICP Analysis: No target analytes were detected in the blanks except as noted above in the summary section and the following. In the CCB for sample 41231-005, magnesium (Mg) was detected at a concentration > the reporting limit (RL). This sample should have been redigested and reanalyzed for Mg, but were not. However, the associated sample result was >10X the blank concentration. Thus, no sample data were qualified. In the ICB and/or CCB, aluminum (Al), barium (Ba), calcium (Ca), copper (Cu), iron (Fe), and Sb were detected. In the method blank, Ba, Ca, Cu, and potassium (K) were detected. However, all associated sample results were either ND or >5X the blank concentration. Thus, no sample data were qualified. In the ICB and/or CCB, Al, chromium (Cr), Mg, Na, arsenic (As), and zinc (Zn) were detected at negative concentrations. The absolute values were > the detection limit (DL) but < the RL. However, all associated sample results were >5X the DL. Thus, no sample data were qualified.

CVAA Analysis: No target analytes were detected in the blanks except as noted above in the summary section.

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

ICP Analysis: The MS analysis met QC acceptance criteria except as noted above in the summary section. No MSD analyses were performed. The replicate analyses were used as measures of laboratory precision.

CVAA Analysis: The MS analysis was performed on a sample from another SDG. No sample data were qualified as a result. The case narrative stated that all QC acceptance criteria were met.

Laboratory Control Sample (LCS/LCSD) Analyses

All Analyses: The LCS/LSD analyses met all QC acceptance criteria.

Replicate Analysis

ICP Analysis: The replicate analysis met all QC acceptance criteria.

CVAA Analysis: The replicate analysis was performed on a sample from another SDG. No sample data were qualified as a result. The case narrative stated that all QC acceptance criteria were met.

ICP Interference Check Sample (ICS)

ICP Analysis: The ICS met all QC acceptance criteria.

CVAA Analysis: No ICS was required for this method.

ICP Serial Dilution

ICP Analysis: The serial dilution analysis met all QC acceptance criteria.

CVAA Analysis: No serial dilution was required for this method.

Other QC

All Analyses: No field duplicate, equipment blank (EB), or field blank (FB) was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

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

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MEMORANDUM

DATE: July 25, 2001

TO: File

FROM: Kenneth Salaz

SUBJECT: Organic Data Review and Validation - SNL
TA3/5 Assessment GWM, ARCOC #604438,
GEL SDG #41231/41232, Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with approved procedures using method EPA8260A/B VOCs. Problems were identified with the data package that result in the qualification of data.

1. The initial calibration response factors (RFs) of trichloroethene for the trip blank (TB) and the soil samples were less than (<) the required minimum but greater than (>) 0.01. All associated sample results were non-detect (ND) and will be qualified "UJ." The continuing calibration verification (CCV) percent differences (%Ds) of vinyl acetate for the TB and the soil samples were >60%. All associated sample results were ND and will be qualified "R" (unusable). The CCV %D of acetone for the soil samples was >20% but <40%. The associated results of samples 41231-003 and -004 were detects and will be qualified "J."

2. In the method blank for the soil samples, methylene chloride was detected. All associated sample results were detects, <10X the blank concentration, < the reporting limit (RL), and will be qualified "5U,B."

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

Holding Times/Preservation

All samples were analyzed within the prescribed holding time and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. The CCV %Ds of chloroethane, carbon disulfide, 2-butanone, and 2-hexanone for the soil samples, as well as that of chloromethane for the TB, were >20% but <40%. However, all associated sample results were ND. Thus, no sample data were qualified.

Blanks

No target analytes were detected in the method blanks except as noted above in the summary section and the following. In the method blank for the TB, acetone was detected. However, the associated sample result was ND. Thus, no sample data were qualified.

Surrogates

The surrogate %Rs met QC acceptance criteria.

Internal Standards (ISs)

The IS areas and retention times (RTs) met QC acceptance criteria.

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

The MS/MSD analyses for the TB and the soil samples were performed on samples from other SDGs. No sample data were qualified as a result. The case narratives stated that all QC acceptance criteria were met.

Laboratory Control Samples (LCS/LCSD) Analysis

The LCS/LCSD analyses met all QC acceptance criteria.

Other QC

No target analytes were detected in the TB. No field duplicate or equipment blank (EB) were submitted on the ARCOC.

No other specific issues were identified which affect data quality.

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

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MEMORANDUM

DATE: July 25, 2001

TO: File

FROM: Kenneth Salaz

SUBJECT: Radiochemical Data Review and Validation - SNL TA3/5 Assessment GWM, ARCOC #604438, GEL SDG #41231, Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with approved procedures using methods EPA906.0 Tritium. No problems were identified with the data package that result in the qualification of data.

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

Holding Times/Preservation

All samples were analyzed within the prescribed holding times and properly preserved.

Calibration

The case narrative stated that the instrument used was properly calibrated.

Blanks

No target analytes were detected in the method blank at concentrations greater than (>) the associated MDA.

Matrix Spike (MS) Analysis

The MS analysis met all QC acceptance criteria.

Laboratory Control Sample (LCS) Analysis

The LCS analysis met all QC acceptance criteria.

Replicates

The replicate analysis met all QC acceptance criteria.

Tracer/Carrier Recoveries

No tracer/carrier was required for this method.

Negative Bias

All sample results met negative bias QC acceptance criteria.

Other QC

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

No other specific issues were identified which affect data quality.

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

Data Validation Summary

Site/Project: TA3/5 Assessment GWM Project/Task #: 7219.01.05 # of Samples: 13 Matrix: 12 soil/1 aqueous

AR/COC #: 604438 Laboratory Sample IDs: 41231-001 to -012

Laboratory: GEL 41232-001

SDG #: 41231/41232

QC Element	Analysis									
	Organics				Inorganics				RAD	Other
	VOC	SVOC	Pesticide/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN		
1. Holding Times/Preservation	✓				✓	NA	✓	NA	✓	NA
2. Calibrations	R; J; UJ				✓		✓		✓	
3. Method Blanks	5U, B				J, B3		✓		✓	
4. MS/MSD	NA				UJ, A2		NA		✓	
5. Laboratory Control Samples	✓		NA		✓		✓		✓	
6. Replicates					✓		NA		✓	
7. Surrogates	✓									
8. Internal Standards	✓									
9. TCL Compound Identification	✓									
10. ICP Interference Check Sample					✓					
11. ICP Serial Dilution					✓					
12. Carrier/Chemical Tracer Recoveries									NA	
13. Other QC	✓				NA	✓	NA	✓	NA	✓

J = Estimated
U = Not Detected
UJ = Not Detected, Estimated
R = Unusable

Check (√) = Acceptable
Shaded Cells = Not Applicable (also "NA")
NP = Not Provided
Other: _____

Reviewed By: [signature] Date: 7/25/01

Inorganic Metals

Site/Project: TA3/5 Assessment GWM AR/COC #: 604438 Laboratory Sample IDs: 41231-005 to -008

Laboratory: GEL SDG #: 41231

Methods: EPA6010B(ICP-AES), EPA7471A(CVAA)

# of Samples: 4 Matrix: soil Batch #s: 75880, 75920

CAS #/ Analyte	QC Element																		
	TAL	ICV	CCV	ICB (µg/L)	① CCB (µg/L)	Method Blanks	LCS	LCSD	LCSD RPD	② MS	MSD	MSD RPD	Rep. RPD	ICS AB	Serial Dilu-tion	④ Field Dup. RPD	Equip. Blanks	Field Blanks	③ CCB (µg/L)
7429-90-5 Al	✓	✓	✓	✓	288/222	✓	✓	✓	✓	NA	NA	NA	✓	✓	✓	NA	NA	NA	-26.2
7440-39-3 Ba	✓			0.379	✓	0.0422				NA			✓		✓				✓
7440-41-7 Be	✓			✓		✓				✓			✓		NA				
7440-43-9 Cd	✓					✓				✓			NA		NA				
7440-70-2 Ca	✓				33.0	13.7				NA		MS 7/25/01	~~NA~~	MS 7/25/01	~~NA~~				9.38
7440-47-3 Cr	✓				✓	✓				✓			✓		NA				-0.589
7440-48-4 Co	✓				✓	✓							✓						✓
7440-50-8 Cu	✓				0.877	0.259							✓						0.877
7439-89-6 Fe	✓				9.75	✓				NA			✓		✓				✓
7439-95-4 Mg	✓			-4.49	223/202					NA			✓		✓				
7439-96-5 Mn	✓			✓	✓					NA			✓		✓				
7440-02-0 Ni	✓				✓					✓			✓		NA				
7440-09-7 K	✓		✓		✓	2.06				NA			✓		NA				NA
7440-22-4 Ag	✓		✓/89		✓	✓				✓			NA		NA				✓
7440-23-5 Na	✓		✓	17.9	-24.7								✓		NA				-12.7
7440-62-2 V	✓		✓	✓	✓								✓		NA				✓
7440-66-6 Zn	✓		✓	✓	✓								✓		✓				-0.852
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	NA				✓
7782-49-2 Se	✓			2.94	✓					✓			NA		NA				✓
7440-38-2 As	✓			-4.09	-2.77					✓			✓		NA				-4.45
7440-36-0 Sb	✓			4.14	✓					44			NA		NA				✓
7440-28-0 Tl	✓			✓	✓					✓			NA		NA				✓
7439-97-6 Hg	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	NA	NA				NA
Cyanide CN																			

Notes: Shaded rows are RCRA metals. **Solids-to-aqueous conversion:** mg / kg = µg / g : [(µg / g) x (sample mass {g} / sample vol. {ml}) x (1000 ml / 1 liter)] / Dilution Factor = µg / l NA = Not Applicable

Comments: ① All analysis except for K + Hg apply to sample -005 only.
② MS + Rep. for Hg performed on a sample from another SDG. Case narrative stated all QC were met.
③ CCB applies to samples -006, -007, + -008.
④ Field dup. submitted.

Reviewed By: [signature] Date: 7/25/01

Volatile Organics (SW 846 Method 8260)

Site/Project: TA-3/5 Assessment GWM AR/COC #: ~~75494~~ 604438 (AS 7/24/01) # of Samples: 4 Matrix: Soil

Laboratory: GEL SDG #: 41231 Laboratory Sample IDs: 41231-001 to -004

Methods: EPA 8260A Batch #s: 75494

IS	CAS #	Name	TCL	Min. RF	Intercept	Calib. RF >.05	Calib. RSD/ R^2 <20% / 0.99	CCV %D 20%	Method Blks	LCS	LCSD	LCS RPD	① MS	MSD	MS RPD	② Field Dup. RPD	Equip. Blanks	Trip Blanks		
1	74-87-3	Chloromethane	✓	0.10	✓	✓	✓	✓	✓							NA	NA	✓		
1	74-83-9	Bromomethane		0.10	✓	✓	✓													
1	75-01-4	**vinyl chloride**		0.10	NA	✓	✓													
1	75-00-3	Chloroethane		0.01	NA	✓	✓	-35.5												
1	75-09-2	methylene chloride (10xblk)		0.01	✓	✓	✓	✓	0.587											
1	67-64-1	**acetone(10xblk)**		0.01	✓	✓	✓	-28.7	✓											
1	75-15-0	carbon disulfide		0.10	✓	✓	✓	22.4												
1	75-35-4	**1,1-dichloroethene**		0.20	NA	✓	✓	✓		✓	✓	✓	NA	NA	NA					
1	75-34-3	**1,1-dichloroethane**		0.10		✓	✓													
1	67-66-3	**Chloroform**		0.20		✓	✓													
1	107-06-2	**1,2-dichloroethane**		0.10		✓	✓													
1	78-93-3	**2-butanone(10xblk)**		0.01	✓	✓	✓	-29.3												
2	71-55-6	1,1,1-trichloroethane		0.10	NA	✓	✓	✓												
2	56-23-5	**carbon tetrachloride**		0.10		✓	✓													
2	75-27-4	Bromodichloromethane		0.20		✓	✓													
2	78-87-5	**1,2-dichloropropane**		0.01		✓	✓													
2	10061-01-5	cis-1,3-dichloropropene		0.20		✓	✓													
2	79-01-6	**Trichloroethene**		0.30		0.28	✓			✓	✓	✓	NA	NA	NA					
2	124-48-1	Dibromochloromethane		0.10		✓	✓													
2	79-00-5	1,1,2-trichloroethane		0.10		✓	✓													
2	71-43-2	**Benzene**		0.50	✓	✓	✓			✓	✓	✓	NA	NA	NA					
2	10061-02-6	trans-1,3-dichloropropene		0.10	NA	✓	✓													
2	75-25-2	Bromoform		0.10		✓	✓													
3	108-10-1	4-methyl-2-pentanone		0.10		✓	✓													
3	591-78-6	2-hexanone		0.01		✓	✓	-21.8												
3	127-18-4	**Tetrachloroethene**		0.20		✓	✓	✓												
3	79-34-5	1,1,2,2-tetrachloroethane		0.30		✓	✓													
3	108-88-3	toluene(10xblk)		0.40		✓	✓			✓	✓	✓	NA	NA	NA					
3	108-90-7	**Chlorobenzene**		0.50		✓	✓			✓	✓	✓	NA	NA	NA					
3	100-41-4	Ethylbenzene		0.10		✓	✓													
3	100-42-5	Styrene		0.30		✓	✓													
3	1330-20-7	xylenes(total)		0.30	✓	✓	✓													
	540-59-0	**1,2-dichloroethylene(total)**		0.01	NA	✓	✓													
	108-05-4	Vinyl Acetate			NA	✓	✓	75.7												

Comments:

① MS/MSD performed on a sample from another SDG. The case narrative stated all QC criteria were met.

② No field dup.s submitted

Notes: Shaded rows are RCRA compounds.

NA = Not Applicable

Reviewed By: [signature] Date: 7/24/01

Volatile Organics

Site/Project: TA 3/5 Assessment GWM AR/COC #: 604438 Batch #s: 75494

Laboratory: GEL SDG #: 41231 # of Samples: 4 Matrix: soil

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

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

SMC 1: Bromofluorobenzene
SMC 2: Dibromofluormethane
SMC 3: Toluene-d8

IS 1: Fluorobenzene
IS 2: Chlorobenzene-d5
IS 3: 1,4-Dichlorobenzene-d4

Comments:

Volatile Organics (SW 846 Method 8260)

Site/Project: TA3/5 Assessment GWM AR/COC #: 604438 # of Samples: 1 Matrix: aqueous

Laboratory: GEL SDG #: 41232 Laboratory Sample IDs: 41232-001(FB)

Methods: EPA8260B Batch #s: 74968

IS	CAS #	Name	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Trip Blanks		
						>.05	<20% / 0.99	20%												
1	74-87-3	Chloromethane	✓	0.10	NA	✓	✓	22.8	✓							NA	NA	NA		
1	74-83-9	Bromomethane	✓	0.10		✓	✓	✓												
1	75-01-4	**vinyl chloride**	✓	0.10		✓	✓													
1	75-00-3	Chloroethane	✓	0.01		✓	✓													
1	75-09-2	methylene chloride (10xblk)	✓	0.01	✓	✓	✓		✓											
1	67-64-1	**acetone(10xblk)**	✓	0.01	NA	✓	✓		0.941											
1	75-15-0	carbon disulfide	✓	0.10		✓	✓		✓											
1	75-35-4	**1,1-dichloroethene**	✓	0.20		✓	✓			✓	✓	✓	NA	NA	NA					
1	75-34-3	**1,1-dichloroethane**	✓	0.10		✓	✓													
1	67-66-3	**Chloroform**	✓	0.20		✓	✓													
1	107-06-2	**1,2-dichloroethane**	✓	0.10		✓	✓													
1	78-93-3	**2-butanone(10xblk)**	✓	0.01		✓	✓													
2	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓													
2	56-23-5	**carbon tetrachloride**	✓	0.10		✓	✓													
2	75-27-4	Bromodichloromethane	✓	0.20		✓	✓													
2	78-87-5	**1,2-dichloropropane**	✓	0.01		✓	✓													
2	10061-01-5	cis-1,3-dichloropropene	✓	0.20		✓	✓													
2	79-01-6	**Trichloroethene**	✓	0.30		0.24	✓			✓	✓	✓	NA	NA	NA					
2	124-48-1	Dibromochloromethane	✓	0.10		✓	✓													
2	79-00-5	1,1,2-trichloroethane	✓	0.10		✓	✓													
2	71-43-2	**Benzene**	✓	0.50		✓	✓			✓	✓	✓	NA	NA	NA					
2	10061-02-6	trans-1,3-dichloropropene	✓	0.10		✓	✓													
2	75-25-2	Bromoform	✓	0.10		✓	✓													
3	108-10-1	4-methyl-2-pentanone	✓	0.10		✓	✓													
3	591-78-6	2-hexanone	✓	0.01		✓	✓													
3	127-18-4	**Tetrachloroethene**	✓	0.20		✓	✓													
3	79-34-5	1,1,2,2-tetrachloroethane	✓	0.30		✓	✓													
3	108-88-3	toluene(10xblk)	✓	0.40		✓	✓			✓	✓	✓	NA	NA	NA					
3	108-90-7	**Chlorobenzene**	✓	0.50		✓	✓			✓	✓	✓	NA	NA	NA					
3	100-41-4	Ethylbenzene	✓	0.10		✓	✓													
3	100-42-5	Styrene	✓	0.30		✓	✓													
3	1330-20-7	xylenes(total)	✓	0.30		✓	✓													
	540-59-0	**1,2-dichloroethylene(total)**	✓	0.01		✓	✓													
	108-05-4	Vinyl Acetate	✓			✓	✓	70.5												

Comments: MS/MSD performed on a sample from another SDG. All QC criteria were met. Case narrative started

Notes: Shaded rows are RCRA compounds.

NA=Not Applicable

Reviewed By: [signature] Date: 7/24/01

Volatile Organics

Site/Project: TA3/5 Assessment Grant AR/COC #: 604438 Batch #s: 74968

Laboratory: GEL SDG #: 41232 # of Samples: 1 Matrix: groundwater

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

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

SMC 1: Bromofluorobenzene
SMC 2: Dibromofluormethane
SMC 3: Toluene-d8

IS 1: Fluorobenzene
IS 2: Chlorobenzene-d5
IS 3: 1,4-Dichlorobenzene-d4

Comments:

Radiochemistry

Site/Project: TA3/5 Assessment GWM AR/COC #: 604438 Laboratory Sample IDs: 41231-009 to -012

Laboratory: GEL SDG #: 41231

Methods: EPA 906.0 (H3)

# of Samples: 4 Matrix: Soil Batch #s: 75538

Analyte	QC Element													
	Method Blanks	LCS	MS	Rep RER	Equip. Blanks	(1) Field Dup. RER	Field Blanks	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105
H3	✓	✓	✓	✓	NA	NA	NA	NA					
U-238													
U-234													
U-235/-236													
Th-232													
Th-228													
Th-230													
Pu-239/-240													
Gross Alpha													
Nonvolatile Beta													
Ra-226													
Ra-228													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													

Comments:

(1) No field dup. submitted.

NA = Not Applicable

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Reviewed By: [illegible] Date: 7/25/01

Contract Verification Review (CVR)

Project Leader LAI | Project Name TA 3/5 ASSESSMENT GWM | Case No. 7219_01.05

AR/COC No. 604438 | Analytical Lab GEL | SDG No. 41231

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

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L_c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples	X		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	ANTIMONY FAILED RECOVERY LIMITS
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples	X		
b) Matrix spike duplicate RPD data reported and met for all organic samples	NA		
3.5 Blank data a) Method or reagent blank data reported and met for all samples		X	CALCIUM DETECTED IN METALS BLANK
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"-analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010 and 8082) a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) Instrument run logs provided	NA		
4.3 Inorganics (metals) a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry a) Instrument run logs provided	X		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
054909-002, 054910-002 & 054911-002	METALS	CALCIUM MISSING "B" QUALIFIER

Were deficiencies unresolved? ☑ Yes ☐ No

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

If no, provide: nonconformance report or correction request number 2525 and date correction request was submitted: 6-4-2001

Reviewed by: W. Palencia Date: 6-4-2001 Closed by: W. Palencia Date: 6/13/01

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. 100650 SAR/WR No.

AR/COC 604438

Dept. No./Mail Stop:	8135/1089	Date Samples Shipped:	4-24-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/~~Sanders~~ TA III/V Assessment	Carrier/Waybill No.	743180	Project/Task No.:	7219.01.05
Project Name:	~~TAV Well Borehole~~ MLON	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	~~CF012-01~~ CF0012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: 604440

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054907-001	TAV-BH-MW6-420-S	420	TAV	042001 0842	S	AG	4oz	None	G	SA	VOC (8260)	
054907-002	TAV-BH-MW6-420-S	420	TAV	042001 0842	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054907-003	TAV-BH-MW6-420-S	420	TAV	042001 0842	S	G	2x1L	None	G	SA	Tritium (906.0)	
054909-001	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	AG	4oz	None	G	SA	VOC (8260)	
054909-002	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054909-003	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	G	2x1L	None	G	SA	Tritium (906.0)	
054910-001	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	AG	4oz	None	G	SA	VOC (8260)	
054910-002	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054910-003	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	G	2x1L	None	G	SA	Tritium (906.0)	
054911-001	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	AG	4oz	None	G	SA	VOC (8260)	

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day
Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 04/30/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	[illegible]	GQ	IT/6135/284-3309
	W Gibson	William [illegible]	WG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4/23/01	Time 1335	4.Relinquished by	Org.	Date	Time
1. Received by [illegible]	Org. 6132	Date 4/23/01	Time 1335	4. Received by	Org.	Date	Time
2.Relinquished by [illegible]	Org. 6132	Date 4/24/01	Time 1045	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

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC 604438

Project Name:	TA-V Well Borehole	Project/Task Manger:	Lai/Sanders	Project/Task No.:	7219.01.05
Location	Tech Area				
Building NA	Room NA	Reference LOV (available at SMO)			

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
054911-002	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054911-003	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	G	2x1L	None	G	SA	Tritium (906.0)	
054918-001	TAV-BH-MW6-420-TB	420	TAV	042101 0842	DIW	~~3x40ml~~ G	3x40ml	HCl	G	TB	VOC (8260)	

Abnormal Conditions on Receipt **LAB USE**

Recipient Initials _____

Inorganic Metals

Site/Project: TA 3/5 Assessment GWM AR/COC #: 604412/604415 Laboratory Sample IDs: 41150-008 to -014

Laboratory: GEL SDG #: 41150

Methods: EPA 6010B (ICP-AES), EPA 7470A (CVAA)

# of Samples: 7 Matrix: soil Batch #s: 74857, 75920

CAS #/ Analyte	QC Element																		
	TAL	ICV	CCV	① ICB	② CCB	Method Blanks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	Rep. RPD	ICS AB	Serial Dilu-tion	③ Field Dup. RPD	Equip. Blanks	Field Blanks	④ CCB
7429-90-5 Al	✓	✓	✓	✓	21.6/37.2	4.0	✓	✓	✓	NA	NA	NA	✓	✓	✓	NA	NA	NA	
7440-39-3 Ba	✓	↓	↓	↓	✓	✓	↓	↓	↓	NA	↓	↓	37	↓	✓	↓	↓	↓	
7440-41-7 Be	✓	↓	↓	↓	✓	↓	↓	↓	↓	✓	↓	↓	NA	↓	NA	↓	↓	↓	
7440-43-9 Cd	✓	↓	↓	↓	-.518/✓	↓	↓	↓	↓	✓	↓	↓	NA	↓	NA	↓	↓	↓	
7440-70-2 Ca	✓	↓	↓	-5.95/✓	19.4/9.96	↓	↓	↓	↓	NA	↓	↓	✓	↓	12.7	↓	↓	↓	
7440-47-3 Cr	✓	↓	↓	✓	✓	↓	↓	↓	↓	✓	↓	↓	✓	↓	NA	↓	↓	↓	
7440-48-4 Co	✓	↓	↓	↓	✓	↓	↓	↓	↓	↓	↓	↓	✓	↓	NA	↓	↓	↓	
7440-50-8 Cu	✓	↓	↓	-1.08/✓	✓/-.972	↓	↓	↓	↓	↓	↓	↓	✓	↓	NA	↓	↓	↓	
7439-89-6 Fe	✓	↓	↓	↓	78.1/✓ 9.3	↓	↓	↓	↓	NA	↓	↓	✓	↓	✓	↓	↓	↓	
7439-95-4 Mg	✓	↓	↓	-7.28	✓	↓	↓	↓	↓	↓	↓	↓	✓	↓	✓	↓	↓	↓	
7439-96-5 Mn	✓	↓	↓	✓	✓	↓	↓	↓	↓	↓	↓	↓	✓	↓	✓	↓	↓	↓	
7440-02-0 Ni	✓	↓	↓	✓	✓	↓	↓	↓	↓	✓	↓	↓	✓	↓	NA	↓	↓	↓	
7440-09-7 K	✓	↓	↓	✓	6.76/16.5	3.19	↓	↓	↓	493	↓	↓	✓	↓	~~12.9~~/NA	↓	↓	↓	✓
7440-22-4 Ag	✓	↓	↓	✓	✓	✓	↓	↓	↓	✓	↓	↓	NA	↓	NA	↓	↓	↓	
7440-23-5 Na	✓	↓	↓	12.0	38.1/36.7	↓	↓	↓	↓	148	↓	↓	✓	↓	NA	↓	↓	↓	
7440-62-2 V	✓	↓	↓	✓	✓	↓	↓	↓	↓	138	↓	↓	✓	↓	NA	↓	↓	↓	
7440-66-6 Zn	✓	↓	↓	-1.65	13.1/-1.69	↓	↓	↓	↓	✓	↓	↓	✓	↓	✓	↓	↓	↓	
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	✓	✓	NA	↓	↓	↓	
7782-49-2 Se	✓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	NA	↓	↓	↓	
7440-38-2 As	✓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	✓	↓	NA	↓	↓	↓	
7440-36-0 Sb	✓	↓	↓	6.04	64/9.89	↓	↓	↓	29	59	↓	↓	NA	↓	NA	↓	↓	↓	
7440-28-0 Tl	✓	↓	↓	✓	✓	↓	↓	↓	✓	✓	↓	↓	✓	↓	NA	↓	↓	↓	
7439-97-6 Hg	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	NA	NA	NA	↓	↓	↓	
Cyanide CN																			

Notes: Shaded rows are RCRA metals. Solids-to-aqueous conversion: mg / kg = µg / g : [(µg / g) x (sample mass (g) / sample vol. (ml)) x (1000 ml / 1 liter)] / Dilution Factor = µg / l NA = Not Applicable

Comments: ① 2nd Ca (ICB + CCB) entry applies to samples -008, -012, & -014 only. ② 1st K entry applies to samples -009 to -011 only. 2nd K entry applies to samples -008 & -012 only. 1st (all other) entries apply to sample -008 only. 2nd Na & Zn results apply to all samples. 1st Zn entry > RL.

③ No field dup. submitted. ④ K entry applies to all other samples.

Reviewed By: [signature] Date: 8/1/01

Volatile Organics (SW 846 Method 8260)

Site/Project: TA-3/5 Assessment GWM AR/COC #: 604412/604415 # of Samples: 7 Matrix: soil

Laboratory: GEL SDG #: 41150 Laboratory Sample IDs: 41150-001 to -007

Methods: EPA 8260A Batch #s: 75430

IS	CAS #	Name	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	(1) Field Dup. RPD	Equip. Blanks	(bottle) Trip Blanks		
						>.05	<20% / 0.99	20%												
1	74-87-3	Chloromethane	✓	0.10	✓	✓	✓	✓	✓							NA	NA	✓		
1	74-83-9	Bromomethane		0.10	✓	✓	✓													
1	75-01-4	**vinyl chloride**		0.10	NA	✓	✓													
1	75-00-3	Chloroethane		0.01	NA	✓	✓	-44.8												
1	75-09-2	methylene chloride (10xblk)		0.01	✓	✓	✓	✓												
1	67-64-1	**acetone(10xblk)**		0.01	✓	✓	✓		9.85											
1	75-15-0	carbon disulfide		0.10	✓	✓	✓		✓											
1	75-35-4	**1,1-dichloroethene**		0.20	NA	✓	✓			✓	✓	✓	✓	✓	✓					
1	75-34-3	**1,1-dichloroethane**		0.10		✓	✓													
1	67-66-3	**Chloroform**		0.20		✓	✓													
1	107-06-2	**1,2-dichloroethane**		0.10		✓	✓													
1	78-93-3	**2-butanone(10xblk)**		0.01	✓	✓	✓													
2	71-55-6	1,1,1-trichloroethane		0.10	NA	✓	✓													
2	56-23-5	**carbon tetrachloride**		0.10		✓	✓													
2	75-27-4	Bromodichloromethane		0.20		✓	✓													
2	78-87-5	**1,2-dichloropropane**		0.01		✓	✓													
2	10061-01-5	cis-1,3-dichloropropene		0.20		✓	✓													
2	79-01-6	**Trichloroethene**		0.30		0.28	✓			✓	✓	✓	✓	✓	✓					
2	124-48-1	Dibromochloromethane		0.10		✓	✓													
2	79-00-5	1,1,2-trichloroethane		0.10		✓	✓													
2	71-43-2	**Benzene**		0.50	✓	✓	✓			✓	✓	✓	✓	✓	✓					
2	10061-02-6	trans-1,3-dichloropropene		0.10	NA	✓	✓													
2	75-25-2	Bromoform		0.10		✓	✓													
3	108-10-1	4-methyl-2-pentanone		0.10		✓	✓													
3	591-78-6	2-hexanone		0.01		✓	✓													
3	127-18-4	**Tetrachloroethene**		0.20		✓	✓													
3	79-34-5	1,1,2,2-tetrachloroethane		0.30		✓	✓													
3	108-88-3	toluene(10xblk)		0.40		✓	✓			✓	✓	✓	✓	✓	✓					
3	108-90-7	**Chlorobenzene**		0.50		✓	✓			✓	✓	✓	✓	✓	✓					
3	100-41-4	Ethylbenzene		0.10		✓	✓													
3	100-42-5	Styrene		0.30		✓	✓													
3	1330-20-7	xylenes(total)		0.30	✓	✓	✓													
	540-59-0	**1,2-dichloroethylene(total)**		0.01	NA	✓	✓													
	108-05-4	Vinyl Acetate	✓		NA	✓	✓	67.9												

Comments:
(1) No field dup. submitted

Notes: Shaded rows are RCRA compounds.

NA = not applicable

Reviewed By: [signature] Date: 8/1/01

Volatile Organics

Site/Project: TA3/5 Assessment GWM AR/COC #: 604112/604415 Batch #s: 75430

Laboratory: GEL SDG #: 41150 # of Samples: 7 Matrix: soil

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

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

SMC 1: Bromofluorobenzene
SMC 2: Dibromofluormethane
SMC 3: Toluene-d8

IS 1: Fluorobenzene
IS 2: Chlorobenzene-d5
IS 3: 1,4-Dichlorobenzene-d4

Comments:

Volatile Organics (SW 846 Method 8260)

Site/Project: TA3/5 Assessment GWM AR/COC #: 604412/604415 # of Samples: 2 Matrix: aqueous

Laboratory: GEL SDG #: 41151 Laboratory Sample IDs: 41151-001 + -002 (TBx)

Methods: EPA 8260B Batch #s: 74968

IS	CAS #	Name	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Trip Blanks		
						>.05	<20% / 0.99	20%												
1	74-87-3	Chloromethane	✓	0.10	NA	✓	✓	22.8	✓							NA	NA	NA		
1	74-83-9	Bromomethane	✓	0.10		✓	✓	✓												
1	75-01-4	**vinyl chloride**	✓	0.10		✓	✓													
1	75-00-3	Chloroethane	✓	0.01		✓	✓													
1	75-09-2	methylene chloride (10xblk)	✓	0.01	✓	✓	✓		✓											
1	67-64-1	**acetone(10xblk)**	✓	0.01	NA	✓	✓		0.941											
1	75-15-0	carbon disulfide	✓	0.10		✓	✓		✓											
1	75-35-4	**1,1-dichloroethene**	✓	0.20		✓	✓			✓	✓	✓	NA	NA	NA					
1	75-34-3	**1,1-dichloroethane**	✓	0.10		✓	✓													
1	67-66-3	**Chloroform**	✓	0.20		✓	✓													
1	107-06-2	**1,2-dichloroethane**	✓	0.10		✓	✓													
1	78-93-3	**2-butanone(10xblk)**	✓	0.01		✓	✓													
2	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓													
2	56-23-5	**carbon tetrachloride**	✓	0.10		✓	✓													
2	75-27-4	Bromodichloromethane	✓	0.20		✓	✓													
2	78-87-5	**1,2-dichloropropane**	✓	0.01		✓	✓													
2	10061-01-5	cis-1,3-dichloropropene	✓	0.20		✓	✓													
2	79-01-6	**Trichloroethene**	✓	0.30		0.24	✓			✓	✓	✓	NA	NA	NA					
2	124-48-1	Dibromochloromethane	✓	0.10		✓	✓													
2	79-00-5	1,1,2-trichloroethane	✓	0.10		✓	✓													
2	71-43-2	**Benzene**	✓	0.50		✓	✓			✓	✓	✓	NA	NA	NA					
2	10061-02-6	trans-1,3-dichloropropene	✓	0.10		✓	✓													
2	75-25-2	Bromoform	✓	0.10		✓	✓													
3	108-10-1	4-methyl-2-pentanone	✓	0.10		✓	✓													
3	591-78-6	2-hexanone	✓	0.01		✓	✓													
3	127-18-4	**Tetrachloroethene**	✓	0.20		✓	✓													
3	79-34-5	1,1,2,2-tetrachloroethane	✓	0.30		✓	✓													
3	108-88-3	toluene(10xblk)	✓	0.40		✓	✓			✓	✓	✓	NA	NA	NA					
3	108-90-7	**Chlorobenzene**	✓	0.50		✓	✓			✓	✓	✓	NA	NA	NA					
3	100-41-4	Ethylbenzene	✓	0.10		✓	✓													
3	100-42-5	Styrene	✓	0.30		✓	✓													
3	1330-20-7	xylenes(total)	✓	0.30		✓	✓													
	540-59-0	**1,2-dichloroethylene(total)**	✓	0.01		✓	✓													
	108-05-4	Vinyl Acetate	✓			✓	✓	70.5												

Comments: Notes: Shaded rows are RCRA compounds.

CASIRSA performed on a sample from another SDG. Case narrative stated all QC criteria were met.

NA = not applicable

Reviewed By: [signature] Date: 8/1/01

Volatile Organics

Site/Project: TA3/5 Assessment GWM AR/COC #: 604412/604415 Batch #s: 74968

Laboratory: GEL SDG #: 41151 # of Samples: 2 Matrix: aqueous

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

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

SMC 1: Bromofluorobenzene
SMC 2: Dibromofluormethane
SMC 3: Toluene-d8

IS 1: Fluorobenzene
IS 2: Chlorobenzene-d5
IS 3: 1,4-Dichlorobenzene-d4

Comments:

Radiochemistry

Site/Project: TA35 Assessment GWM AR/COC #: 604412/604415 Laboratory Sample IDs: 41150-015 to -019

Laboratory: GEL SDG #: 41150

Methods: EPA906.0(H3)

# of Samples: 5 Matrix: soil Batch #s: 74927

Analyte	QC Element													
	Method Blanks	LCS	MS	Rep RER	Equip. Blanks	Field Dup. RER	Field Blanks	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105
H3	✓	✓	✓	✓	NA	NA	NA	NA					
U-238													
U-234													
U-235/-236													
Th-232													
Th-228													
Th-230													
Pu-239/-240													
Gross Alpha													
Nonvolatile Beta													
Ra-226													
Ra-228													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													

Comments:
(1) No field dup. submitted

NA = Not Applicable

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Reviewed By: [signature] Date: 8/2/01

Contract Verification Review (CVR)

Project Leader LAI | Project Name TA 3/5 ASSESSMENT GWM | Case No. 7219-01.05

AR/COC No. 604412 & 604415 | Analytical Lab GEL | SDG No. 41150A & B

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

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L_c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples	X		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met	X		
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	RPD FOR BARIUM OUTSIDE ACCEPTANCE LIMITS
b) Matrix spike duplicate RPD data reported and met for all organic samples	X		
3.5 Blank data a) Method or reagent blank data reported and met for all samples		X	ACETONE DETECTED IN VOC METHOD BLANK
b) Sampling blank (e.g., field, trip, and equipment) data reported and met	X		
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"-analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	X		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010 and 8082) a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) Instrument run logs provided	NA		
4.3 Inorganics (metals) a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry a) Instrument run logs provided	X		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
ALL	METALS	NEGATIVE VALUES REPORTED IN QC SUMMARY

Were deficiencies unresolved? ☑ Yes ☐ No

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

If no, provide: nonconformance report or correction request number 2522 and date correction request was submitted: 6-4-2001

Reviewed by: W. Palencia Date: 6-4-2001 Closed by: W. Palencia Date: 6-13-01

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. 100635 SAR/WR No. 544555 544561

AR/COC 604415

Dept. No./Mail Stop:	~~6135/1089~~ 6133/1087	Date Samples Shipped:	04-23-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders TA III/V Assess	Carrier/Waybill No.	743179	Project/Task No.:	7219.01.05
Project Name:	~~TA-V Well Borehole~~ GW Mon	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	~~CF012-01~~ CF0012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: 604417

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054890-001	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	AG	2x4oz	None	G	SA + QC	VOC (8260)	
054890-002	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	G	250ml	None	G	SA + QC	TAL metals (6010/7000)	
054890-003	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	G	4x1L	None	G	SA +QC	Tritium (906.0)	
054891-001	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	AG	4oz	None	G	SA	VOC (8260)	
054891-002	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054891-003	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	G	2X1L	None	G	SA	Tritium (906.0)	
054892-001	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	AG	4oz	None	G	SA	VOC (8260)	
054892-002	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054892-003	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	G	2x1L	None	G	SA	Tritium (906.0)	
054893-001	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	AG	4oz	None	G	SA	VOC (8260)	

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day
Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 04/26/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RAW REVIEW OK 4/25/01

*Please list as separate report.

Sample Team Members

Name	Signature	Init	Company/Organization/Phone/Cellular
M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
~~C Quintana~~			11/6135/284-3309
W Gobson	William J Gobson	WJG	MDM/6133/845-3267

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4/19/01	Time 1035	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/19/01	Time 1035	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6132	Date 4-23-01	Time 1140	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

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604415

Project Name: TA-V Well Borehole | Project/Task Manger: Lal/Sanders | Project/Task No.: 7219.01.05

Location Tech Area

Building NA Room NA

Reference LOV (available at SMO)

Lab use

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054893-002	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054893-003	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	G	2x1L	None	G	SA	Tritium (906.0)	
054916-001	TAV-BH-MW6-120-TB	120	TAV	041801 0919	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	

Abnormal Conditions on Receipt **LAB USE**

Recipient Initials_____

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Batch No. 100634 JAC SAR/WR No. S 44553

Page 1 of 1

AR/COC 604412

Dept. No./Mail Stop:	6435/1089, 6133/1087	Date Samples Shipped:	4-23-01	SMO USE Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders TA III/V ASSESSMENT	Carrier/Waybill No.	743179	Project/Task No.:	7219.01.05
Project Name:	~~TA-V Well Borehole~~ GW Monitoring	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	~~CF012-01~~ CF0012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: 604414

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054885-001	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	AG	4oz	None	G	SA	VOC (8260)	
054885-002	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054885-003	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	G	2x1L	None	G	SA	Tritium (906.0)	
054888-001	TAV-BH-MW6-80-S	80	TAV	041701 1637	S	AG	4oz	None	G	SA	VOC (8260)	
054888-002	TAV-BH-MW6-80-S	80	TAV	041701 1637	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054889-001	TAV-BH-MW6-100-S	100	TAV	041701 1747	S	AG	4oz	None	G	SA	VOC (8260)	
054889-002	TAV-BH-MW6-100-S	100	TAV	041701 1747	S	G	250ml	None	G	SA	TAL metals (6010/7000)	
054915-001	TAV-BH-MW6-20-TB	20	TAV	041701 0953	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	
			JAC									

RMMA ☑ Yes ☐ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day
Return Samples By: ☐ Negotiated TAT

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 04/25/01
Entered by: JAC
QC inits.

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez		Weston/6135/845-3267
	~~G Quintana~~			~~IT/6435/284-3309~~
	W Gobson	William J Gobson	WJG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org. 135	Date 04/30/01	Time 1050	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4-30-01	Time 1050	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6132	Date 4-23-01	Time 1130	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

ON-SITE LABORATORY (RPSD)
ANALYSIS REQUEST AND CHAIN OF CUSTODY

RUSH

Internal Lab

Page 1 of 1

Batch No 100634 SAR/WR No

AR/COC 604414

Dept. No /Mail Stop:	~~6135/1089~~ 6133/1087	Date Samples Shipped: 4-19-01 SMO USE	Logged By		☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Project/Task No.:	7219.01.05	☐ Waste Characterization
Project Name:	~~TA-V Well Borehole~~ TA III/V Assessment Groundwater	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
Record Center Code:	ER/1306/DAT Mon.	Lab Destination: RPSD	Location	Tech Area	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building	Room	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab
					-This COC Number Releases COC No(s).: 604412 604413

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054885-004	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	M	500 ml	None	G	SA	
01											Gamma Spec
054888-004	TAV-BH-MW6-80-S	80	TAV	041701 1637	S	M	500 ml	None	G	SA	Gamma Spec
02											
054889-004	TAV-BH-MW6-100-S	100	TAV	041701 1747	S	M	500 ml	None	G	SA	Gamma Spec
03											
LCS 04											

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	04/27/01
Turnaround Time	☑ Normal ☐ Rush	Entered by:	JAC
	Required Report Date	QC inits.	

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN FOR BACKGROUND LEVEL

Please list as separate report.

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	~~G Quintana~~		~~GQ~~	~~IT/6135/284-3309~~
	W Gibson	William J Gibson Jr	WJG	MDM/6133/845-3267

1. Relinquished by	Margaret Sanchez	Org. 6135	Date 4/19/01	Time 1045	4. Relinquished by	Org. 6132	Date 4/26/01 Time 0731
1. Received by		Org. 6132	Date 4-19-01	Time 1045	4. Received by	Org. 6133	Date 4-26-01 Time 0731
2. Relinquished by		Org. 6132	Date 4-19-01	Time 1055	5. Relinquished by	Org.	Date Time
2. Received by		Org. 7132	Date 4-19-01	Time 1055	5. Received by	Org.	Date Time
3. Relinquished by		Org. 7132	Date 4/23/01	Time 0838	6. Relinquished by	Org.	Date Time
3. Received by		Org. 6132	Date 4/23/01	Time 0838	6. Received by	Org.	Date Time

Sample Findings Summary

Site: T/A 3/5 Assessment GWM **AR/COC:** 604418/604435 **Data Type:** Organic, Inorganic, and Rad

Sample ID	74-83-9 (bromomethane)	75-09-2 (methylene chloride)	108-05-4 (vinyl acetate)	74-87-3 (chloromethane)	67-64-1 (acetone)	7429-90-5 (aluminum)	7440-22-4 (silver)	7440-41-7 (beryllium)	7782-49-2 (selenium)	7439-97-6 (mercury)	7440-70-2 (calcium)	7440-36-0 (antimony)	7440-47-3 (chromium)	7440-48-4 (cobalt)	7440-09--7 (potassium)	10028-17-8 (tritium)	
054894-001 / TAV-BH-MW6-200-S		5 U, B1	UJ	UJ	10.7 U, B, B2												
054895-001 / TAV-BH-MW6-200-DU		5 U, B1	UJ	UJ	10.4 U, B, B2												
054896-001 / TAV-BH-MW6-220-S		5 U, B1	UJ	UJ	10.4 U, B, B2												
054897-001 / TAV-BH-MW6-240-S		5 U, B1	UJ	UJ	10.3 U, B, B2												
054898-001 / TAV-BH-MW6-260-S		5 U, B1	UJ	UJ	11.0 U, B, B2												
054899-001 / TAV-BH-MW6-280-S		5 U, B1	UJ	UJ													
054901-001 / TAV-BH-MW6-320-S		5 U, B1	UJ	UJ	10.4 U, B, B2												
054902-001 / TAV-BH-MW6-340-S		5 U, B1	UJ	UJ	10.7 U, B, B2												
054903-001 / TAV-BH-MW6-360-S		5 U, B1	UJ	UJ	11.1 U, B, B2												
054906-001 / TAV-BH-MW6-360-DU		5 U, B1	UJ	UJ	10.4 U, B, B2												
054904-001 / TAV-BH-MW6-380-S		5 U, B1	UJ	UJ	10.8 U, B, B2												
054905-001 / TAV-BH-MW6-400-S		5 U, B1	UJ	UJ	11.4 U,B, B2												
054894-002 / TAV-BH-MW6-200-S										J, B3		UJ, A2	J, A2, P1	J, P1	J		
054895-002 / TAV-BH-MW6-200-DU										J, B3		UJ, A2	J, A2, P1	J, P1	J		
054896-002 / TAV-BH-MW6-220-S										J, B3		UJ, A2	J, A2, P1	J, P1			
054897-002 / TAV-BH-MW6-240-S										J, B3		UJ, A2	J, A2, P1	J, P1			
054898-002 / TAV-BH-MW6-260-S										UJ, B3		UJ, A2	J, A2, P1	J, P1	J		
054899-002 / TAV-BH-MW6-280-S										UJ, B3		UJ, A2	J, A2, P1	J, P1	J		
054901-002 / TAV-BH-MW6-320-S										UJ, B3		UJ, A2	J, A2, P1	J, P1	J		
054902-002 / TAV-BH-MW6-340-S										UJ, B3		UJ, A2	J, A2, P1	J, P1	J		
054903-002 / TAV-BH-MW6-360-S										UJ, B3		UJ, A2	J, A2, P1	J, P1	J		
054906-002 / TAV-BH-MW6-360-DU										UJ, B3		UJ, A2	J, A2, P1	J, P1	J		
054904-002 / TAV-BH-MW6-380-S										UJ, B3		UJ, A2	J, A2, P1	J, P1	J		
054905-002 / TAV-BH-MW6-400-S										UJ, B3		J, B3, A2	J, A2, P1	J, P1	J		
054917-001 / TAV-BH-MW6-200-~~S~~TB	UJ	5 U,B	UJ														
054920-001 / TAV-BH-MW6-320-TB	UJ	5 U,B	UJ														
054921-001 / TAV-BH-MW6-380-EB	UJ	5 U,B	UJ														
054921-002 / TAV-BH-MW6-380-EB						J, B3	J, B, B3	UJ, B3	UJ, B3	J, B3	J, B3						
054921-003 / TAV-BH-MW6-380-EB																R	

Validated By: Kevin A Lambert **Date:** 06/28/01

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MEMORANDUM

DATE: June 28, 2001

TO: File

FROM: Kevin Lambert

SUBJECT: Inorganic Data Review and Validation – SNL TA 3/5 Assessment GWM, AR/COC No. 604418/604435, SDG No. 41320/41322(GEL), and Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

The sample was prepared and analyzed with accepted procedures and specified methods (ICP – EPA6010B and CVAA – EPA7470A). All parameters were successfully analyzed. No problems were identified with the data package that result in the qualification of data.

1. ICP – Equipment Blank (EB): The continuing calibration blank (CCB) value for aluminum and silver was greater than (>) the detection limit (DL). Sample results were less than (<) 5x CCB values and are qualified "J, B3." The CCB absolute value for beryllium, selenium, and calcium were > the DL but < the reporting limit (RL). Beryllium and selenium results were non-detect and are qualified "UJ, B3." Calcium result was < 5x the DL and is qualified "J, B3."

2. ICP – EB: Silver was detected in the method blank (MB). Silver result was < 5x the MB value and is qualified "J, B."

3. CVAA – EB: The CCB absolute value for mercury was > the DL but < the RL. Mercury result was non-detect and is qualified "UJ, B3."

4. ICP – Soil: The initial calibration blank (ICB) and continuing calibration blank (CCB) values for antimony were > the DL. Sample 41320-024 was < 5x the ICB and CCB values and is qualified "J, B3."

5. ICP – Soil: The matrix spike (MS) percent recovery (%R) for chromium (151%) was > the upper QC limit (139%) and the relative percent difference (RPD) for chromium (30%) was outside QC acceptance criteria (28%). Sample results were detect and are qualified "J, A2, P1."

6. ICP – Soil: The MS/MSD RPD for cobalt (40%) was outside QC acceptance criteria (23%). Sample results were detect and are qualified "J, P1."

7. ICP – Soil: The MS %R for antimony (44%) was > the lower QC limit (75%). Sample results were non-detect except for 41320-024 and are qualified "UJ, A2." Sample 41320-024 is qualified "J, A2."

8. ICP – Soil: The serial dilution RPD for potassium (24%) was > 10%. Sample results for samples 41320-013 to –014 and 41320-017 to –024 were > 50x the RL; data is qualified "J."

9. CVAA – Soil: The ICB and CCB absolute values for mercury were > the DL but < the RL. Sample results were < 5x the DL or non-detect. Detects are qualified "J, B3" and non-detects are qualified "UJ, B3."

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

Holding Times

ICP and CVAA - EB and Soil: The sample was analyzed within the prescribed holding times.

Calibration

ICP and CVAA – EB and Soil: Initial and continuing calibration verification data met QC acceptance criteria.

Blanks

ICP - EB:
No target analytes were detected in the ICB except for sodium and antimony. Sodium ICB absolute value was > the DL but < the RL. Sodium result was > 5x the DL; no data is qualified as a result. Antimony ICB value was > the DL but the sample result was non-detect; no data is qualified as a result.

No target analytes were detected in the CCB except for aluminum, silver, arsenic, antimony, beryllium, selenium, calcium, potassium, and sodium. Aluminum, silver, beryllium, selenium, and calcium are qualified as noted above in the summary section. The arsenic and antimony CCB values were > the DL but sample results were non-detect: no data are qualified as a result. The CCB absolute values for potassium and sodium were > the DL but < the RL, and sample results were > 5x the DL; no data are qualified as a result.

No target analytes were detected in the MB except for silver. Silver is qualified as noted above in the summary section.

CVAA - EB: Mercury was not detected in the ICB and MB. Mercury was detected in the CCB and is qualified as noted above in the summary section.

ICP - Soil:
No target analytes were detected in the ICB except for sodium, calcium, zinc, and antimony. Antimony results are qualified and noted above in the summary section. Sodium, calcium, and zinc ICB absolute values were > the DL but < the RL. Sodium, calcium, and zinc results were > 5x the DL; no data are qualified as a result.

No target analytes were detected in the CCB except for aluminum, calcium, cobalt, iron, magnesium, nickel, lead, antimony, potassium, sodium, and zinc. Antimony results are qualified and noted above in the summary section. The aluminum, calcium, cobalt, iron, magnesium, nickel, and lead CCB values were > the DL but sample results were > 5x the CCB values; no data are qualified as a result. The CCB absolute values for potassium, sodium, and zinc were > the DL but < the RL, and sample results were > 5x the DL; no data are qualified as a result.

No target analytes were detected in the MB except for barium, calcium, and antimony. Sample results were > 5x the MB value or non-detect; no data are qualified as a result.

CVAA - Soil: Mercury was not detected in the MB. Mercury was detected in the ICB and CCB, and is qualified as noted above in the summary section.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analyses

ICP and CVAA - EB: The LCS/LCSD met QC acceptance criteria.

ICP - Soil: The LCS/LCSD met QC acceptance criteria except for zinc. The zinc LCSD %R (133%) was > the upper QC limit (127%) and LCS/LCSD RPD (21%) was slightly outside QC acceptance criteria (20%). The LCS %R, MS %R and replicate RPD met QC acceptance criteria. As a result based on professional judgment no data are qualified.

CVAA - Soil: The LCS/LCSD met QC acceptance criteria.

Matrix Spike (MS) Analyses

ICP and CVAA - EB: No MS was run with the sample delivery group (SDG). An MS was run on another SNL SDG in the batch and met QC acceptance criteria.

ICP - Soil: The MS met QC acceptance criteria for chromium and antimony. Sample results are qualified as noted above in the summary section.

CVAA - Soil: The MS met QC acceptance criteria.

Replicate Analyses

ICP and CVAA - EB: No replicate analysis was run with the SDG. A replicate analysis was run on another SNL SDG in the batch and met QC acceptance criteria.

ICP - Soil: The replicate analysis met QC acceptance criteria for chromium and cobalt. Sample results are qualified as noted above in the summary section.

CVAA - Soil: The replicate analysis met QC acceptance criteria.

ICP Interference Check Sample (ICS) Analysis

ICP – EB and Soil: The ICS data met QC acceptance criteria.

ICP Serial Dilution

ICP - EB: The serial dilution met QC acceptance criteria.

ICP - Soil: The serial dilution met QC acceptance criteria except potassium and sodium. Potassium results are qualified as noted above in the summary section. Sodium serial dilution RPD (12%) was > 10% but sample results were < 50x the RL; no data re qualified as a result.

Other QC

ICP - Soil: No target analytes were detected in the EB except for aluminum, barium, calcium, iron, magnesium, nickel, potassium, silver, and sodium. Sample were > 5x the EB values or non-detect; no data are qualified as a result. A field duplicate pair was submitted, however there are no "required" review criteria for field duplicate analyses comparability.

CVAA - Soil: Mercury was not detected in the EB. A field duplicate pair was submitted, however there are no "required" review criteria for field duplicate analyses comparability.

No other specific issues were identified which affect data quality.

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

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MEMORANDUM

DATE: June 28, 2001

TO: File

FROM: Kevin Lambert

SUBJECT: Organic Data Review and Validation – SNL TA 3/5 Assessment GWM, AR/COC No. 604418/604435, SDG No. 41320/41322(GEL), and Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

The samples were prepared and analyzed with accepted procedures and specified methods (VOC – EPA8260A/B). All compounds were successfully analyzed. Problems were identified with the data package that result in the qualification of data.

1. VOC – Equipment Blank (EB) and Trip Blank (TB): The continuing calibration verification percent difference (CCV %D) for bromomethane (63%) and vinyl acetate (74%) were greater than (>) 60%. The bias are considered high and sample results were non-detect, therefore based on professional judgment data are qualified "UJ."

2. VOC – EB and TB: Methylene chloride was detected in the method blank (MB). Sample results were less than (<) the reporting limit (RL) and < 10x the MB value; data are qualified non-detect at the RL (5 U, B).

3. VOC – Soil: The CCV %D for vinyl acetate (68%) was > 60%. The bias is considered high and sample results were non-detect, therefore based on professional judgment data are qualified "UJ."

4. VOC – Soil: The CCV %D for chloromethane (-45%%) was > 40 but < 60%. Sample results were non-detect and are qualified "UJ."

5. VOC -Soil: Acetone was detected in the MB. Samples 41320-001 to –005 and 41320-007 to –012 were > the RL but < 10x the MB value; data are qualified non-detect at the reported value (reported value U, B).

6. VOC - Soil: Acetone was detected in the EB. Samples 41320-001 to –005 and 41320-007 to –012 were > the RL but < 10x the EB value data are qualified non-detect at the reported value (reported value U, B2).

7. VOC -Soil: Methylene chloride was detected in the TBs. Sample results were < the RL and < 10x the TB values; data are qualified non-detect at the RL (5 U, B1).

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

Holding Times

VOC – EB, TB, and Soil: The sample were extracted and analyzed within the prescribed holding times.

Calibration

VOC – EB and TB:
The initial calibration data met QC acceptance criteria.

The continuing calibration data met QC acceptance criteria except for bromomethane and vinyl acetate. Sample results are qualified as noted above in the summary section.

VOC - Soil:
The initial calibration data met QC acceptance criteria.

The continuing calibration data met QC acceptance criteria except for chloromethane and vinyl acetate. Sample results are qualified as noted above in the summary section.

Blanks

VOC – EB and TB: No target analytes were detected in the MB except for methylene chloride. Sample results are qualified as noted above in the summary section.

VOC - Soil: No target analytes were detected in the MB except for acetone. Sample results are qualified as noted above in the summary section.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analyses

VOC – EB, TB, and Soil: The LCS/LCSD met QC acceptance criteria.

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

VOC – EB and TB: No MS/MSD was run with the sample delivery group (SDG).

VOC Analysis: No MS/MSD was run on this SDG. An MS/MSD was run on another SNL SDG in the batch and met QC acceptance criteria.

Surrogates

VOC – EB, TB, and Soil: The surrogate recoveries met QC acceptance criteria.

Internal Standards

VOC – EB, TB, and Soil: Internal standards data met QC acceptance criteria.

Other QC

VOC - Soil:
No target analytes were detected in the TBs except methylene chloride and 1,2-dichloropropane. Methylene chloride results are qualified as noted above in the summary section. The sample results for 1,2-dichloropropane were non-detect; no data is qualified as a result.

No target analytes were detected in the EB except acetone and methylene chloride. Acetone is qualified as noted above in the summary section. Methylene chloride results were > the RL and > 10x the EB value; no data is qualified as a result.

A field duplicate pair was submitted, however there are no "required" review criteria for field duplicate analyses comparability.

No other specific issues were identified which affect data quality.

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

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MEMORANDUM

DATE: June 28, 2001

TO: File

FROM: Kevin Lambert

SUBJECT: Radiochemical Data Review and Validation – SNL TA 3/5 Assessment GWM, AR/COC No. 604418/604435, SDG No. 41320/41322(GEL), and Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

The sample was prepared and analyzed with accepted procedures and specified method (Tritium – EPA906.0). All analytes were successfully analyzed. A problem was identified with the data package that result in the qualification of data.

1. Tritium – Equipment Blank (EB): The sample result was negative. The absolute value was greater than (>) the reporting limit (RL), therefore the result is qualified "R" (unusable).

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

Holding Times

Tritium – EB and Soil: The sample was analyzed within the prescribed holding times.

Calibration

Tritium – EB and Soil: Case narratives state all initial and continuing calibration requirements were met.

Blanks

Tritium – EB and Soil: No target analytes were detected in the method blank (MB).

Laboratory Control Sample (LCS) Analyses

Tritium– EB and Soil: The LCS met QC acceptance criteria.

Matrix Spike (MS) Analyses

Tritium - EB: The MS met QC acceptance criteria.

Tritium –Soil: No MS was run on this sample delivery group (SDG).

Replicate Analyses

Tritium - EB: Replicate analysis met QC acceptance criteria.

Tritium –Soil: No replicate analysis was run on this SDG.

Negative Bias

Tritium - EB: Did not meet QC acceptance criteria. Data is qualified as noted above in the summary section.

Tritium –Soil: Met QC acceptance criteria.

Other QC

Tritium - Soil: The EB is unusable; negative bias did not meet QC acceptance criteria.

No other specific issues were identified which affect data quality.

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

Volatile Organics

Site/Project: TA 3/5 Assessment GW/MAR/COC #: 604325/604328 Batch #s: 73958

Laboratory: GEL Laboratory Report #: 40709A/B, 40711 # of Samples: 3 Matrix: Aqueous

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

Sample	SMC 1	SMC 2	SMC 3	IS 1 area	IS 1 RT	IS 2 area	IS 2 RT	IS 3 area	IS 3 RT
		Met				Met			
		Criteria				Criteria			

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

IS 1: Bromochloromethane
IS 2: 1,4-Difluorobenzene
IS 3: Chlorobenzene-d5

Comments: NA - Not Applicable

① Calib RF: Trichloroethene => The Calib RF (0.235) was < the specified min. RF (0.30) but > 0.01, Sample results were ND and are qualified "UJ"

② CCV %D: 2-Butanone, 4-Methyl-2-Pentanone, and 2-Hexanone => CCV %D (34, 24, + 36 respectively) were > 20% but < 40%, Sample results were ND and as a result based on professional judgment No data are qualified.

Acetone => CCV %D (38) was > 20% but < 40%, Samples 40711-002 and -003 were detect and are qualified "J." Sample 40711-001 was ND and is qualified based on professional judgment "UJ."

Volatile Organics (SW 846 Method 8260)

Site/Project: TA3/5 Assessment GW/MA R/COC #: 604325/604328 # of Samples: 7 Matrix: Soil

Laboratory: GEL Laboratory Report #: 40709A/B, 40711 Laboratory Sample IDs: 40709-001 to -007

Methods: EPA 8260A Batch #s: 73957

IS	CAS #	Name	TCL	Min. RF	Intercept	Calib. RF (1) >.05	Calib. RSD/ R^2 <20%/ 0.99	CCV %D (2) 20%	Method Blks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD (3)	Field Dup. RPD	Equip. Blanks (4) 40711-002 µg/l	Trip Blanks (5) 40711-001 µg/l	TB (5) 40711-003 µg/l
1	74-87-3	Chloromethane	✓	0.10		✓	✓	28	✓								✓	✓	✓
1	74-83-9	Bromomethane	✓	0.10	✓	✓	✓	36 KAL 05/18/01											
1	75-01-4	vinyl chloride	✓	0.10		✓	✓	✓ ~~36~~											
1	75-00-3	Chloroethane	✓	0.01		✓	✓	✓											
1	75-09-2	methylene chloride (10xblk)	✓	0.01	✓	✓	✓												
1	67-64-1	acetone(10xblk)	✓	0.01		✓	✓										2.68 J		2.94 J
1	75-15-0	carbon disulfide	✓	0.10		✓	✓										✓		✓
1	75-35-4	1,1-dichloroethene	✓	0.20	✓	✓	✓			✓	✓	✓	✓	✓	28(20)				
1	75-34-3	1,1-dichloroethane	✓	0.10		✓	✓												
1	67-66-3	Chloroform	✓	0.20		✓	✓												
1	107-06-2	1,2-dichloroethane	✓	0.10		✓	✓												
1	78-93-3	2-butanone(10xblk)	✓	0.01		✓	✓												
2	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓												
2	56-23-5	carbon tetrachloride	✓	0.10		✓	✓												
2	75-27-4	Bromodichloromethane	✓	0.20		✓	✓												
2	78-87-5	1,2-dichloropropane	✓	0.01		✓	✓											4.63	7.04
2	10061-01-5	cis-1,3-dichloropropene	✓	0.20	✓	✓	✓												
2	79-01-6	Trichloroethene	✓	0.30		0.25	✓			✓	✓	✓	✓	✓	30(20)				
2	124-48-1	Dibromochloromethane	✓	0.10	✓	✓	✓										0.302 J		
2	79-00-5	1,1,2-trichloroethane	✓	0.10		✓	✓										✓		
2	71-43-2	Benzene	✓	0.50		✓	✓			✓	✓	✓	✓	✓	20(19)				
2	10061-02-6	trans-1,3-dichloropropene	✓	0.10	✓	✓	✓												
2	75-25-2	Bromoform	✓	0.10	✓	✓	✓	-23											
3	108-10-1	4-methyl-2-pentanone	✓	0.10	✓	✓	✓	-29											
3	591-78-6	2-hexanone	✓	0.01	✓	✓	✓	✓											
3	127-18-4	Tetrachloroethene	✓	0.20		✓	✓	✓											
3	79-34-5	1,1,2,2-tetrachloroethane	✓	0.30		✓	✓	✓											
3	108-88-3	toluene(10xblk)	✓	0.40		✓	✓	✓		✓	✓	✓	✓	✓	✓				
3	108-90-7	Chlorobenzene	✓	0.50		✓	✓	✓		✓	✓	✓	✓	✓	✓				
3	100-41-4	Ethylbenzene	✓	0.10		✓	✓	✓											
3	100-42-5	Styrene	✓	0.30	✓	✓	✓	✓											
3	1330-20-7	xylenes(total)	✓	0.30		✓	✓	✓											
	540-59-0	1,2-dichloroethylene(total)	✓	0.01		✓	✓	✓											
	110-75-8	2-chloroethyl vinyl ether																	
	108-05-4	vinyl acetate	✓			✓	✓	23	✓								✓	✓	✓

No "Required" Revised Criteria

Comments:

Notes: Shaded rows are RCRA compounds.

(4) EB: Acetone and dibromochloromethane were detected, Sample results were ND, no data are qualified as a result

(5) TBs: Acetone and 1,2-Dichloropropane were detected, Sample results were ND, no data are qualified as a result

Reviewed By: Kevin A Lambert Date: 05/18/01

B

Volatile Organics

Site/Project: TA3/5 Assessment GLM AR/COC #: 604325/604328 Batch #s: 73957

Laboratory: GEL Laboratory Report #: 40709A/B, 40711 # of Samples: 7 Matrix: soil

Surrogate Recovery and Internal Standard Outliers (SW 846 Method 8260)

Sample	SMC 1	SMC 2	SMC 3	IS 1 area	IS 1 RT	IS 2 area	IS 2 RT	IS 3 area	IS 3 RT
		Met				Met			
		Criteria				Criteria			

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

IS 1: Bromochloromethane
IS 2: 1,4-Difluorobenzene
IS 3: Chlorobenzene-d5

Comments:

① Calib RF: Trichloroethene ⇒ Calib RF(0.25) was < the specified min. RF(0.30) but > 0.01, Sample results were ND and are qualified "UJ."

② CCV%D: Chloromethane, Bromomethane, Bromoform, 4-Methyl-2-Pentanone, and Vinyl Acetate = CCV%Ds (28, 36, -23, -29, +23 respectively) were > 20% but < 40%, Sample results were ND and as a result based on professional judgment ~~are not~~ KAL 05/17/01 No data are qualified

③ MS/MSD RPD: Benzene ⇒ RPD(20) was slightly outside QC acceptance criteria (19), Sample results were ND and all other QC met criteria, as a result based on professional judgment No data are qualified.

1,1-Dichloroethene and Trichloroethene ⇒ ~~CCV%~~ KAL 05/17/01 RPD(28 and 30 respectively) were outside QC acceptance criteria (20), Sample results were ND and data are qualified "UJ, A2".

Radiochemistry

Site/Project: TA 3/5 Assessment GWM AR/COC #: 604325/604328 Laboratory Sample IDs: 40709-015, -016, -017, -018, -019, -020, + -021

Laboratory: GEL Laboratory Report #: 40709 A/B, 40711

Methods: EPA 906.0

# of Samples: 7 Matrix: Soil Batch #s: 73323

Analyte	QC Element													
	Method Blanks	LCS	MS	Rep RER	Equip. Blanks	Field Dup. RER	Field Blanks	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105
H3	✓	✓	✓	✓	✓	No "Required" Review Criteria	NA						
U-238													
U-234													
U-235/-236													
Th-232													
Th-228													
Th-230													
Pu-239/-240													
Gross Alpha													
Nonvolatile Beta													
Ra-226													
Ra-28													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													

NA - Not Applicable

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Comments:

Reviewed By: Kevin A Lambert Date: 05/18/01

Radiochemistry

Site/Project: TA 3/5 Assessment GWM AR/COC #: 604325/604328 Laboratory Sample IDs: 40711-005 (EB)

Laboratory: GEL Laboratory Report #: 40709A/B, 40711

Methods: EPA 906.0

# of Samples: 1 Matrix: Aqueous Batch #s: 73455

Analyte	QC Element												
	Method Blanks	LCS	MS	Rep RER	Equip. Blanks	Field Dup. RER	Field Blanks	Sample ID	Isotope	IS/Trace	Sample ID	Isotope	IS/Trace
Criteria	U	20%	25%	<1.0	U	<1.0	U			50-105			50-105
H3	✓	✓	NA	NA	NA	No "Required" Review Criteria	NA						
U-238													
U-234													
U-235/-236													
Th-232													
Th-228													
Th-230													
Pu-239/-240													
Gross Alpha													
Nonvolatile Beta													
Ra-226													
Ra-28													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													

NA - Not Applicable

Comments:

Parameter	Method	Typical Tracer	Typical Carrier
Iso-U	Alpha spec.	U-232	NA
Iso-Pu	Alpha spec.	Pu-242	NA
Iso-Th	Alpha spec.	Th-229	NA
Am-241	Alpha spec.	Am-242	NA
Sr-90	Beta	Y ingrowth	NA
Ni-63	Beta	NA	Ni by ICP
Ra-226	Deamination	NA	NA
Ra-226	Alpha spec.	Ba-133 or Ra-225	NA
Ra-228	Gamma spec.	Ba-133	NA

Gamma spec. LCS contains: Am-241, Cs-137, and Co-60

Reviewed By: Kevin A Lambert Date: 05/18/01

Contract Verification Review (CVR)

Project Leader LAI | Project Name TA 3/5 ASSESSMENT GWM | Case No. 7219_01.05

AR/COC No. 604325 & 604328 | Analytical Lab GEL | SDG No. 40709A & B

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

1.0 Analysis Request and Chain of Custody Record and Log-In Information

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
1.1	All items on COC complete - data entry clerk initialed and dated	X				
1.2	Container type(s) correct for analyses requested	X				
1.3	Sample volume adequate for # and types of analyses requested	X				
1.4	Preservative correct for analyses requested	X				
1.5	Custody records continuous and complete	X				
1.6	Lab sample number(s) provided and SNL sample number(s) cross referenced and correct	X				
1.7	Date samples received	X				
1.8	Condition upon receipt information provided	X				

2.0 Analytical Laboratory Report

Line No.	Item	Complete? Yes	Complete? No	If no, explain	Resolved? Yes	Resolved? No
2.1	Data reviewed, signature	X				
2.2	Method reference number(s) complete and correct	X				
2.3	QC analysis and acceptance limits provided (MB, LCS, Replicate)	X				
2.4	Matrix spike/matrix spike duplicate data provided(if requested)	X				
2.5	Detection limits provided; PQL and MDL(or IDL), MDA and L_c	X				
2.6	QC batch numbers provided	X				
2.7	Dilution factors provided and all dilution levels reported	X				
2.8	Data reported in appropriate units and using correct significant figures	X				
2.9	Radiochemistry analysis uncertainty (2 sigma error) and tracer recovery (if applicable) reported	X				
2.10	Narrative provided	X				
2.11	TAT met	X				
2.12	Hold times met	X				
2.13	Contractual qualifiers provided	X				
2.14	All requested result and TIC (if requested) data provided	X				

Contract Verification Review (Continued)

3.0 Data Quality Evaluation

Item	Yes	No	If no, Sample ID No./Fraction(s) and Analysis
3.1 Are reporting units appropriate for the matrix and meet contract specified or project-specific requirements? Inorganics and metals reported as ppm (mg/liter or mg/Kg)? Tritium reported in picocuries per liter with percent moisture for soil samples? Units consistent between QC samples and sample data	X		
3.2 Quantitation limit met for all samples	X		
3.3 Accuracy a) Laboratory control samples accuracy reported and met for all samples	X		
b) Surrogate data reported and met for all organic samples analyzed by a gas chromatography technique	X		
c) Matrix spike recovery data reported and met		X	ANTIMONY AND POTASSIUM FAILED RECOVERY LIMITS
3.4 Precision a) Replicate sample precision reported and met for all inorganic and radiochemistry samples		X	SEVERAL ELEMENTS FAILED QC ACCEPTANCE LIMITS FOR METALS DUP
b) Matrix spike duplicate RPD data reported and met for all organic samples		X	RPDs FOR VOC MS/MSD OUTSIDE ACCEPTANCE LIMITS
3.5 Blank data a) Method or reagent blank data reported and met for all samples	X		
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	1,2-DICHLOROPROPANE & ACETONE DETECTED IN VOC TRIP BLANKS ACETONE & DBCM DETECTED IN VOC EQUIPMENT BLANK SEVERAL ELEMENTS DETECTED IN METALS EQUIPMENT BLANK
3.6 Contractual qualifiers provided: "J"- estimated quantity; "B"-analyte found in method blank above the MDL for organic or above the PQL for inorganic; "U"-analyte undetected (results are below the MDL, IDL, or MDA (radiochemical)); "H"-analysis done beyond the holding time	X		
3.7 Narrative addresses planchet flaming for gross alpha/beta	NA		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and pesticides/PCBs	NA		

Contract Verification Review (Continued)

4.0 Calibration and Validation Documentation

Item	Yes	No	Comments
4.1 GC/MS (8260, 8270, etc.) a) 12-hour tune check provided	X		
b) Initial calibration provided	X		
c) Continuing calibration provided	X		
d) Internal standard performance data provided	X		
e) Instrument run logs provided	X		
4.2 GC/HPLC (8330 and 8010 and 8082) a) Initial calibration provided	NA		
b) Continuing calibration provided	NA		
c) Instrument run logs provided	NA		
4.3 Inorganics (metals) a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry a) Instrument run logs provided	X		

Contract Verification Review (Concluded)

5.0 Problem Resolution

Summarize the findings in the table below. List only samples/fractions for which deficiencies have been noted.

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions

Were deficiencies unresolved? ☐ Yes ☑ No

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

If no, provide: nonconformance report or correction request number _____ and date correction request was submitted:_____

Reviewed by: W. Palencia Date: 5-14-2001 Closed by:_____ Date:_____

CONTRACT LABORATORY

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab SMO

Batch No. N/A SAR/WR No. 40709A

AR/COC 604325

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-10-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	742746	Project/Task No.:	7219.01.02
Project Name:	TA-V Well Borehole	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	Dwayne Salmi
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	CF012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☑ Released by COC No.: ~~604327~~ Non Release

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154

Location: Tech Area
Building NA Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054848-001	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	AG	4oz	None	G	SA	VOC (8260)	004
054848-002	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	011
054848-003	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	G	1x1L	None	G	SA	Tritium (906.0)	018
054849-001	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	AG	2x4oz	None	G	SA + MS/MSD	VOC (8260)	001
054849-002	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	G	250 ml	None	G	SA + MS/MSD	TAL metals (6010/7000)	008
054849-003	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	G	2x1L	None	G	SA + MS/MSD	Tritium (906.0)	015
054850-001	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	AG	4oz	None	G	SA	VOC (8260)	005
054850-002	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	012
054850-003	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	G	1L	None	G	SA	Tritium (906.0)	019
054851-001	TAV-BH-MW8-200-DU	200	N/A	040801 1453	S	AG	4oz	None	G	DU	VOC (8260)	006

RMMA ☐ Yes ☑ No Ref. No.
Sample Disposal ☐ Return to Client ☑ Disposal by lab
Turnaround Time ☐ 7 Day ☐ 15 Day ☑ 30 Day ☐ Negotiated TAT

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

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Abnormal Conditions on Receipt: 3.2°C

Return Samples By:

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Robert Quintana	GQ	IT/6135/284-3309
	~~W Gobson~~			~~MDM/6133/845-3267~~

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4-10-01	Time 1000	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/10/01	Time 1000	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6132	Date 4-10-01	Time 1130	5.Relinquished by	Org.	Date	Time
2. Received by Patricia Davis	Org. GEL	Date 4/11/01	Time 08:30	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

Notification.

CONTRACT LABORATORY
Analysis Request And Chain Of Custody (Continuation)

AR/COC- 604325

Project Name: TA-V Well Borehole | Project/Task Manger: Lal/Sanders | Project/Task No.: 7219.01.05

Location: Tech Area

Building NA Room NA

Reference LOV (available at SMO)

Sample No-Fraction	ER Sample ID or Sample Location detail	Beginning Depth (ft)	ER Site No.	Date/Time (hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab use: Lab Sample ID
054851-002	TAV-BH-MW8-200-DU	200	N/A	040801 1453	S	G	250 ml	None	G	DU	TAL metals (6010/7000)	013
054851-003	TAV-BH-MW8-200-DU	200	N/A	040801 1453	S	G	1L	None	G	DU	Tritium (906.0)	020
054852-001	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	AG	4oz	None	G	SA	VOC (8260)	007
054852-002	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	014
054852-003	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	G	2x1L	None	G	SA	Tritium (906.0)	021
054871-001	TAV-BH-MW8-40-TB	N/A	N/A	040801 0915	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	40TB 003

LAB USE

Abnormal Conditions on Receipt

Recipient Initials P.A.D.

CONTRACT LABORATORY

ANALYSIS REQUEST AND CHAIN OF CUSTODY

nternal Lab

Batch No. N/A SAR/WR No. 40709B

AR/COC 604328

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-10-01 SMO USE	Contract No:	AJ-2480A
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	742746	Project/Task No.:	7219.01.05
Project Name:	TA-V Well Borehole	Lab Contact:	E Kent 803-556-8171	SMO Authorization:	
Record Center Code:	ER/1306/DAT	Lab Destination:	GEL		
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110		
Service Order No.	CF012-01	Send Report to SMO:	S Jensen 505-844-3184		

☐ Waste Characterization
-RCRA Date=
☐ Send:Preliminary/report to
☐ Validation Required
☐ Released by COC No.:

Bill To: Sandia National Labs (Accounts Payable)
P.O. Box 5800, MS-0154
Albuquerque, NM., 87185-0154 40709

Location	Tech Area
Building NA	Room NA

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Beginning Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserve All@4C	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
054853-001	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	AG	4oz	None	G	SA	VOC (8260)	002
054853-002	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	009
054853-003	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	G	1L	None	G	SA	Tritium (906.0)	016
054855-001	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	AG	4oz	None	G	SA	VOC (8260)	003
054855-002	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	G	250 ml	None	G	SA	TAL metals (6010/7000)	010
054855-003	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	G	1L	None	G	SA	Tritium (906.0)	017
054873-001	TAV-BH-MW8-400-TB	N/A	N/A	040901 0827	DIW	G	3x40ml	HCl	G	TB	VOC (8260)	40710 001
054872-001	TAV-BH-MW8-400-EB	N/A	N/A	040901 0948	DIW	G	3x40ml	HCl	G	EB	VOC (8260)	002
054872-002	TAV-BH-MW8-400-EB	N/A	N/A	040901 0948	DIW	P	500ml	HNO3	G	EB	TAL metals (6010/7000)	004
054872-003	TAV-BH-MW8-400-EB	N/A	N/A	040901 0948	DIW	AG	250ml	None	G	EB	Tritium (906.0)	005

RMMA	☐ Yes ☑ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☐ Return to Client ☑ Disposal by lab	Date Entered(mm/dd/yy)	
Turnaround Time	☐ 7 Day ☐ 15 Day ☑ 30 Day	Entered by:	
Return Samples By:	☐ Negotiated TAT	QC Inits.	

Special Instructions/QC Requirements:
EDD ☑ Yes ☐ No
Raw Data Packag ☑ Yes ☐ No
*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

Abnormal Conditions on Receipt
4.3°c

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	M Sanchez	MS	Weston/6135/845-3267
	G Quintana	Robert Quintana	RQ	IT/6135/284-3309
	~~W Gobsch~~			~~MDM/6133/845-3267~~

1.Relinquished by Margaret Sanchez	Org. 6135	Date 4/10/01	Time 0930	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/10/01	Time 0930	4. Received by	Org.	Date	Time
2.Relinquished by	Org. 6132	Date 4/10/01	Time 1130	5.Relinquished by	Org.	Date	Time
2. Received by Patricia Dawson	Org. GEL	Date 4/11/01	Time 08:30	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

[illegible] ACI [illegible]ires [illegible] not [illegible]ion.

Sample Findings Summary

Site: TA3/5 Assessment GWM **AR/COC:** 604412/604415 **Data Type:** Radiochemical

Sample ID	Method/CAS Number (Analysis/Analyte)															
			All QC acceptance criteria were met.													
			No sample data were qualified.													

Validated By: Mr. Kenneth Salaz **Date:** 8/02/01

Sample Findings Summary

Site: TA3/5 Assessment GWM **AR/COC:** 604412/604415 **Data Type:** Organic

Sample ID	Method/CAS Number (Analysis/Analyte)														
	67-64-1 (acetone)	75-00-3 (chloroethane)	79-01-6 (trichloroethene)	108-05-4 (vinyl acetate)											
COC #604112															
054885-001 TAV-BH-MW6-20-S	10.3U,B	UJ	UJ	R											
054888-001 TAV-BH-MW6-80-S	11.3U,B	UJ	UJ	R											
054889-001 TAV-BH-MW6-100-S	11.8U,B	UJ	UJ	R											
054915-001 TAV-BH-MW6-20-TB			UJ	R											
COC #604115															
054890-001 TAV-BH-MW6-120-S	11.5U,B	UJ	UJ	R											
054891-001 TAV-BH-MW6-140-S	11.7U,B	UJ	UJ	R											
054892-001 TAV-BH-MW6-160-S	12.8U,B	UJ	UJ	R											
054893-001 TAV-BH-MW6-180-S	10.9U,B	UJ	UJ	R											
054916-001 TAV-BH-MW6-120-TB			UJ	R											

Validated By: Mr. Kenneth Salaz **Date:** 8/02/01

Sample Findings Summary

Site: TA3/5 Assessment GWM **AR/COC:** 604412/604415 **Data Type:** Inorganic

Sample ID	Method/CAS Number (Analysis/Analyte)														
	7440-70-2 (Ca)	7440-43-9 (Cd)	7440-09-7 (K)	7440-23-5 (Na)	7440-62-2 (V)	7440-36-0 (Sb)	7440-66-6 (Zn)								
COC #604112															
054885-002 TAV-BH-MW6-20-S	J		J,A2	J,A2	J,A2	J,A2,B3									
054888-002 TAV-BH-MW6-80-S	J		J,A2	J,A2	J,A2	UJ,A2									
054889-002 TAV-BH-MW6-100-S	J		J,A2	J,A2	J,A2	UJ,A2									
COC #604115															
054890-002 TAV-BH-MW6-120-S	J	UJ,B3	J,A2	J,A2	J,A2	UJ,A2	J,B3								
054891-002 TAV-BH-MW6-140-S	J		J,A2	J,A2	J,A2	J,A2,B3									
054892-002 TAV-BH-MW6-160-S	J		J,A2	J,A2	J,A2	UJ,A2									
054893-002 TAV-BH-MW6-180-S	J		J,A2	J,A2	J,A2	UJ,A2									

Validated By: Mr. Kenneth Salaz **Date:** 8/02/01

Analytical Quality Associates, Inc.
616 Maxine NE
Albuquerque, NM 87123
Phone: 505-299-5201
Fax: 505-299-6744
Email: minteer@aol.com

MEMORANDUM

DATE: August 2, 2001

TO: File

FROM: Kenneth Salaz

SUBJECT: Inorganic Data Review and Validation - SNL TA3/5 Assessment GWM, ARCOC #604412/604415, GEL SDG #41150, Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with approved procedures using methods EPA6010B ICP-AES and EPA7470A CVAA. Problems were identified with the data package that result in the qualification of data.

1. ICP Analysis: In the continuing calibration blank (CCB) for sample 41150-008, zinc (Zn) was detected at a concentration greater than (>) the reporting limit (RL). This sample should have been re-digested and re-analyzed for this analyte but was not. The associated sample result was less than (<) 10X the blank concentration and will be qualified "J,B3." In the initial calibration blanks (ICBs) and CCBs, antimony (Sb) was detected. The associated results of samples -009 and -012 were detects, less than (<) 5X the blank concentrations, and will be qualified "J,B3." In the CCB for sample -008, cadmium (Cd) was detected at a negative concentration. The absolute value was > the detection limit (DL) but < the RL. The associated sample result was non-detect (ND) and will be qualified "UJ,B3."

2. ICP Analysis: The MS percent recovery (%R) of antimony (Sb) was <75% but >30%. The associated results of samples 41150-009 and -012 were detects and will be qualified "J,A2." All other associated sample results were ND and will be qualified "UJ,A2." The MS %Rs of potassium (K), sodium (Na), and vanadium (V) were >125%. All associated sample results were detects and will be qualified "J,A2."

3. ICP Analysis: The serial dilution relative percent difference (RPD) of calcium (Ca) was >10%. All associated sample results were detects, >50X the RL, and will be qualified "J."

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

Holding Times/Preservation

All Analyses: All samples were analyzed within the prescribed holding times and properly preserved.

Calibration

All Analyses: The initial and continuing calibrations met all QC acceptance criteria.

Blanks

ICP Analysis: No target analytes were detected in the blanks except as noted above in the summary section and the following. In the ICB and/or CCB, aluminum (Al), calcium (Ca), iron (Fe), K, and Na were detected. In the method blank, Al and K were detected. However, all associated sample results were >5X the blank concentration. Thus, no sample data were qualified. In the ICB and/or CCB, Ca, copper (Cu), Mg, K, Na, and Zn were detected at negative concentrations. The absolute values were > the DL but < the RL. However, all associated sample results were >5X the DL. Thus, no sample data were qualified.

CVAA Analysis: No target analytes were detected in the blanks.

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

ICP Analysis: The MS analysis met QC acceptance criteria except as noted above in the summary section. No MSD analysis was performed. The replicate analysis was used as a measure of laboratory precision.

CVAA Analysis: The MS analysis met all QC acceptance criteria. No MSD analysis was performed. The replicate analysis was used as a measure of laboratory precision.

Laboratory Control Sample (LCS/LCSD) Analyses

ICP Analysis: The LCS/LSD analyses met QC acceptance criteria except for the following. The LCSD RPD of Sb was > the QC acceptance limit. However, the LCS/LCSD %Rs met QC acceptance criteria. Thus, no sample data were qualified.

CVAA Analysis: The LCS/LSD analyses met all QC acceptance criteria.

Replicate Analysis

ICP Analysis: The replicate analysis met QC acceptance criteria except for the following. The replicate RPD for barium (Ba) was slightly >35%. However, all other QC acceptance criteria were met. Thus, no sample data were qualified.

CVAA Analysis: The replicate analysis met all QC acceptance criteria.

ICP Interference Check Sample (ICS)

ICP Analysis: The ICS met all QC acceptance criteria.

CVAA Analysis: No ICS was required for this method.

ICP Serial Dilution

ICP Analysis: The serial dilution analysis met QC acceptance criteria except as noted above in the summary section.

CVAA Analysis: No serial dilution was required for this method.

Other QC

All Analyses: No field duplicate, equipment blank (EB), or field blank (FB) was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

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

Analytical Quality Associates, Inc.
616 Maxine NE
Albuquerque, NM 87123
Phone: 505-299-5201
Fax: 505-299-6744
Email: minteer@aol.com

MEMORANDUM

DATE: August 2, 2001

TO: File

FROM: Kenneth Salaz

SUBJECT: Radiochemical Data Review and Validation - SNL TA3/5 Assessment GWM, ARCOC #604412/604415, GEL SDG #41150, Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with approved procedures using methods EPA906.0 Tritium. No problems were identified with the data package that result in the qualification of data.

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

Holding Times/Preservation

All samples were analyzed within the prescribed holding times and properly preserved.

Calibration

The case narrative stated that the instrument used was properly calibrated.

Blanks

No target analytes were detected in the method blank at concentrations greater than (>) the associated MDA.

Matrix Spike (MS) Analysis

The MS analysis met all QC acceptance criteria.

Laboratory Control Sample (LCS) Analysis

The LCS analysis met all QC acceptance criteria.

Replicates

The replicate analysis met all QC acceptance criteria.

Tracer/Carrier Recoveries

No tracer/carrier was required for this method.

Negative Bias

All sample results met negative bias QC acceptance criteria.

Other QC

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

No other specific issues were identified which affect data quality.

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

Analytical Quality Associates, Inc.
616 Maxine NE
Albuquerque, NM 87123
Phone: 505-299-5201
Fax: 505-299-6744
Email: minteer@aol.com

MEMORANDUM

DATE: August 2, 2001

TO: File

FROM: Kenneth Salaz

SUBJECT: Organic Data Review and Validation - SNL
TA3/5 Assessment GWM, ARCOC #604412/604415,
GEL SDG #41150/41151, Project/Task No. 7219.01.05

See the attached Data Validation Worksheets for supporting documentation on the data review and validation.

Summary

All samples were prepared and analyzed with approved procedures using method EPA8260A/B VOCs. Problems were identified with the data package that result in the qualification of data.

1. The initial calibration response factors (RFs) of trichloroethene for the trip blanks (TBs) and the soil samples were less than (<) the required minimum but greater than (>) 0.01. All associated sample results were non-detect (ND) and will be qualified "UJ." The continuing calibration verification (CCV) percent differences (%Ds) of vinyl acetate for the TBs and the soil samples were >60%. All associated sample results were ND and will be qualified "R" (unusable). The CCV %D of chloroethane for the soil samples was >40% but <60%. All associated sample results were ND and will be qualified "UJ."

2. In the method blank for the soil samples, acetone was detected. All associated sample results were detects, <10X the blank concentration, > the reporting limit (RL), and will be qualified "U,B" at their respective concentrations.

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

Holding Times/Preservation

All samples were analyzed within the prescribed holding time and properly preserved.

Calibration

The initial and continuing calibrations met QC acceptance criteria except as noted above in the summary section and the following. The CCV %D of chloromethane for the TBs was >20% but <40%. However, all associated sample results were ND. Thus, no sample data were qualified.

Blanks

No target analytes were detected in the method blanks except as noted above in the summary section and the following. In the method blank for the TBs, acetone was detected. However, all associated sample results were ND. Thus, no sample data were qualified.

Surrogates

The surrogate %Rs met QC acceptance criteria.

Internal Standards (ISs)

The IS areas and retention times (RTs) met QC acceptance criteria.

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

The MS/MSD analyses for the soil samples met all QC acceptance criteria. The MS/MSD analyses for the TBs were performed on a sample from another SDG. No sample data were qualified as a result. The case narrative stated that all QC acceptance criteria were met.

Laboratory Control Samples (LCS/LCSD) Analysis

The LCS/LCSD analyses met all QC acceptance criteria.

Other QC

No target analytes were detected in the TBs. No field duplicate or equipment blank (EB) was submitted on the ARCOC.

No other specific issues were identified which affect data quality.

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

Data Validation Summary

Site/Project: TA3/5 Assessment GWM Project/Task #: 7219.01.05 # of Samples: 21 Matrix: 19 soil/2 aqueous

AR/COC #: 604412/604415 Laboratory Sample IDs: 41150-001 to -019

Laboratory: GEL 41151-001 + -002

SDG #: 41150/41151

QC Element	Analysis									
	Organics				Inorganics				RAD	Other
	VOC	SVOC	Pesticide/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN		
1. Holding Times/Preservation	✓				✓	NA	✓	NA	✓	NA
2. Calibrations	R,UJ				✓		✓		✓	
3. Method Blanks	U,B				J,B3 UJ,B3		✓		✓	
4. MS/MSD	✓				J,A2 UJ,A2		✓		✓	
5. Laboratory Control Samples	✓		NA		✓		✓		✓	
6. Replicates					✓		NA		✓	
7. Surrogates	✓									
8. Internal Standards	✓									
9. TCL Compound Identification	✓									
10. ICP Interference Check Sample					✓					
11. ICP Serial Dilution					J					
12. Carrier/Chemical Tracer Recoveries									NA	
13. Other QC	✓				NA	↓	NA	↓	✓	↓

J = Estimated
U = Not Detected
UJ = Not Detected, Estimated
R = Unusable

Check (√) = Acceptable
Shaded Cells = Not Applicable (also "NA")
NP = Not Provided
Other: _____

Reviewed By: [signature] Date: 8/2/01

ANNEX C
Gamma Spectroscopy Data

Memorandum

To: Project File
From: Stacy Griffith (Dept. 6133, ph. 284-2588)
CC: Records Center
Date: 10/16/2001
Re: Correction to RPSD Reports

As per discussions with Mark Miller on October 10, 2001, the following changes to RPSD reports were made. The changes were verified with Kathye Chavez and Amir Mohagheghi of the RPSD laboratory.

RPSD #	Record number	ER Sample #	Results for Uranium-235 (pCi/g)	2-sigma error	Change made to reported result
10063501	604417	TAV-BH-MW6-120-S	0.098	0.159	ND (0.098)
10065101	604420	TAV-BH-MW6-200-S	0.121	0.146	ND (0.121)
10065102	604420	TAV-BH-MW6-200-DU	0.094	0.151	ND (0.094)
10065105	604420	TAV-BH-MW6-260-S	0.0862	0.17	ND (0.0862)
10065203	604437	TAV-BH-MW6-360-S	0.129	0.179	ND (0.129)
10065003	604440	TAV-BH-MW6-480-S	0.0862	0.158	ND (0.0862)
10057801	604330	TAV-BH-MW8-400-S	0.108	0.157	ND (0.108)

ND = Not detected.

The sample results for the above listed samples were changed as noted. The changes were due to naturally occurring Ra-226 counts being mis-categorized as possible U-235 by the laboratory analysis software. The values should be reported as no detects with the minimum detectable activity given as the reported value.

The last sample on the table (TAV-BH-MW8-400-S) did have a confirming spectral line that conclusively indicated that it would be U-235. Since the reported value is less than the 2-sigma error, it should be reported as not detected with the minimum detectable activity given as the reported value.

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page _1_ of _1_

Batch No. 100

SAR/WR No.

AR/COC 604327

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-10-01 SMO USE	Logged By:		☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Task No.:	7219.01.05	☐ Waste Characterization
Project Name:	TA-V Well Borehole	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination: RPSD	Location: N/A	Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building: N/A	Room: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab

-This COC Number Releases None

COC No(s): ~~604326 & 604326~~

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Analysis Request
054848-004	TAV-BH-MW8-40-S	40	N/A	040801 0915	S	M	16oz	None	G	SA	Gamma Spec
054849-004	TAV-BH-MW8-100-S	100	N/A	040801 1240	S	M	16oz	None	G	SA	Gamma Spec
054850-004	TAV-BH-MW8-200-S	200	N/A	040801 1453	S	M	16oz	None	G	SA	Gamma Spec
054852-004	TAV-BH-MW8-300-S	300	N/A	040801 1720	S	M	16oz	None	G	SA	Gamma Spec

RMMA	☐ Yes ☑ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	
Turnaround Time	☑ Normal ☐ Rush	Entered by:	
	Required Report Date	QC inits.	

Special Instructions/QC Requirements

EDD ☑ Yes ☐ No

Raw Data Package ☑ Yes ☐ No

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Gilbert Quintana	GQ	IT/6135/284-3309
	~~W Gibson/6133/845-3267~~			

*Please send report to:

M Sanders 284-2486 MS1089/Org 6135

mrsande@sandia.gov

Please list as separate report.

1.Relinquished by	Org. 6135	Date 4/10/01	Time 0950	4.Relinquished by	Org.	Date	Time
1. Received by	Org. 6132	Date 4/10/01	Time 0950	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

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*************************************************************************
*                Sandia National Laboratories                           *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]    *
*                  4/11/01  8:11:36 AM                                  *
*************************************************************************
*                                                                       *
* Analyzed by:                    Reviewed by:                          *
*************************************************************************
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Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054848-004
Lab Sample ID : 10057701

Sample Description : TAV-BH-MW8-40-S
Sample Quantity : 443.300 gram
Sample Date/Time : 4/08/01 9:15:00 AM
Acquire Start Date/Time : 4/10/01 10:03:45 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds

Comments:

****

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	8.26E-001
RA-226	1.34E+000	5.13E-001	7.10E-001
PB-214	5.16E-001	9.06E-002	6.54E-002
BI-214	4.94E-001	9.13E-002	5.93E-002
PB-210	Not Detected	---------	3.70E+001
TH-232	5.21E-001	2.74E-001	2.20E-001
RA-228	5.29E-001	1.92E-001	1.61E-001
AC-228	Not Detected	---------	2.17E-001
TH-228	7.79E-001	2.46E-001	5.12E-001
RA-224	5.98E-001	1.62E-001	9.18E-002
PB-212	6.13E-001	1.37E-001	4.46E-002
BI-212	8.04E-001	3.36E-001	4.50E-001
TL-208	5.98E-001	1.24E-001	1.14E-001
U-235	Not Detected	---------	2.40E-001
TH-231	Not Detected	---------	1.37E+001
PA-231	Not Detected	---------	1.52E+000
TH-227	Not Detected	---------	3.96E-001
RA-223	Not Detected	---------	2.42E-001
RN-219	Not Detected	---------	3.89E-001
PB-211	Not Detected	---------	9.33E-001
TL-207	Not Detected	---------	1.54E+001
AM-241	Not Detected	---------	5.30E-001
PU-239	Not Detected	---------	4.48E+002
NP-237	Not Detected	---------	2.45E+000
PA-233	Not Detected	---------	6.01E-002

TH-229	Not Detected	---------	2.70E-001

[Summary Report] - Sample ID: : 10057701

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	4.09E-002
AG-110m	Not Detected	---------	3.14E-002
BA-133	Not Detected	---------	5.28E-002
BE-7	Not Detected	---------	2.58E-001
CD-115	Not Detected	---------	1.27E-001
CE-139	Not Detected	---------	3.00E-002
CE-141	Not Detected	---------	5.57E-002
CE-144	Not Detected	---------	2.48E-001
CM-243	Not Detected	---------	1.90E-001
CO-56	Not Detected	---------	3.91E-002
CO-57	Not Detected	---------	3.29E-002
CO-58	Not Detected	---------	3.82E-002
CO-60	Not Detected	---------	4.15E-002
CR-51	Not Detected	---------	2.63E-001
CS-134	Not Detected	---------	4.50E-002
CS-137	Not Detected	---------	3.37E-002
EU-152	Not Detected	---------	9.93E-002
EU-154	Not Detected	---------	2.02E-001
EU-155	Not Detected	---------	1.47E-001
FE-59	Not Detected	---------	7.18E-002
GD-153	Not Detected	---------	1.09E-001
HG-203	Not Detected	---------	3.53E-002
I-131	Not Detected	---------	3.56E-002
IR-192	Not Detected	---------	2.96E-002
K-40	1.58E+001	2.19E+000	3.20E-001
MN-52	Not Detected	---------	4.61E-002
MN-54	Not Detected	---------	3.71E-002
MO-99	Not Detected	---------	4.03E-001
NA-22	Not Detected	---------	4.72E-002
NA-24	Not Detected	---------	3.51E-001
ND-147	Not Detected	---------	2.16E-001
NI-57	Not Detected	---------	9.17E-002
RU-103	Not Detected	---------	3.17E-002
RU-106	Not Detected	---------	3.16E-001
SB-122	Not Detected	---------	7.46E-002
SB-124	Not Detected	---------	3.35E-002
SB-125	Not Detected	---------	8.70E-002
SN-113	Not Detected	---------	3.96E-002
SR-85	Not Detected	---------	3.96E-002
TA-182	Not Detected	---------	1.63E-001
TA-183	Not Detected	---------	6.04E-001
TL-201	Not Detected	---------	2.98E-001
Y-88	Not Detected	---------	3.27E-002
ZN-65	Not Detected	---------	1.08E-001
ZR-95	Not Detected	---------	5.84E-002

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*************************************************************************
*                Sandia National Laboratories                           *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]    *
*                  4/13/01 12:57:05 PM                                  *
*************************************************************************
*                                                                       *
* Analyzed by:                    Reviewed by:                          *
*************************************************************************
```

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054849-004
Lab Sample ID : 10057702

Sample Description : TAV-BH-MW8-100-S
Sample Quantity : 807.400 gram
Sample Date/Time : 4/08/01 12:40:00 PM
Acquire Start Date/Time : 4/10/01 11:45:48 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds
Comments:

****

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	5.47E-001
RA-226	8.60E-001	3.21E-001	4.46E-001
PB-214	5.32E-001	8.27E-002	4.61E-002
BI-214	4.46E-001	8.15E-002	6.39E-002
PB-210	Not Detected	---------	2.51E+001
TH-232	3.63E-001	1.82E-001	1.26E-001
RA-228	4.08E-001	2.42E-001	1.08E-001
AC-228	Not Detected	---------	1.37E-001
TH-228	2.55E-001	2.78E-001	4.44E-001
RA-224	4.37E-001	1.09E-001	5.17E-002
PB-212	4.08E-001	5.79E-001	2.97E-002
BI-212	5.27E-001	2.65E-001	3.86E-001
TL-208	3.92E-001	7.31E-002	5.51E-002
U-235	Not Detected	---------	1.65E-001
TH-231	Not Detected	---------	9.07E+000
PA-231	Not Detected	---------	1.01E+000
TH-227	Not Detected	---------	2.46E-001
RA-223	Not Detected	---------	1.59E-001
RN-219	Not Detected	---------	2.59E-001
PB-211	Not Detected	---------	5.88E-001
TL-207	Not Detected	---------	9.33E+000
AM-241	Not Detected	---------	3.67E-001
PU-239	Not Detected	---------	3.01E+002
NP-237	Not Detected	---------	1.68E+000
PA-233	Not Detected	---------	4.05E-002
TH-229	Not Detected	---------	1.80E-001

[Summary Report] - Sample ID: : 10057702

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.53E-002
AG-110m	Not Detected	---------	2.03E-002
BA-133	Not Detected	---------	3.59E-002
BE-7	Not Detected	---------	1.71E-001
CD-115	Not Detected	---------	8.02E-002
CE-139	Not Detected	---------	1.99E-002
CE-141	Not Detected	---------	3.64E-002
CE-144	Not Detected	---------	1.62E-001
CM-243	Not Detected	---------	1.17E-001
CO-56	Not Detected	---------	2.33E-002
CO-57	Not Detected	---------	2.14E-002
CO-58	Not Detected	---------	2.27E-002
CO-60	Not Detected	---------	2.62E-002
CR-51	Not Detected	---------	1.63E-001
CS-134	Not Detected	---------	3.02E-002
CS-137	Not Detected	---------	2.21E-002
EU-152	Not Detected	---------	6.39E-002
EU-154	Not Detected	---------	1.22E-001
EU-155	Not Detected	---------	1.01E-001
FE-59	Not Detected	---------	5.12E-002
GD-153	Not Detected	---------	7.54E-002
HG-203	Not Detected	---------	2.21E-002
I-131	Not Detected	---------	2.24E-002
IR-192	Not Detected	---------	1.83E-002
K-40	1.34E+001	1.82E+000	2.36E-001
MN-52	Not Detected	---------	2.83E-002
MN-54	Not Detected	---------	2.37E-002
MO-99	Not Detected	---------	2.57E-001
NA-22	Not Detected	---------	2.92E-002
NA-24	Not Detected	---------	2.08E-001
ND-147	Not Detected	---------	1.43E-001
NI-57	Not Detected	---------	5.22E-002
RU-103	Not Detected	---------	2.03E-002
RU-106	Not Detected	---------	1.98E-001
SB-122	Not Detected	---------	4.50E-002
SB-124	Not Detected	---------	2.11E-002
SB-125	Not Detected	---------	5.63E-002
SN-113	Not Detected	---------	2.62E-002
SR-85	Not Detected	---------	2.56E-002
TA-182	Not Detected	---------	1.14E-001
TA-183	Not Detected	---------	4.10E-001
TL-201	Not Detected	---------	2.04E-001
Y-88	Not Detected	---------	1.86E-002
ZN-65	Not Detected	---------	7.47E-002
ZR-95	Not Detected	---------	3.80E-002

```
*************************************************************************
*                Sandia National Laboratories                           *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]    *
*                 4/11/01  8:25:06 AM                                   *
*************************************************************************
*                                                                       *
* Analyzed by:                    Reviewed by:                          *
*************************************************************************
```

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054850-004
Lab Sample ID : 10057703

Sample Description : TAV-BH-MW8-200-S
Sample Quantity : 692.500 gram
Sample Date/Time : 4/08/01 2:53:00 PM
Acquire Start Date/Time : 4/10/01 1:27:47 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds
Comments:

****

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.46E-001
RA-226	1.23E+000	4.34E-001	5.97E-001
PB-214	5.67E-001	9.09E-002	5.80E-002
BI-214	4.81E-001	8.21E-002	4.58E-002
PB-210	Not Detected	---------	3.09E+001
TH-232	6.78E-001	3.29E-001	2.04E-001
RA-228	7.33E-001	2.96E-001	1.18E-001
AC-228	6.28E-001	1.29E-001	9.90E-002
TH-228	6.21E-001	3.34E-001	4.93E-001
RA-224	6.63E-001	1.56E-001	6.57E-002
PB-212	6.16E-001	2.43E-001	3.43E-002
BI-212	5.20E-001	2.27E-001	3.12E-001
TL-208	5.39E-001	1.10E-001	1.07E-001
U-235	Not Detected	---------	1.93E-001
TH-231	Not Detected	---------	1.05E+001
PA-231	Not Detected	---------	1.19E+000
TH-227	Not Detected	---------	3.10E-001
RA-223	Not Detected	---------	1.84E-001
RN-219	Not Detected	---------	2.87E-001
PB-211	Not Detected	---------	6.54E-001
TL-207	Not Detected	---------	1.13E+001
AM-241	Not Detected	---------	4.42E-001
PU-239	Not Detected	---------	3.61E+002
NP-237	Not Detected	---------	1.95E+000
PA-233	Not Detected	---------	4.81E-002
TH-229	Not Detected	---------	2.11E-001

[Summary Report] - Sample ID: : 10057703

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.11E-002
AG-110m	Not Detected	---------	2.54E-002
BA-133	Not Detected	---------	4.19E-002
BE-7	Not Detected	---------	2.00E-001
CD-115	Not Detected	---------	1.02E-001
CE-139	Not Detected	---------	2.35E-002
CE-141	Not Detected	---------	4.37E-002
CE-144	Not Detected	---------	1.96E-001
CM-243	Not Detected	---------	1.45E-001
CO-56	Not Detected	---------	2.88E-002
CO-57	Not Detected	---------	2.49E-002
CO-58	Not Detected	---------	2.54E-002
CO-60	Not Detected	---------	3.03E-002
CR-51	Not Detected	---------	1.94E-001
CS-134	Not Detected	---------	3.39E-002
CS-137	Not Detected	---------	2.78E-002
EU-152	Not Detected	---------	7.48E-002
EU-154	Not Detected	---------	1.48E-001
EU-155	Not Detected	---------	1.18E-001
FE-59	Not Detected	---------	5.83E-002
GD-153	Not Detected	---------	8.89E-002
HG-203	Not Detected	---------	2.67E-002
I-131	Not Detected	---------	2.60E-002
IR-192	Not Detected	---------	2.26E-002
K-40	1.52E+001	2.07E+000	3.22E-001
MN-52	Not Detected	---------	3.04E-002
MN-54	Not Detected	---------	2.97E-002
MO-99	Not Detected	---------	3.11E-001
NA-22	Not Detected	---------	3.50E-002
NA-24	Not Detected	---------	2.52E-001
ND-147	Not Detected	---------	1.77E-001
NI-57	Not Detected	---------	6.59E-002
RU-103	Not Detected	---------	2.31E-002
RU-106	Not Detected	---------	2.21E-001
SB-122	Not Detected	---------	5.25E-002
SB-124	Not Detected	---------	2.34E-002
SB-125	Not Detected	---------	6.67E-002
SN-113	Not Detected	---------	3.06E-002
SR-85	Not Detected	---------	3.23E-002
TA-182	Not Detected	---------	1.28E-001
TA-183	Not Detected	---------	4.94E-001
TL-201	Not Detected	---------	2.35E-001
Y-88	Not Detected	---------	2.17E-002
ZN-65	Not Detected	---------	8.40E-002
ZR-95	Not Detected	---------	4.37E-002

```
*************************************************************************
*                Sandia National Laboratories                           *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]    *
*                 4/11/01  8:30:23 AM                                   *
*************************************************************************
*                                                                       *
* Analyzed by:                    Reviewed by:                          *
*************************************************************************
```

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054852-004
Lab Sample ID : 10057704

Sample Description : TAV-BH-MW8-300-S
Sample Quantity : 651.700 gram
Sample Date/Time : 4/08/01 5:20:00 PM
Acquire Start Date/Time : 4/10/01 3:09:55 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds
Comments:

****

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.03E-001
RA-226	1.83E+000	6.46E-001	9.03E-001
PB-214	5.11E-001	8.37E-002	5.42E-002
BI-214	5.10E-001	8.79E-002	5.22E-002
PB-210	Not Detected	---------	3.34E+001
TH-232	6.69E-001	3.21E-001	1.80E-001
RA-228	7.53E-001	2.92E-001	1.29E-001
AC-228	7.35E-001	1.43E-001	9.20E-002
TH-228	7.09E-001	3.22E-001	4.54E-001
RA-224	7.41E-001	1.73E-001	7.16E-002
PB-212	6.84E-001	3.49E-001	3.42E-002
BI-212	7.74E-001	2.72E-001	3.47E-001
TL-208	6.16E-001	1.16E-001	9.85E-002
U-235	Not Detected	---------	2.00E-001
TH-231	Not Detected	---------	1.15E+001
PA-231	Not Detected	---------	1.21E+000
TH-227	Not Detected	---------	3.35E-001
RA-223	Not Detected	---------	2.02E-001
RN-219	Not Detected	---------	3.27E-001
PB-211	Not Detected	---------	7.25E-001
TL-207	Not Detected	---------	1.19E+001
AM-241	Not Detected	---------	4.61E-001
PU-239	Not Detected	---------	3.72E+002
NP-237	Not Detected	---------	2.11E+000
PA-233	Not Detected	---------	4.92E-002
TH-229	Not Detected	---------	2.25E-001

[Summary Report] - Sample ID: : 10057704

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.48E-002
AG-110m	Not Detected	---------	2.49E-002
BA-133	Not Detected	---------	4.22E-002
BE-7	Not Detected	---------	2.10E-001
CD-115	Not Detected	---------	1.08E-001
CE-139	Not Detected	---------	2.51E-002
CE-141	Not Detected	---------	4.50E-002
CE-144	Not Detected	---------	2.07E-001
CM-243	Not Detected	---------	1.49E-001
CO-56	Not Detected	---------	3.01E-002
CO-57	Not Detected	---------	2.63E-002
CO-58	Not Detected	---------	2.85E-002
CO-60	Not Detected	---------	3.14E-002
CR-51	Not Detected	---------	2.06E-001
CS-134	Not Detected	---------	3.50E-002
CS-137	Not Detected	---------	2.83E-002
EU-152	Not Detected	---------	7.85E-002
EU-154	Not Detected	---------	1.68E-001
EU-155	Not Detected	---------	1.25E-001
FE-59	Not Detected	---------	6.25E-002
GD-153	Not Detected	---------	9.54E-002
HG-203	Not Detected	---------	2.74E-002
I-131	Not Detected	---------	2.78E-002
IR-192	Not Detected	---------	2.32E-002
K-40	1.45E+001	1.98E+000	2.64E-001
MN-52	Not Detected	---------	3.30E-002
MN-54	Not Detected	---------	1.97E-002
MO-99	Not Detected	---------	3.00E-001
NA-22	Not Detected	---------	3.47E-002
NA-24	Not Detected	---------	2.41E-001
ND-147	Not Detected	---------	1.81E-001
NI-57	Not Detected	---------	6.54E-002
RU-103	Not Detected	---------	2.43E-002
RU-106	Not Detected	---------	2.44E-001
SB-122	Not Detected	---------	5.76E-002
SB-124	Not Detected	---------	2.51E-002
SB-125	Not Detected	---------	7.22E-002
SN-113	Not Detected	---------	3.17E-002
SR-85	Not Detected	---------	3.22E-002
TA-182	Not Detected	---------	1.33E-001
TA-183	Not Detected	---------	5.09E-001
TL-201	Not Detected	---------	2.52E-001
Y-88	Not Detected	---------	2.25E-002
ZN-65	Not Detected	---------	9.05E-002
ZR-95	Not Detected	---------	4.89E-002

```
*************************************************************************
*                Sandia National Laboratories                           *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]    *
*                  4/11/01  6:46:20 AM                                  *
*************************************************************************
*                                                                       *
* Analyzed by:                    Reviewed by:                          *
*************************************************************************
```

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : LAB CONTROL SAMPLE USING CG134
Lab Sample ID : 10057705

Sample Description : MIXED_GAMMA_STANDARD_CG134
Sample Quantity : 1.000 Each
Sample Date/Time : 11/01/90 12:00:00 PM
Acquire Start Date/Time : 4/11/01 6:36:06 AM
Detector Name : LAB02
Elapsed Live/Real Time : 600 / 605 seconds
Comments:

****

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	4.12E+003
RA-226	Not Detected	---------	5.56E+003
PB-214	Not Detected	---------	6.18E+002
BI-214	Not Detected	---------	5.33E+002
PB-210	Not Detected	---------	2.52E+005
TH-232	Not Detected	---------	1.98E+003
RA-228	Not Detected	---------	2.04E+003
AC-228	Not Detected	---------	1.24E+003
TH-228	Not Detected	---------	2.70E+005
RA-224	Not Detected	---------	1.27E+004
PB-212	Not Detected	---------	2.09E+004
BI-212	Not Detected	---------	1.48E+005
TL-208	Not Detected	---------	3.49E+004
U-235	Not Detected	---------	1.58E+003
TH-231	Not Detected	---------	7.39E+004
PA-231	Not Detected	---------	1.26E+004
TH-227	Not Detected	---------	2.53E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	5.82E+003
PB-211	Not Detected	---------	1.32E+004
TL-207	Not Detected	---------	1.93E+005
AM-241	8.68E+004	1.39E+004	6.75E+003
PU-239	Not Detected	---------	2.74E+006
NP-237	Not Detected	---------	1.47E+004
PA-233	Not Detected	---------	5.55E+002
TH-229	Not Detected	---------	1.65E+003

[Summary Report] - Sample ID: : 10057705

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	2.51E+002
AG-110m	Not Detected	---------	6.30E+007
BA-133	Not Detected	---------	7.53E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.52E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.69E+007
CM-243	Not Detected	---------	1.94E+003
CO-56	Not Detected	---------	2.23E+017
CO-57	Not Detected	---------	3.41E+006
CO-58	Not Detected	---------	4.15E+018
CO-60	8.47E+004	1.10E+004	7.09E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	8.27E+003
CS-137	7.54E+004	9.75E+003	4.95E+002
EU-152	Not Detected	---------	1.05E+003
EU-154	Not Detected	---------	2.55E+003
EU-155	Not Detected	---------	4.19E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	3.79E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	9.24E+017
K-40	Not Detected	---------	1.08E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.39E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	2.80E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.22E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	2.89E+021
SB-125	Not Detected	---------	1.38E+004
SN-113	Not Detected	---------	3.84E+012
SR-85	Not Detected	---------	1.69E+020
TA-182	Not Detected	---------	8.60E+012
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	8.04E+012
ZN-65	Not Detected	---------	3.39E+007
ZR-95	Not Detected	---------	3.50E+020

ANALYSIS REQUEST AND CHAIN OF CUSTODY

Internal Lab

Page _1_ of _1_

Batch No. 100

SAR/WR No.

AR/COC 604330

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-10-01 SMO USE	Logged By:		☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Task No.:	7219.01.05	☐ Waste Characterization
Project Name:	TA-V Well Borehole	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination: RPSD	Location: N/A	Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building: N/A	Room: N/A	☐ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☐ Release to Off-Site Lab
					-This COC Number Releases COC No(s).: NON-RELEASE

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Analysis Request
054853-004	TAV-BH-MW8-400-S	400	N/A	040901 0827	S	M	16oz	None	G	SA	Gamma Spec
054855-004	TAV-BH-MW8-480-S	480	N/A	040901 1349	S	M	16oz	None	G	SA	Gamma Spec

RMMA	☐ Yes ☑ No	Ref. No.	
Sample Disposal	☑ Return to Client	☐ Disposal by Lab	
Turnaround Time	☑ Normal	☐ Rush	

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

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Required Report Date — QC Inits.

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Gilbert Quintana	GQ	IT/6135/284-3309
	~~W Gibson~~			~~MDM/6133/845-3267~~

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov

Please list as separate report.

1.Relinquished by Margaret Sanchez	Org 6133	Date 04/10/01	Time 0930	4.Relinquished by	Org.	Date	Time
1. Received by Gilbert Quintana GQ	Org. 6132	Date 4/10/01	Time 0930	4. Received by	Org.	Date	Time
2.Relinquished by	Org.	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

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*************************************************************************
*                Sandia National Laboratories                           *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]    *
*                  4/11/01  8:41:53 AM                                  *
*************************************************************************
*                                                                       *
* Analyzed by:                    Reviewed by:                          *
*************************************************************************
```

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054853-004
Lab Sample ID : 10057801

Sample Description : TAV-BH-MW8-400-S
Sample Quantity : 598.900 gram
Sample Date/Time : 4/09/01 8:27:00 AM
Acquire Start Date/Time : 4/10/01 4:52:03 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds
Comments:

****

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.77E-001
RA-226	Not Detected	---------	6.48E-001
PB-214	7.01E-001	1.11E-001	6.73E-002
BI-214	5.54E-001	9.43E-002	5.13E-002
PB-210	Not Detected	---------	3.45E+001
TH-232	7.40E-001	3.57E-001	2.12E-001
RA-228	8.63E-001	2.95E-001	1.37E-001
AC-228	7.39E-001	1.48E-001	1.04E-001
TH-228	7.24E-001	3.81E-001	5.59E-001
RA-224	7.72E-001	1.81E-001	7.35E-002
PB-212	8.11E-001	1.54E-001	3.77E-002
BI-212	8.47E-001	3.58E-001	4.99E-001
TL-208	7.23E-001	1.27E-001	8.98E-002
U-235	1.08E-001	1.57E-001	2.54E-001
TH-231	Not Detected	---------	1.24E+001
PA-231	Not Detected	---------	1.35E+000
TH-227	Not Detected	---------	3.73E-001
RA-223	Not Detected	---------	2.11E-001
RN-219	Not Detected	---------	3.50E-001
PB-211	Not Detected	---------	7.63E-001
TL-207	Not Detected	---------	1.26E+001
AM-241	Not Detected	---------	5.00E-001
PU-239	Not Detected	---------	4.16E+002
NP-237	Not Detected	---------	2.25E+000
PA-233	Not Detected	---------	5.43E-002
TH-229	Not Detected	---------	2.52E-001

[Summary Report] - Sample ID: : 10057801

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.40E-002
AG-110m	Not Detected	---------	2.87E-002
BA-133	Not Detected	---------	4.86E-002
BE-7	Not Detected	---------	2.47E-001
CD-115	Not Detected	---------	9.71E-002
CE-139	Not Detected	---------	2.69E-002
CE-141	Not Detected	---------	4.96E-002
CE-144	Not Detected	---------	2.21E-001
CM-243	Not Detected	---------	1.67E-001
CO-56	Not Detected	---------	3.32E-002
CO-57	Not Detected	---------	2.98E-002
CO-58	Not Detected	---------	3.06E-002
CO-60	Not Detected	---------	3.38E-002
CR-51	Not Detected	---------	2.22E-001
CS-134	Not Detected	---------	3.83E-002
CS-137	Not Detected	---------	3.08E-002
EU-152	Not Detected	---------	8.92E-002
EU-154	Not Detected	---------	1.67E-001
EU-155	Not Detected	---------	1.35E-001
FE-59	Not Detected	---------	6.33E-002
GD-153	Not Detected	---------	1.02E-001
HG-203	Not Detected	---------	3.03E-002
I-131	Not Detected	---------	2.86E-002
IR-192	Not Detected	---------	2.55E-002
K-40	1.62E+001	2.21E+000	2.84E-001
MN-52	Not Detected	---------	3.68E-002
MN-54	Not Detected	---------	3.14E-002
MO-99	Not Detected	---------	2.96E-001
NA-22	Not Detected	---------	4.19E-002
NA-24	Not Detected	---------	1.37E-001
ND-147	Not Detected	---------	1.91E-001
NI-57	Not Detected	---------	5.53E-002
RU-103	Not Detected	---------	2.62E-002
RU-106	Not Detected	---------	2.63E-001
SB-122	Not Detected	---------	5.35E-002
SB-124	Not Detected	---------	2.72E-002
SB-125	Not Detected	---------	7.98E-002
SN-113	Not Detected	---------	3.31E-002
SR-85	Not Detected	---------	3.68E-002
TA-182	Not Detected	---------	1.49E-001
TA-183	Not Detected	---------	5.11E-001
TL-201	Not Detected	---------	2.47E-001
Y-88	Not Detected	---------	2.63E-002
ZN-65	Not Detected	---------	9.87E-002
ZR-95	Not Detected	---------	5.19E-002

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*************************************************************************
*                Sandia National Laboratories                           *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]    *
*                  4/11/01  8:43:47 AM                                  *
*************************************************************************
*                                                                       *
* Analyzed by:                    Reviewed by:                          *
*************************************************************************
```

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054855-004
Lab Sample ID : 10057802

Sample Description : TAV-BH-MW8-480-S
Sample Quantity : 707.000 gram
Sample Date/Time : 4/09/01 1:49:00 PM
Acquire Start Date/Time : 4/10/01 6:34:00 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds
Comments:

****

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.85E-001
RA-226	1.27E+000	4.96E-001	7.07E-001
PB-214	6.54E-001	1.07E-001	7.67E-002
BI-214	5.75E-001	9.59E-002	5.23E-002
PB-210	Not Detected	---------	3.07E+001
TH-232	7.08E-001	3.33E-001	1.66E-001
RA-228	7.40E-001	2.76E-001	1.25E-001
AC-228	7.37E-001	1.43E-001	9.69E-002
TH-228	7.84E-001	2.99E-001	4.00E-001
RA-224	7.32E-001	1.68E-001	6.20E-002
PB-212	7.33E-001	5.18E-001	3.58E-002
BI-212	7.07E-001	2.60E-001	3.41E-001
TL-208	6.85E-001	1.18E-001	8.16E-002
U-235	Not Detected	---------	2.02E-001
TH-231	Not Detected	---------	1.10E+001
PA-231	Not Detected	---------	1.17E+000
TH-227	Not Detected	---------	3.33E-001
RA-223	Not Detected	---------	1.87E-001
RN-219	Not Detected	---------	2.99E-001
PB-211	Not Detected	---------	6.74E-001
TL-207	Not Detected	---------	1.12E+001
AM-241	Not Detected	---------	4.47E-001
PU-239	Not Detected	---------	3.65E+002
NP-237	Not Detected	---------	2.02E+000
PA-233	Not Detected	---------	4.74E-002
TH-229	Not Detected	---------	2.20E-001

[Summary Report] - Sample ID: : 10057802

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.10E-002
AG-110m	Not Detected	---------	2.36E-002
BA-133	Not Detected	---------	4.25E-002
BE-7	Not Detected	---------	2.06E-001
CD-115	Not Detected	---------	8.19E-002
CE-139	Not Detected	---------	2.38E-002
CE-141	Not Detected	---------	4.50E-002
CE-144	Not Detected	---------	1.98E-001
CM-243	Not Detected	---------	1.48E-001
CO-56	Not Detected	---------	2.80E-002
CO-57	Not Detected	---------	2.70E-002
CO-58	Not Detected	---------	2.67E-002
CO-60	Not Detected	---------	3.13E-002
CR-51	Not Detected	---------	1.96E-001
CS-134	Not Detected	---------	3.69E-002
CS-137	Not Detected	---------	2.74E-002
EU-152	Not Detected	---------	8.01E-002
EU-154	Not Detected	---------	1.50E-001
EU-155	Not Detected	---------	1.23E-001
FE-59	Not Detected	---------	5.84E-002
GD-153	Not Detected	---------	9.10E-002
HG-203	Not Detected	---------	2.72E-002
I-131	Not Detected	---------	2.51E-002
IR-192	Not Detected	---------	2.23E-002
K-40	1.49E+001	2.03E+000	2.40E-001
MN-52	Not Detected	---------	2.85E-002
MN-54	Not Detected	---------	1.80E-002
MO-99	Not Detected	---------	2.70E-001
NA-22	Not Detected	---------	3.42E-002
NA-24	Not Detected	---------	9.76E-002
ND-147	Not Detected	---------	1.79E-001
NI-57	Not Detected	---------	4.07E-002
RU-103	Not Detected	---------	2.34E-002
RU-106	Not Detected	---------	2.46E-001
SB-122	Not Detected	---------	4.56E-002
SB-124	Not Detected	---------	2.42E-002
SB-125	Not Detected	---------	6.87E-002
SN-113	Not Detected	---------	3.16E-002
SR-85	Not Detected	---------	3.18E-002
TA-182	Not Detected	---------	1.27E-001
TA-183	Not Detected	---------	4.54E-001
TL-201	Not Detected	---------	2.07E-001
Y-88	Not Detected	---------	2.06E-002
ZN-65	Not Detected	---------	8.50E-002
ZR-95	Not Detected	---------	4.48E-002

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*****************************************************************************
*                Sandia National Laboratories                               *
*   Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                  4/11/01  6:33:12 AM                                      *
*****************************************************************************
*                                                                           *
* Analyzed by:                    Reviewed by:                              *
*****************************************************************************
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Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : LAB CONTROL SAMPLE USING CG134
Lab Sample ID : 10057803

Sample Description : MIXED_GAMMA_STANDARD_CG134
Sample Quantity : 1.000 Each
Sample Date/Time : 11/01/90 12:00:00 PM
Acquire Start Date/Time : 4/11/01 6:22:57 AM
Detector Name : LAB02
Elapsed Live/Real Time : 600 / 605 seconds
Comments:

*****

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	4.10E+003
RA-226	Not Detected	---------	5.48E+003
PB-214	Not Detected	---------	6.18E+002
BI-214	Not Detected	---------	5.40E+002
PB-210	Not Detected	---------	2.46E+005
TH-232	Not Detected	---------	1.97E+003
RA-228	Not Detected	---------	2.10E+003
AC-228	Not Detected	---------	1.24E+003
TH-228	Not Detected	---------	2.69E+005
RA-224	Not Detected	---------	8.36E+003
PB-212	Not Detected	---------	2.03E+004
BI-212	Not Detected	---------	1.45E+005
TL-208	Not Detected	---------	3.61E+004
U-235	Not Detected	---------	1.54E+003
TH-231	Not Detected	---------	7.06E+004
PA-231	Not Detected	---------	1.29E+004
TH-227	Not Detected	---------	2.53E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	5.78E+003
PB-211	Not Detected	---------	1.30E+004
TL-207	Not Detected	---------	1.96E+005
AM-241	8.50E+004	1.36E+004	6.65E+003
PU-239	Not Detected	---------	2.76E+006
NP-237	Not Detected	---------	1.47E+004
PA-233	Not Detected	---------	5.52E+002
TH-229	Not Detected	---------	1.62E+003

[Summary Report] - Sample ID: : 10057803

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	2.56E+002
AG-110m	Not Detected	---------	6.29E+007
BA-133	Not Detected	---------	7.63E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.37E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.66E+007
CM-243	Not Detected	---------	1.92E+003
CO-56	Not Detected	---------	2.27E+017
CO-57	Not Detected	---------	3.38E+006
CO-58	Not Detected	---------	4.07E+018
CO-60	8.36E+004	1.08E+004	6.29E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	8.21E+003
CS-137	7.53E+004	9.73E+003	4.32E+002
EU-152	Not Detected	---------	1.03E+003
EU-154	Not Detected	---------	2.59E+003
EU-155	Not Detected	---------	4.09E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	3.79E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	9.12E+017
K-40	Not Detected	---------	1.23E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.36E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	2.69E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.27E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	2.87E+021
SB-125	Not Detected	---------	1.43E+004
SN-113	Not Detected	---------	3.81E+012
SR-85	Not Detected	---------	1.70E+020
TA-182	Not Detected	---------	8.70E+012
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	6.96E+012
ZN-65	Not Detected	---------	3.51E+007
ZR-95	Not Detected	---------	3.55E+020

ON-SITE LABORATORY (RPSD)
ANALYSIS REQUEST AND CHAIN OF CUSTODY

RC74

AR/COC 604414

ernal Lab
tch No. 100634 SAR/WR No.

pt. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-19-01 SMO USE	Logged By:		☐ Characterization Only
ject/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Project/Task No.:	7219.01.05	☐ Waste Characterization
oject Name:	TA-V Well Borehole	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
cord Center Code:	ER/1306/DAT	Lab Destination: RPSD	Location:	Tech Area:	-Send preliminary/copy report to:
gbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building:	Room:	☑ Release to ERCL On-Site Lab
rvice Order No.:	CFO 012-01				☑ Release to Off-Site Lab
					-This COC Number Releases COC No(s).: 604412 604413

ample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Analysis Request
054885-004	TAV-BH-MW6-20-S	20	TAV	041701 0953	S	M	500 ml	None	G	SA	
01											Gamma Spec
054888-004	TAV-BH-MW6-80-S	80	TAV	041701 1637	S	M	500 ml	None	G	SA	Gamma Spec
02											
054889-004	TAV-BH-MW6-100-S	100	TAV	041701 1747	S	M	500 ml	None	G	SA	Gamma Spec
03											
LCS 04											

MMA	☑ Yes ☐ No	Ref. No.	Sample Tracking	Smo Use
ample Disposal	☑ Return to Client	☐ Disposal by Lab	Date Entered(mm/dd/yy)	
urnaround Time	☑ Normal	☐ Rush	Entered by:	
		Required Report Date		QC inits.

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

	Name	Signature	Init	Company/Organization/Phone/Cellular
ample	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
eam	G Quintana			IT/6135/284-3309
embers	W Gibson	William J Gibson Jr	WJG	MDM/6133/845-3267

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN FOR BACKGROUND LEVEL

Please list as separate report.

Relinquished by	Margaret Sanchez	Org 6135	Date 4/19/01	Time 1045	4. Relinquished by	Org.	Date	Time
Received by	[illegible] SMO	Org. 6132	Date 4-19-01	Time 1045	4. Received by	Org.	Date	Time
Relinquished by	[illegible] SMO	Org. 6132	Date 4-19-01	Time 1055	5. Relinquished by	Org.	Date	Time
Received by	[illegible]	Org. 7132	Date 4-19-01	Time 1055	5. Received by	Org.	Date	Time
Relinquished by	[illegible]	Org. 7132	Date 4/23/01	Time 0838	6. Relinquished by	Org.	Date	Time
Received by	[illegible] SMO	Org. 6132	Date 4/23/01	Time 0838	6. Received by	Org.	Date	Time

PAGE 2

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/20/01 10:56:49 AM

Analyzed by: 4/20/01 Reviewed by: 4/20/01 2nd

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054885-004
Lab Sample ID : 10063401

Sample Description : TAV-BH-MW6-20-S
Sample Quantity : 544.200 gram
Sample Date/Time : 4/17/01 9:53:00 AM
Acquire Start Date/Time : 4/20/01 9:16:31 AM
Detector Name : LAB03
Elapsed Live/Real Time : 6000 / 6002 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	8.68E-001	5.17E-001	5.19E-001
RA-226	2.24E-000	7.25E-001	9.85E-001
PB-214	8.40E-001	1.33E-001	8.51E-002
BI-214	8.23E-001	1.37E-001	6.47E-002
PB-210	Not Detected	---------	4.47E+000
TH-232	7.91E-001	3.80E-001	2.11E-001
RA-228	9.37E-001	3.95E-001	2.11E-001
AC-228	7.98E-001	1.73E-001	1.35E-001
TH-228	1.05E+000	5.16E-001	7.48E-001
RA-224	9.14E-001	2.26E-001	8.70E-002
PB-212	8.57E-001	1.66E-001	4.57E-002
BI-212	1.28E+000	4.81E-001	6.41E-001
TL-208	8.18E-001	1.56E-001	1.30E-001
U-235	Not Detected	---------	2.16E-001
TH-231	Not Detected	---------	8.50E+000
PA-231	Not Detected	---------	1.51E+000
TH-227	Not Detected	---------	4.36E-001
RA-223	Not Detected	---------	1.63E-001
RN-219	Not Detected	---------	4.77E-001
PB-211	Not Detected	---------	1.07E+000
TL-207	Not Detected	---------	1.68E+001
AM-241	Not Detected	---------	1.76E-001
PU-239	Not Detected	---------	3.87E+002
NP-237	Not Detected	---------	2.03E+000
PA-233	Not Detected	---------	6.52E-002
TH-229	Not Detected	---------	1.97E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 10063401

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	----------	5.25E-002
AG-110m	Not Detected	---------	3.69E-002
BA-133	Not Detected	---------	6.64E-002
BE-7	Not Detected	---------	3.05E-001
CD-115	Not Detected	---------	2.10E-001
CE-139	Not Detected	---------	2.91E-002
CE-141	Not Detected	---------	5.08E-002
CE-144	Not Detected	---------	2.05E-001
CM-243	Not Detected	---------	1.86E-001
CO-56	Not Detected	---------	4.10E-002
CO-57	Not Detected	---------	2.70E-002
CO-58	Not Detected	---------	4.24E-002
CO-60	Not Detected	---------	4.87E-002
CR-51	Not Detected	---------	2.91E-001
CS-134	Not Detected	---------	7.44E-002
CS-137	Not Detected	---------	4.18E-002
EU-152	Not Detected	---------	8.10E-002
EU-154	Not Detected	---------	2.41E-001
EU-155	Not Detected	---------	1.21E-001
FE-59	Not Detected	---------	9.55E-002
GD-153	Not Detected	---------	8.16E-002
HG-203	Not Detected	---------	3.47E-002
I-131	Not Detected	---------	4.30E-002
IR-192	Not Detected	---------	3.23E-002
K-40	1.50E+001	2.12E+000	4.29E-001
MN-52	Not Detected	---------	6.55E-002
MN-54	Not Detected	---------	4.65E-002
MO-99	Not Detected	---------	6.36E-001
NA-22	Not Detected	---------	5.39E-002
NA-24	Not Detected	---------	1.19E+000
ND-147	Not Detected	---------	2.91E-001
NI-57	Not Detected	---------	2.65E-001
RU-103	Not Detected	---------	3.52E-002
RU-106	Not Detected	---------	3.71E-001
SB-122	Not Detected	---------	1.08E-001
SB-124	Not Detected	---------	4.15E-002
SB-125	Not Detected	---------	1.04E-001
SN-113	Not Detected	---------	4.41E-002
SR-85	Not Detected	---------	4.69E-002
TA-182	Not Detected	---------	2.04E-001
TA-183	Not Detected	---------	2.22E-001
TL-201	Not Detected	---------	1.91E-001
Y-88	Not Detected	---------	3.94E-002
ZN-65	Not Detected	---------	1.36E-001
ZR-95	Not Detected	---------	7.75E-002

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/20/01 10:37:44 AM                                 *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/20/01          Reviewed by: 4/20/01                        *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : 054888-004
Lab Sample ID             : 10063402

Sample Description        : TAV-BH-MW6-80-S
Sample Quantity           :   614.600  gram
Sample Date/Time          :  4/17/01   4:37:00 PM
Acquire Start Date/Time   :  4/20/01   8:57:27 AM
Detector Name             : LAB01
Elapsed Live/Real Time    :   6000 /   6002 seconds

Comments:
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Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	5.24E-001
RA-226	1.09E+000	4.96E-001	7.23E-001
PB-214	4.84E-001	8.67E-002	6.54E-002
BI-214	4.28E-001	8.58E-002	6.76E-002
PB-210	Not Detected	---------	7.83E+000
TH-232	4.56E-001	2.45E-001	2.07E-001
RA-228	5.02E-001	2.84E-001	1.59E-001
AC-228	4.72E-001	1.25E-001	1.23E-001
TH-228	5.21E-001	2.26E-001	4.74E-001
RA-224	4.41E-001	1.40E-001	9.76E-002
PB-212	Not Detected	---------	4.10E-002
BI-212	5.83E-001	2.60E-001	3.42E-001
TL-208	4.10E-001	9.26E-002	8.60E-002
U-235	1.73E-001	1.56E-001	1.87E-001
TH-231	Not Detected	---------	6.96E+000
PA-231	Not Detected	---------	1.27E+000
TH-227	Not Detected	---------	2.77E-001
RA-223	Not Detected	---------	1.34E-001
RN-219	Not Detected	---------	3.61E-001
PB-211	Not Detected	---------	8.00E-001
TL-207	Not Detected	---------	1.41E+001
AM-241	Not Detected	---------	1.85E-001
PU-239	Not Detected	---------	3.41E+002
NP-237	Not Detected	---------	1.89E+000
PA-233	Not Detected	---------	5.49E-002
TH-229	Not Detected	---------	1.63E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

E

[Summary Report] - Sample ID: : 10063402

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	----------	3.75E-002
AG-110m	Not Detected	---------	3.34E-002
BA-133	Not Detected	---------	4.52E-002
BE-7	Not Detected	---------	2.59E-001
CD-115	Not Detected	---------	1.45E-001
CE-139	Not Detected	---------	2.33E-002
CE-141	Not Detected	---------	4.25E-002
CE-144	Not Detected	---------	1.81E-001
CM-243	Not Detected	---------	1.60E-001
CO-56	Not Detected	---------	3.59E-002
CO-57	Not Detected	---------	2.36E-002
CO-58	Not Detected	---------	3.55E-002
CO-60	Not Detected	---------	4.10E-002
CR-51	Not Detected	---------	2.31E-001
CS-134	Not Detected	---------	4.30E-002
CS-137	Not Detected	---------	3.62E-002
EU-152	Not Detected	---------	6.99E-002
EU-154	Not Detected	---------	1.80E-001
EU-155	Not Detected	---------	1.08E-001
FE-59	Not Detected	---------	8.32E-002
GD-153	Not Detected	---------	6.59E-002
HG-203	Not Detected	---------	3.05E-002
I-131	Not Detected	---------	3.47E-002
IR-192	Not Detected	---------	2.71E-002
K-40	1.22E+001	1.75E+000	2.95E-001
MN-52	Not Detected	---------	5.19E-002
MN-54	Not Detected	---------	3.74E-002
MO-99	Not Detected	---------	5.16E-001
NA-22	Not Detected	---------	4.80E-002
NA-24	Not Detected	---------	6.78E-001
ND-147	Not Detected	---------	2.43E-001
NI-57	Not Detected	---------	1.87E-001
RU-103	Not Detected	---------	2.87E-002
RU-106	Not Detected	---------	3.01E-001
SB-122	Not Detected	---------	8.35E-002
SB-124	Not Detected	---------	3.18E-002
SB-125	Not Detected	---------	8.25E-002
SN-113	Not Detected	---------	3.62E-002
SR-85	Not Detected	---------	3.82E-002
TA-182	Not Detected	---------	1.70E-001
TA-183	Not Detected	---------	2.29E-001
TL-201	Not Detected	---------	1.55E-001
Y-88	Not Detected	---------	3.34E-002
ZN-65	Not Detected	---------	1.16E-001
ZR-95	Not Detected	---------	6.45E-002

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/20/01 12:45:31 PM                                 *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/20/01                    Reviewed by: 4/20/01              *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : 054889-004
Lab Sample ID             : 10063403

Sample Description        : TAV-BH-MW6-100-S
Sample Quantity           :   742.800  gram
Sample Date/Time          :  4/17/01   5:47:00 PM
Acquire Start Date/Time   :  4/20/01  11:05:13 AM
Detector Name             : LAB01
Elapsed Live/Real Time    :   6000 /   6001 seconds

Comments:
*****************************************************************************
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Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	3.88E-001
RA-226	1.11E+000	3.95E-001	5.37E-001
PB-214	5.06E-001	8.38E-002	5.14E-002
BI-214	4.50E-001	8.20E-002	5.05E-002
PB-210	Not Detected	---------	5.91E+000
TH-232	1.98E-001	1.36E-001	1.62E-001
RA-228	1.81E-001	9.58E-002	1.32E-001
AC-228	Not Detected	---------	1.30E-001
TH-228	Not Detected	---------	5.38E-001
RA-224	2.78E-001	9.78E-002	7.69E-002
PB-212	2.28E-001	2.79E-001	2.92E-002
BI-212	4.31E-001	2.29E-001	3.22E-001
TL-208	1.79E-001	5.62E-002	6.61E-002
U-235	Not Detected	---------	1.44E-001
TH-231	Not Detected	---------	5.38E+000
PA-231	Not Detected	---------	9.33E-001
TH-227	Not Detected	---------	1.96E-001
RA-223	Not Detected	---------	9.96E-002
RN-219	Not Detected	---------	2.69E-001
PB-211	Not Detected	---------	6.02E-001
TL-207	Not Detected	---------	1.08E+001
AM-241	Not Detected	---------	1.33E-001
PU-239	Not Detected	---------	2.54E+002
NP-237	Not Detected	---------	1.41E+000
PA-233	Not Detected	---------	4.24E-002
TH-229	Not Detected	---------	1.22E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 10063403

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.88E-002
AG-110m	Not Detected	---------	2.39E-002
BA-133	Not Detected	---------	3.58E-002
BE-7	Not Detected	---------	1.99E-001
CD-115	Not Detected	---------	1.02E-001
CE-139	Not Detected	---------	1.83E-002
CE-141	Not Detected	---------	3.34E-002
CE-144	Not Detected	---------	1.36E-001
CM-243	Not Detected	---------	1.15E-001
CO-56	Not Detected	---------	2.91E-002
CO-57	Not Detected	---------	1.80E-002
CO-58	Not Detected	---------	2.49E-002
CO-60	Not Detected	---------	2.76E-002
CR-51	Not Detected	---------	1.86E-001
CS-134	Not Detected	---------	3.70E-002
CS-137	Not Detected	---------	2.60E-002
EU-152	Not Detected	---------	5.40E-002
EU-154	Not Detected	---------	1.36E-001
EU-155	Not Detected	---------	8.11E-002
FE-59	Not Detected	---------	5.53E-002
GD-153	Not Detected	---------	5.01E-002
HG-203	Not Detected	---------	2.18E-002
I-131	Not Detected	---------	2.63E-002
IR-192	Not Detected	---------	2.12E-002
K-40	4.85E+000	7.71E-001	2.63E-001
MN-52	Not Detected	---------	3.67E-002
MN-54	Not Detected	---------	2.73E-002
MO-99	Not Detected	---------	3.42E-001
NA-22	Not Detected	---------	3.27E-002
NA-24	Not Detected	---------	5.04E-001
ND-147	Not Detected	---------	1.73E-001
NI-57	Not Detected	---------	1.45E-001
RU-103	Not Detected	---------	2.34E-002
RU-106	Not Detected	---------	2.17E-001
SB-122	Not Detected	---------	5.97E-002
SB-124	Not Detected	---------	2.38E-002
SB-125	Not Detected	---------	6.30E-002
SN-113	Not Detected	---------	2.85E-002
SR-85	Not Detected	---------	2.78E-002
TA-182	Not Detected	---------	1.36E-001
TA-183	Not Detected	---------	1.66E-001
TL-201	Not Detected	---------	1.20E-001
Y-88	Not Detected	---------	2.46E-002
ZN-65	Not Detected	---------	8.81E-002
ZR-95	Not Detected	---------	4.31E-002

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]       *
*                      4/20/01  1:03:09 PM                                  *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/20/01                    Reviewed by: 4/20/01              *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : LAB CONTROL SAMPLE USING CG134
Lab Sample ID             : 10063404

Sample Description        : MIXED_GAMMA_STANDARD_CG134
Sample Quantity           :     1.000  Each
Sample Date/Time          : 11/01/90  12:00:00 PM
Acquire Start Date/Time   :  4/20/01  12:52:49 PM
Detector Name             : LAB01
Elapsed Live/Real Time    :    600 /    604 seconds

Comments:
*****************************************************************************
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Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	2.66E+003
RA-226	Not Detected	---------	5.30E+003
PB-214	Not Detected	---------	6.55E+002
BI-214	Not Detected	---------	6.05E+002
PB-210	Not Detected	---------	7.62E+004
TH-232	Not Detected	---------	2.10E+003
RA-228	Not Detected	---------	2.72E+003
AC-228	Not Detected	---------	1.57E+003
TH-228	Not Detected	---------	2.89E+005
RA-224	Not Detected	---------	1.63E+004
PB-212	Not Detected	---------	1.90E+004
BI-212	Not Detected	---------	1.89E+005
TL-208	Not Detected	---------	4.19E+004
U-235	Not Detected	---------	1.31E+003
TH-231	Not Detected	---------	4.13E+004
PA-231	Not Detected	---------	1.27E+004
TH-227	Not Detected	---------	2.30E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	6.08E+003
PB-211	Not Detected	---------	1.36E+004
TL-207	Not Detected	---------	2.32E+005
AM-241	8.52E+004	1.22E+004	1.85E+003
PU-239	Not Detected	---------	2.22E+006
NP-237	Not Detected	---------	1.23E+004
PA-233	Not Detected	---------	5.77E+002
TH-229	Not Detected	---------	1.06E+003

[Summary Report] - Sample ID: : 10063404

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	3.23E+002
AG-110m	Not Detected	---------	7.23E+007
BA-133	Not Detected	---------	8.30E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	3.95E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.41E+007
CM-243	Not Detected	---------	1.90E+003
CO-56	Not Detected	---------	2.99E+017
CO-57	Not Detected	---------	2.81E+006
CO-58	Not Detected	---------	5.58E+018
CO-60	7.97E+004	1.05E+004	7.33E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	1.01E+004
CS-137	6.83E+004	8.82E+003	4.30E+002
EU-152	Not Detected	---------	8.38E+002
EU-154	Not Detected	---------	3.29E+003
EU-155	Not Detected	---------	3.43E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	2.49E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.07E+018
K-40	Not Detected	---------	1.48E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.65E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	3.24E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.85E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	3.89E+021
SB-125	Not Detected	---------	1.59E+004
SN-113	Not Detected	---------	4.30E+012
SR-85	Not Detected	---------	2.11E+020
TA-182	Not Detected	---------	1.18E+013
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	8.53E+012
ZN-65	Not Detected	---------	4.46E+007
ZR-95	Not Detected	---------	5.29E+020

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

Report Date : 4/20/01 1:03:13 PM
QA File : C:\GENIE2K\CAMFILES\LCS1.QAF
Analyst : KICHAVE
Sample ID : 10063404
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 4/20/01 12:52:49 PM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 604 seconds

Parameter	Mean	1S Error	New Value	<	LU	SD	UD	BS >
AM-241 ACTIVITY	8.509E-002	2.660E-003	8.521E-002	<				>
CS-137 Activity	6.832E-002	1.244E-003	6.829E-002	<				>
CO-60 Activity	7.653E-002	2.533E-003	7.933E-002	<				>

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

Reviewed by: 4/20/01

```
*****************************************************************************
*                        Sandia National Laboratories                       *
*     Radiation Protection Sample Diagnostics Program [806 Laboratory]      *
*                          4/20/01  1:22:24 PM                              *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/20/01                    Reviewed by: 4/20/01              *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : LAB CONTROL SAMPLE USING CG134
Lab Sample ID             : 10063405

Sample Description        : MIXED_GAMMA_STANDARD_CG134
Sample Quantity           :      1.000  Each
Sample Date/Time          : 11/01/90  12:00:00 PM
Acquire Start Date/Time   :  4/20/01   1:12:07 PM
Detector Name             : LAB03
Elapsed Live/Real Time    :    600 /    605 seconds

Comments:
*****************************************************************************
```

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	2.63E+003
RA-226	Not Detected	---------	5.72E+003
PB-214	Not Detected	---------	7.10E+002
BI-214	Not Detected	---------	6.18E+002
PB-210	Not Detected	---------	4.76E+004
TH-232	Not Detected	---------	2.22E+003
RA-228	Not Detected	---------	2.61E+003
AC-228	Not Detected	---------	1.46E+003
TH-228	Not Detected	---------	2.95E+005
RA-224	Not Detected	---------	1.33E+004
PB-212	Not Detected	---------	2.03E+004
BI-212	Not Detected	---------	1.87E+005
TL-208	Not Detected	---------	4.31E+004
U-235	Not Detected	---------	1.31E+003
TH-231	Not Detected	---------	3.95E+004
PA-231	Not Detected	---------	1.33E+004
TH-227	Not Detected	---------	2.50E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	6.45E+003
PB-211	Not Detected	---------	1.46E+004
TL-207	Not Detected	---------	2.41E+005
AM-241	8.75E+004	1.25E+004	2.46E+003
PU-239	Not Detected	---------	2.21E+006
NP-237	Not Detected	---------	1.17E+004
PA-233	Not Detected	---------	6.02E+002
TH-229	Not Detected	---------	1.08E+003

[Summary Report] - Sample ID: : 10063405

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	3.21E+002
AG-110m	Not Detected	---------	7.48E+007
BA-133	Not Detected	---------	8.82E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.20E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.40E+007
CM-243	Not Detected	---------	1.91E+003
CO-56	Not Detected	---------	3.02E+017
CO-57	Not Detected	---------	2.75E+006
CO-58	Not Detected	---------	5.51E+018
CO-60	8.37E+004	1.09E+004	7.15E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	9.73E+003
CS-137	7.10E+004	9.14E+003	4.99E+002
EU-152	Not Detected	---------	8.22E+002
EU-154	Not Detected	---------	3.24E+003
EU-155	Not Detected	---------	3.21E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	2.57E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.08E+018
K-40	Not Detected	---------	1.36E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.66E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	3.51E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.94E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	3.81E+021
SB-125	Not Detected	---------	1.69E+004
SN-113	Not Detected	---------	4.48E+012
SR-85	Not Detected	---------	2.17E+020
TA-182	Not Detected	---------	1.11E+013
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	7.74E+012
ZN-65	Not Detected	---------	4.28E+007
ZR-95	Not Detected	---------	4.99E+020

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

Report Date : 4/20/01 1:22:28 PM
QA File : C:\GENIE2K\CAMFILES\LCS3.QAF
Analyst : KICHAVE
Sample ID : 10063805
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 4/20/01 1:12:07 PM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	<	LU	SD	UD	BS >
AM-241 Activity	8.698E-002	1.753E-003	8.750E-002	<	:	:	:	>
CS-137 Activity	6.982E-002	1.719E-003	7.103E-002	<	:	:	:	>
CO-60 Activity	7.965E-002	1.643E-003	8.132E-002	<	:	:	:	>

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

Reviewed by: 4/20/01

ON-SITE LABORATORY (RPSD)
ANALYSIS REQUEST AND CHAIN OF CUSTODY

RUSH

Internal Lab

Batch No 100635

SAR/WR No

AR/COC 604417

Dept. No./Mail Stop:	~~6135/1089~~ 6133/1087	Date Samples Shipped: 4-19-01	SMO USE	Logged By:	☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC		Project/Task No.: 7219.01.05	☐ Waste Characterization
Project Name	~~TA-V Well Borehole~~ TA III/V Assessment Groundwater Non	Lab Contact	R Reese 505-844-7683	SMO Authorization	-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination:	RPSD	Location N/A Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110	Building N/A Room: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab
					-This COC Number Releases COC No(s): 604415 & 604416

Sample No -Fraction / RPSD No -Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054890-004	TAV-BH-MW6-120-S	120	TAV	041801 0919	S	M	500 ml	None	G	SA	
01											Gamma Spec
054891-004	TAV-BH-MW6-140-S	140	TAV	041801 1441	S	M	500 ml	None	G	SA	Gamma Spec
02											
054892-004	TAV-BH-MW6-160-S	160	TAV	041801 1457	S	M	500 ml	None	G	SA	Gamma Spec
03											
054893-004	TAV-BH-MW6-180-S	180	TAV	041801 1655	S	M	500 ml	None	G	SA	Gamma Spec
04											

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	04/27/01
Turnaround Time	☑ Normal ☐ Rush	Entered by:	JAC

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Required Report Date

QC inits.

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN FOR BACKGROUND LEVEL

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	~~G Quintana~~			~~IT/6136/284-3309~~
	W Gibson	William J Gibson	WJG	MDM/6133/845-3267

Please list as separate report.

1. Relinquished by	Org 6135	Date 4-19-01	Time 1035	4. Relinquished by	Org. 6132	Date 4/26/01	Time 0730
1. Received by	Org 6132	Date 4/19/01	Time 1035	4. Received by	Org. 6133	Date 4-26-01	Time 0730
2. Relinquished by	Org 6132	Date 4-19-01	Time 1055	5. Relinquished by	Org.	Date	Time
2. Received by	Org. 7132	Date 4-19-01	Time 1055	5. Received by	Org.	Date	Time
3. Relinquished by	Org. 7132	Date 4/23/01	Time 0838	6. Relinquished by	Org.	Date	Time
				6. Received by	Org.	Date	Time

6

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/20/01 3:10:47 PM

Analyzed by: 4/23/01 Reviewed by: 4/23/01

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054890-004
Lab Sample ID : 10063501

Sample Description : TAV-BH-MW6-120-S
Sample Quantity : 591.400 gram
Sample Date/Time : 4/18/01 9:19:00 AM
Acquire Start Date/Time : 4/20/01 1:30:27 PM
Detector Name : LAB03
Elapsed Live/Real Time : 6000 / 6002 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	5.85E-001
RA-226	1.89E+000	7.15E-001	1.02E+000
PB-214	7.95E-001	1.24E-001	7.45E-002
BI-214	7.03E-001	1.23E-001	7.64E-002
PB-210	Not Detected	---------	4.29E+000
TH-232	7.72E-001	3.68E-001	1.95E-001
RA-228	6.68E-001	1.86E-001	2.04E-001
AC-228	7.91E-001	1.67E-001	1.27E-001
TH-228	3.59E-001	2.97E-001	4.60E-001
RA-224	7.35E-001	1.96E-001	1.19E-001
PB-212	7.98E-001	4.67E-001	4.42E-002
BI-212	6.18E-001	3.45E-001	5.05E-001
TL-208	7.27E-001	1.37E-001	1.10E-001
U-235	9.80E-002	1.59E-001	2.05E-001
TH-231	Not Detected	---------	7.59E+000
PA-231	Not Detected	---------	1.45E+000
TH-227	Not Detected	---------	4.04E-001
RA-223	Not Detected	---------	1.38E-001
RN-219	Not Detected	---------	4.31E-001
PB-211	Not Detected	---------	9.85E-001
TL-207	Not Detected	---------	1.72E+001
AM-241	Not Detected	---------	1.69E-001
PU-239	Not Detected	---------	3.57E+002
NP-237	Not Detected	---------	1.89E+000
PA-233	Not Detected	---------	6.56E-002
TH-229	Not Detected	---------	1.81E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 10063501

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	4.85E-002
AG-110m	Not Detected	---------	3.67E-002
BA-133	Not Detected	---------	6.20E-002
BE-7	Not Detected	---------	2.80E-001
CD-115	Not Detected	---------	1.48E-001
CE-139	Not Detected	---------	2.80E-002
CE-141	Not Detected	---------	4.56E-002
CE-144	Not Detected	---------	1.90E-001
CM-243	Not Detected	---------	1.77E-001
CO-56	Not Detected	---------	3.71E-002
CO-57	Not Detected	---------	2.47E-002
CO-58	Not Detected	---------	3.85E-002
CO-60	Not Detected	---------	4.61E-002
CR-51	Not Detected	---------	2.59E-001
CS-134	Not Detected	---------	6.53E-002
CS-137	Not Detected	---------	3.90E-002
EU-152	Not Detected	---------	7.35E-002
EU-154	Not Detected	---------	2.26E-001
EU-155	Not Detected	---------	1.08E-001
FE-59	Not Detected	---------	9.22E-002
GD-153	Not Detected	---------	7.32E-002
HG-203	Not Detected	---------	3.33E-002
I-131	Not Detected	---------	3.68E-002
IR-192	Not Detected	---------	2.93E-002
K-40	1.39E+001	1.97E+000	3.61E-001
MN-52	Not Detected	---------	5.08E-002
MN-54	Not Detected	---------	3.97E-002
MO-99	Not Detected	---------	5.13E-001
NA-22	Not Detected	---------	5.38E-002
NA-24	Not Detected	---------	4.76E-001
ND-147	Not Detected	---------	2.43E-001
NI-57	Not Detected	---------	1.73E-001
RU-103	Not Detected	---------	3.20E-002
RU-106	Not Detected	---------	3.53E-001
SB-122	Not Detected	---------	8.30E-002
SB-124	Not Detected	---------	3.54E-002
SB-125	Not Detected	---------	9.17E-002
SN-113	Not Detected	---------	4.44E-002
SR-85	Not Detected	---------	4.06E-002
TA-182	Not Detected	---------	1.80E-001
TA-183	Not Detected	---------	1.92E-001
TL-201	Not Detected	---------	1.50E-001
Y-88	Not Detected	---------	3.37E-002
ZN-65	Not Detected	---------	1.23E-001
ZR-95	Not Detected	---------	6.78E-002

7

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*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/20/01  5:07:07 PM                                 *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/23/01                  Reviewed by: 4/23/01                *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : 054891-004
Lab Sample ID             : 10063502

Sample Description        : TAV-BH-MW6-140-S
Sample Quantity           :   537.700  gram
Sample Date/Time          :  4/18/01   2:41:00 PM
Acquire Start Date/Time   :  4/20/01   3:26:28 PM
Detector Name             : LAB03
Elapsed Live/Real Time    :   6000 /   6002 seconds

Comments:
*****************************************************************************
```

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.67E-001
RA-226	1.61E+000	7.40E-001	1.10E-000
PB-214	9.05E-001	1.47E-001	1.08E-001
BI-214	8.40E-001	1.42E-001	7.51E-002
PB-210	Not Detected	---------	4.84E+000
TH-232	1.10E+000	5.24E-001	2.87E-001
RA-228	Not Detected	---------	1.90E-001
AC-228	9.53E-001	1.99E-001	1.53E-001
TH-228	7.16E-001	4.44E-001	6.68E-001
RA-224	9.91E-001	2.44E-001	1.03E-001
PB-212	1.09E+000	6.18E-001	4.56E-002
BI-212	1.28E+000	4.62E-001	6.02E-001
TL-208	9.65E-001	1.72E-001	1.26E-001
U-235	Not Detected	---------	2.31E-001
TH-231	Not Detected	---------	8.98E+000
PA-231	Not Detected	---------	1.67E+000
TH-227	Not Detected	---------	4.90E-001
RA-223	Not Detected	---------	1.60E-001
RN-219	Not Detected	---------	4.90E-001
PB-211	Not Detected	---------	1.14E+000
TL-207	Not Detected	---------	1.78E+001
AM-241	Not Detected	---------	1.90E-001
PU-239	Not Detected	---------	4.21E+002
NP-237	Not Detected	---------	2.09E+000
PA-233	Not Detected	---------	6.95E-002
TH-229	Not Detected	---------	2.03E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 10063502

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	5.66E-002
AG-110m	Not Detected	---------	3.97E-002
BA-133	Not Detected	---------	6.76E-002
BE-7	Not Detected	---------	3.12E-001
CD-115	Not Detected	---------	1.65E-001
CE-139	Not Detected	---------	3.14E-002
CE-141	Not Detected	---------	5.23E-002
CE-144	Not Detected	---------	2.19E-001
CM-243	Not Detected	---------	2.12E-001
CO-56	Not Detected	---------	4.20E-002
CO-57	Not Detected	---------	2.86E-002
CO-58	Not Detected	---------	4.53E-002
CO-60	Not Detected	---------	5.01E-002
CR-51	Not Detected	---------	3.02E-001
CS-134	Not Detected	---------	7.70E-002
CS-137	Not Detected	---------	4.56E-002
EU-152	Not Detected	---------	8.56E-002
EU-154	Not Detected	---------	2.62E-001
EU-155	Not Detected	---------	1.25E-001
FE-59	Not Detected	---------	9.88E-002
GD-153	Not Detected	---------	8.49E-002
HG-203	Not Detected	---------	3.93E-002
I-131	Not Detected	---------	4.10E-002
IR-192	Not Detected	---------	3.34E-002
K-40	1.69E+001	2.36E+000	4.49E-001
MN-52	Not Detected	---------	5.73E-002
MN-54	Not Detected	---------	4.62E-002
MO-99	Not Detected	---------	5.52E-001
NA-22	Not Detected	---------	5.87E-002
NA-24	Not Detected	---------	4.25E-001
ND-147	Not Detected	---------	2.93E-001
NI-57	Not Detected	---------	1.86E-001
RU-103	Not Detected	---------	3.85E-002
RU-106	Not Detected	---------	3.98E-001
SB-122	Not Detected	---------	9.37E-002
SB-124	Not Detected	---------	4.42E-002
SB-125	Not Detected	---------	1.12E-001
SN-113	Not Detected	---------	4.60E-002
SR-85	Not Detected	---------	4.90E-002
TA-182	Not Detected	---------	2.12E-001
TA-183	Not Detected	---------	2.09E-001
TL-201	Not Detected	---------	1.69E-001
Y-88	Not Detected	---------	3.81E-002
ZN-65	Not Detected	---------	1.43E-001
ZR-95	Not Detected	---------	8.49E-002

8

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*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                      4/20/01  3:22:38 PM                                   *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/23/01                    Reviewed by: 4/23/01              *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : 054892-004
Lab Sample ID             : 10063503

Sample Description        : TAV-BH-MW6-160-S
Sample Quantity           :   675.300  gram
Sample Date/Time          :  4/18/01   2:57:00 PM
Acquire Start Date/Time   :  4/20/01   1:42:01 PM
Detector Name             : LAB01
Elapsed Live/Real Time    :   6000 /   6002 seconds

Comments:
*****************************************************************************
```

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	5.34E-001
RA-226	1.27E+000	5.26E-001	7.56E-001
PB-214	6.49E-001	1.05E-001	6.33E-002
BI-214	5.93E-001	1.05E-001	6.25E-002
PB-210	Not Detected	---------	8.06E+000
TH-232	7.04E-001	3.45E-001	2.14E-001
RA-228	7.79E-001	3.15E-001	1.33E-001
AC-228	7.18E-001	1.55E-001	1.21E-001
TH-228	Not Detected	---------	4.84E-001
RA-224	6.68E-001	1.77E-001	7.55E-002
PB-212	7.00E-001	1.32E-001	3.82E-002
BI-212	1.03E+000	3.23E-001	3.73E-001
TL-208	5.60E-001	1.12E-001	9.46E-002
U-235	Not Detected	---------	1.90E-001
TH-231	Not Detected	---------	7.47E+000
PA-231	Not Detected	---------	1.28E+000
TH-227	Not Detected	---------	3.07E-001
RA-223	Not Detected	---------	1.35E-001
RN-219	Not Detected	---------	3.51E-001
PB-211	Not Detected	---------	7.74E-001
TL-207	~~4.32E+000~~	~~6.55E+000~~	1.04E+001 NOT DETECTED 4/23/01
AM-241	Not Detected	---------	1.90E-001
PU-239	Not Detected	---------	3.47E+002
NP-237	Not Detected	---------	1.83E+000
PA-233	Not Detected	---------	5.99E-002
TH-229	Not Detected	---------	1.67E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 10063503

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	4.20E-002
AG-110m	Not Detected	---------	3.19E-002
BA-133	Not Detected	---------	4.41E-002
BE-7	Not Detected	---------	2.46E-001
CD-115	Not Detected	---------	1.23E-001
CE-139	Not Detected	---------	2.43E-002
CE-141	Not Detected	---------	4.24E-002
CE-144	Not Detected	---------	1.89E-001
CM-243	Not Detected	---------	1.58E-001
CO-56	Not Detected	---------	3.61E-002
CO-57	Not Detected	---------	2.46E-002
CO-58	Not Detected	---------	3.56E-002
CO-60	Not Detected	---------	3.82E-002
CR-51	Not Detected	---------	2.48E-001
CS-134	Not Detected	---------	4.57E-002
CS-137	Not Detected	---------	3.45E-002
EU-152	Not Detected	---------	7.37E-002
EU-154	Not Detected	---------	2.02E-001
EU-155	Not Detected	---------	1.12E-001
FE-59	Not Detected	---------	7.71E-002
GD-153	Not Detected	---------	6.70E-002
HG-203	Not Detected	---------	2.93E-002
I-131	Not Detected	---------	3.06E-002
IR-192	Not Detected	---------	2.83E-002
K-40	1.14E+001	1.64E+000	3.46E-001
MN-52	Not Detected	---------	4.03E-002
MN-54	Not Detected	---------	3.74E-002
MO-99	Not Detected	---------	3.99E-001
NA-22	Not Detected	---------	4.60E-002
NA-24	Not Detected	---------	2.71E-001
ND-147	Not Detected	---------	2.29E-001
NI-57	Not Detected	---------	1.31E-001
RU-103	Not Detected	---------	3.09E-002
RU-106	Not Detected	---------	3.00E-001
SB-122	Not Detected	---------	6.66E-002
SB-124	Not Detected	---------	3.16E-002
SB-125	Not Detected	---------	8.46E-002
SN-113	Not Detected	---------	3.73E-002
SR-85	Not Detected	---------	3.88E-002
TA-182	Not Detected	---------	1.77E-001
TA-183	Not Detected	---------	2.10E-001
TL-201	Not Detected	---------	1.41E-001
Y-88	Not Detected	---------	2.97E-002
ZN-65	Not Detected	---------	1.17E-001
ZR-95	Not Detected	---------	6.72E-002

9

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

4/23/01 7:14:22 AM

Analyzed by: 4/23/01 Reviewed by:

Customer : LAI/SALMI (6135/SMO)
Customer Sample ID : 054893-004
Lab Sample ID : 10063504

Sample Description : TAV-BH-MW6-180-S
Sample Quantity : 624.900 gram
Sample Date/Time : 4/18/01 4:55:00 PM
Acquire Start Date/Time : 4/20/01 3:43:22 PM
Detector Name : LAB01
Elapsed Live/Real Time : 6000 / 6002 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	5.55E-001
RA-226	1.37E+000	5.39E-001	7.63E-001
PB-214	6.07E-001	1.02E-001	6.73E-002
BI-214	5.89E-001	1.05E-001	6.12E-002
PB-210	Not Detected	---------	8.16E+000
TH-232	5.37E-001	2.80E-001	2.21E-001
RA-228	5.39E-001	1.97E-001	2.57E-001
AC-228	6.83E-001	1.59E-001	1.43E-001
TH-228	Not Detected	---------	4.30E-001
RA-224	6.26E-001	1.74E-001	9.34E-002
PB-212	6.20E-001	1.42E-001	4.04E-002
BI-212	5.03E-001	2.89E-001	4.18E-001
TL-208	5.82E-001	1.14E-001	8.78E-002
U-235	1.83E-001	1.73E-001	2.06E-001
TH-231	Not Detected	---------	7.60E+000
PA-231	Not Detected	---------	1.37E+000
TH-227	Not Detected	---------	3.10E-001
RA-223	Not Detected	---------	1.37E-001
RN-219	Not Detected	---------	4.18E-001
PB-211	Not Detected	---------	9.21E-001
TL-207	Not Detected	---------	1.55E+001
AM-241	Not Detected	---------	1.99E-001
PU-239	Not Detected	---------	3.53E+002
NP-237	Not Detected	---------	2.00E+000
PA-233	Not Detected	---------	6.10E-002
TH-229	Not Detected	---------	1.74E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 10063504

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	4.24E-002
AG-110m	Not Detected	---------	3.35E-002
BA-133	Not Detected	---------	4.49E-002
BE-7	Not Detected	---------	2.72E-001
CD-115	Not Detected	---------	1.24E-001
CE-139	Not Detected	---------	2.46E-002
CE-141	Not Detected	---------	4.52E-002
CE-144	Not Detected	---------	1.93E-001
CM-243	Not Detected	---------	1.64E-001
CO-56	Not Detected	---------	3.88E-002
CO-57	Not Detected	---------	2.43E-002
CO-58	Not Detected	---------	3.76E-002
CO-60	Not Detected	---------	4.28E-002
CR-51	Not Detected	---------	2.57E-001
CS-134	Not Detected	---------	4.69E-002
CS-137	Not Detected	---------	3.76E-002
EU-152	Not Detected	---------	7.34E-002
EU-154	Not Detected	---------	2.02E-001
EU-155	Not Detected	---------	1.21E-001
FE-59	Not Detected	---------	8.17E-002
GD-153	Not Detected	---------	6.71E-002
HG-203	Not Detected	---------	3.06E-002
I-131	Not Detected	---------	3.44E-002
IR-192	Not Detected	---------	2.85E-002
K-40	1.51E+001	2.13E+000	3.63E-001
MN-52	Not Detected	---------	4.10E-002
MN-54	Not Detected	---------	3.99E-002
MO-99	Not Detected	---------	4.16E-001
NA-22	Not Detected	---------	5.15E-002
NA-24	Not Detected	---------	3.21E-001
ND-147	Not Detected	---------	2.42E-001
NI-57	Not Detected	---------	1.38E-001
RU-103	Not Detected	---------	3.27E-002
RU-106	Not Detected	---------	3.19E-001
SB-122	Not Detected	---------	7.10E-002
SB-124	Not Detected	---------	3.16E-002
SB-125	Not Detected	---------	8.28E-002
SN-113	Not Detected	---------	3.93E-002
SR-85	Not Detected	---------	4.05E-002
TA-182	Not Detected	---------	1.89E-001
TA-183	Not Detected	---------	2.24E-001
TL-201	Not Detected	---------	1.47E-001
Y-88	Not Detected	---------	2.97E-002
ZN-65	Not Detected	---------	1.28E-001
ZR-95	Not Detected	---------	6.90E-002

```
*****************************************************************************
*                      Sandia National Laboratories                         *
*     Radiation Protection Sample Diagnostics Program [806 Laboratory]      *
*                        4/23/01  6:17:32 AM                                *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/23/01                    Reviewed by: 4/23/01              *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : LAB CONTROL SAMPLE USING CG134
Lab Sample ID             : 10063505

Sample Description        : MIXED_GAMMA_STANDARD_CG134
Sample Quantity           :      1.000  Each
Sample Date/Time          : 11/01/90  12:00:00 PM
Acquire Start Date/Time   :  4/23/01   6:07:16 AM
Detector Name             : LAB03
Elapsed Live/Real Time    :    600 /    605 seconds

Comments:
*****************************************************************************
```

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	2.57E+003
RA-226	Not Detected	---------	5.69E+003
PB-214	Not Detected	---------	7.22E+002
BI-214	Not Detected	---------	6.23E+002
PB-210	Not Detected	---------	4.77E+004
TH-232	Not Detected	---------	2.27E+003
RA-228	Not Detected	---------	2.69E+003
AC-228	Not Detected	---------	1.54E+003
TH-228	Not Detected	---------	2.96E+005
RA-224	Not Detected	---------	9.14E+003
PB-212	Not Detected	---------	2.03E+004
BI-212	Not Detected	---------	1.79E+005
TL-208	Not Detected	---------	4.29E+004
U-235	Not Detected	---------	1.31E+003
TH-231	Not Detected	---------	3.82E+004
PA-231	Not Detected	---------	1.36E+004
TH-227	Not Detected	---------	2.48E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	6.59E+003
PB-211	Not Detected	---------	1.50E+004
TL-207	Not Detected	---------	2.37E+005
AM-241	8.75E+004	1.25E+004	2.27E+003
PU-239	Not Detected	---------	2.20E+006
NP-237	Not Detected	---------	1.16E+004
PA-233	Not Detected	---------	6.07E+002
TH-229	Not Detected	---------	1.08E+003

[Summary Report] - Sample ID: : 10063505

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	3.19E+002
AG-110m	Not Detected	---------	7.47E+007
BA-133	Not Detected	---------	8.86E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.38E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.41E+007
CM-243	Not Detected	---------	1.94E+003
CO-56	Not Detected	---------	3.06E+017
CO-57	Not Detected	---------	2.80E+006
CO-58	Not Detected	---------	5.78E+018
CO-60	8.14E+004	1.07E+004	8.26E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	1.01E+004
CS-137	7.01E+004	9.02E+003	4.75E+002
EU-152	Not Detected	---------	8.25E+002
EU-154	Not Detected	---------	3.19E+003
EU-155	Not Detected	---------	3.14E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	2.52E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.11E+018
K-40	Not Detected	---------	1.15E-003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.60E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	3.34E-003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	4.07E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	3.99E+021
SB-125	Not Detected	---------	1.62E+004
SN-113	Not Detected	---------	4.55E+012
SR-85	Not Detected	---------	2.20E+020
TA-182	Not Detected	---------	1.14E+013
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	1.01E+013
ZN-65	Not Detected	---------	4.31E+007
ZR-95	Not Detected	---------	5.40E+020

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

Report Date : 4/23/01 6:17:35 AM
QA File : C:\GENIE2K\CAMFILES\LCS3.QAF
Analyst : KICHAVE
Sample ID : 10063505
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 4/23/01 6:07:16 AM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	< LU	SD	UD	BS >
AM-241 Activity	8.698E-002	1.752E-003	8.746E-002	<			>
CS-137 Activity	6.982E-002	1.719E-003	7.006E-002	<			>
CO-60 Activity	7.965E-002	1.643E-003	8.024E-002	<			>

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

Reviewed by: 4/23/01

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/23/01  6:31:40 AM                                 *
*****************************************************************************
*                                                                           *
* Analyzed by: 4/23/01                    Reviewed by: 4/23/01              *
*****************************************************************************
Customer                  : LAI/SALMI (6135/SMO)
Customer Sample ID        : LAB CONTROL SAMPLE USING CG134
Lab Sample ID             : 1006350406

Sample Description        : MIXED_GAMMA_STANDARD_CG134
Sample Quantity           :     1.000  Each
Sample Date/Time          : 11/01/90  12:00:00 PM
Acquire Start Date/Time   :  4/23/01   6:21:26 AM
Detector Name             : LAB01
Elapsed Live/Real Time    :    600 /    604 seconds

Comments:
*****************************************************************************
```

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	2.67E+003
RA-226	Not Detected	---------	5.35E+003
PB-214	Not Detected	---------	6.55E+002
BI-214	Not Detected	---------	6.35E+002
PB-210	Not Detected	---------	7.47E+004
TH-232	Not Detected	---------	2.08E+003
RA-228	Not Detected	---------	2.73E+003
AC-228	Not Detected	---------	1.50E+003
TH-228	Not Detected	---------	2.88E+005
RA-224	Not Detected	---------	1.00E+004
PB-212	Not Detected	---------	1.84E+004
BI-212	Not Detected	---------	1.82E+005
TL-208	Not Detected	---------	4.25E+004
U-235	Not Detected	---------	1.33E+003
TH-231	Not Detected	---------	4.22E+004
PA-231	Not Detected	---------	1.27E+004
TH-227	Not Detected	---------	2.24E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	6.27E+003
PB-211	Not Detected	---------	1.40E+004
TL-207	Not Detected	---------	2.39E+005
AM-241	8.83E+004	1.30E+004	1.35E+003
PU-239	Not Detected	---------	2.23E+006
NP-237	Not Detected	---------	1.23E+004
PA-233	Not Detected	---------	5.96E+002
TH-229	Not Detected	---------	1.05E+003

[Summary Report] - Sample ID: : 100635~~04~~06

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	3.32E+002
AG-110m	Not Detected	---------	7.32E+007
BA-133	Not Detected	---------	8.36E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.05E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.44E+007
CM-243	Not Detected	---------	1.87E+003
CO-56	Not Detected	---------	3.07E+017
CO-57	Not Detected	---------	2.91E+006
CO-58	Not Detected	---------	6.09E+018
CO-60	7.72E+004	1.02E+004	7.09E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	1.01E+004
CS-137	6.91E+004	8.93E+003	3.87E+002
EU-152	Not Detected	---------	8.67E+002
EU-154	Not Detected	---------	3.33E+003
EU-155	Not Detected	---------	3.39E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	2.49E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.10E+018
K-40	Not Detected	---------	1.40E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.73E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	3.33E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.78E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	3.93E+021
SB-125	Not Detected	---------	1.60E+004
SN-113	Not Detected	---------	4.38E+012
SR-85	Not Detected	---------	2.18E+020
TA-182	Not Detected	---------	1.20E+013
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	1.11E+013
ZN-65	Not Detected	---------	4.85E+007
ZR-95	Not Detected	---------	5.17E+020

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

Report Date : 4/23/01 6:31:44 AM
QA File : C:\GENIE2K\CAMFILES\LCS1.QAF
Analyst : KICHAVE
Sample ID : 10063504 06
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 4/23/01 6:21:26 AM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 604 seconds

Parameter	Mean	1S Error	New Value	<	LU	SD	UD	BS	>
AM-241 ACTIVITY	8.509E-002	2.658E-003	8.830E-002	<					>
CS-137 Activity	6.832E-002	1.243E-003	6.913E-002	<					>
CO-60 Activity	7.684E-002	2.533E-003	7.883E-002	<					>

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

Reviewed by: 4/23/01

ON-SITE LABORATORY (ERCL)

ANALYSIS REQUEST AND CHAIN OF CUSTODY

<2nCi/g MWC 4/25/01
No H-3 concerns per Gene

Page 1 of 2

Internal Lab

Batch No. 100651

SAR/WR No.

AR/COC 604420

Dept. No./Mail Stop:	~~6135/1089~~ 6137/1087	Date Samples Shipped:	4-23-01 SMO USE	Logged By:	☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	HC	Project/Task No.: 7219.01.05	☐ Waste Characterization
Project Name:	~~TA-V Well Borehole~~ TA 111/V Assessment Groundwater Nov	Lab Contact:	R Reese 505-844-7683	SMO Authorization:	-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination:	RPSD	Location: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110	Building: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01			Room: N/A	☑ Release to Off-Site Lab

-This COC Number Releases COC No(s).: 604419 & ~~604420~~ 604418

Sample No -Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Analysis Request
054894-004	TAV-BH-MW6-200-S	200	TAV	041901 0851	S	M	500 ml	None	G	SA	Gamma Spec LAB 01
01				782.79							
054895-004	TAV-BH-MW6-200-S DU	200	TAV	041901 0851	S	M	500 ml	None	G	DU	Gamma Spec
02				702.29							
054896-004	TAV-BH-MW6-220-S	220	TAV	041901 1050	S	M	500 ml	None	G	SA	Gamma Spec
03				534.29							
054897-004	TAV-BH-MW6-240-S	240	TAV	041901 1330	S	M	500 ml	None	G	SA	Gamma Spec
04				831.39							

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	04/27/01
Turnaround Time	☑ Normal ☐ Rush	Entered by:	JAC
	Required Report Date	QC inits.	

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN BACKGROUND PLEASE

Please list as seperate report.

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	M Sanchez	Margaret Sanchez	MS	Weston/6135/845-3267
	G Quintana	Gilbert Quintana		IT/6135/284-3309
	W Gibson	William Gibson	WG	MDM/6133/845-3267

1. Relinquished by		Org 6135	Date 4-23-01	Time 1050	4 Relinquished by	Org 6137	Date 4/26/01	Time 073
1. Received by		Org 6137	Date 4/23/01	Time 1050	4 Received by	Org 6137	Date 4-26-01	Time 73
2 Relinquished by		Org 6137	Date 4/23/01	Time 1604	5 Relinquished by	Org	Date	Time
2. Received by		Org 7132	Date 4/23/01	Time 1604	5. Received by	Org	Date	Time
3 Relinquished by		Org 7132	Date 4/25/01	Time 0840	6 Relinquished by	Org	Date	Time
3. Received by		Org 6132	Date 4/25/01	Time 0840	6. Received by	Org	Date	Time

ON-SITE LABORATORY
Analysis Request And Chain Of Custody (Continuation)

100651

AR/COC- 60442

Project Name | Project/Task Manger | Case No

Sample No -Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No / Sample Mass	Date/Time (hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Analysis Request
054898-004	TAV-BH-MW6-260-S	260	TAV	041901 1512	S	M	500 ml	None	G	SA	Gamma Spec LAB01
05				623.89							
054899-004	TAV-BH-MW6-280-S	280	TAV	041901 1700	S	M	500 ml	None	G	SA	Gamma Spec
06				698.4							
LCS											
07											

Abnormal Conditions on Receipt

LAB USE

Recipient Initials_____

****

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

4/24/01 9:23:04 AM

****

Analyzed by: JP Kime 4-24-2001 Reviewed by: 4/25/01

****

ustomer : LAI/PERRY (6135/SMO)
ustomer Sample ID : 054894-004
ab Sample ID : 10065101

ample Description : TAV-BH-MW6-200-S
ample Quantity : 782.700 gram
ample Date/Time : 4/19/01 8:51:00 AM
cquire Start Date/Time : 4/24/01 7:42:28 AM
etector Name : LAB01
lapsed Live/Real Time : 6000 / 6002 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

omments:

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Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	4.62E-001
RA-226	1.29E-000	4.59E-001	6.34E-001
PB-214	5.80E-001	1.05E-001	9.25E-002
BI-214	5.73E-001	9.85E-002	5.38E-002
PB-210	Not Detected	---------	6.80E+000
TH-232	5.40E-001	2.70E-001	1.85E-001
RA-228	3.82E-001	1.91E-001	1.52E-001
AC-228	5.81E-001	1.33E-001	1.17E-001
TH-228	5.28E-001	2.24E-001	4.03E-001
RA-224	5.66E-001	1.55E-001	8.95E-002
PB-212	5.49E-001	3.68E-001	3.53E-002
BI-212	5.21E-001	2.55E-001	3.56E-001
TL-208	5.48E-001	1.03E-001	7.54E-002
U-235	1.21E-001	1.46E-001	1.72E-001
TH-231	Not Detected	---------	6.30E+000
PA-231	Not Detected	---------	1.07E+000
TH-227	Not Detected	---------	2.64E-001
RA-223	Not Detected	---------	1.39E-001
~~RN-219~~	~~1.66E-001~~	~~2.58E-001~~	~~3.16E-001~~ NOT DETECTED 4-24-2001 JPK
PB-211	Not Detected	---------	6.91E-001
TL-207	Not Detected	---------	1.15E+001
AM-241	Not Detected	---------	1.70E-001
PU-239	Not Detected	---------	2.97E+002
NP-237	Not Detected	---------	1.60E+000
PA-233	Not Detected	---------	4.99E-002
TH-229	Not Detected	---------	1.43E-001

[Summary Report] - Sample ID: : 10065101

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.61E-002
AG-110m	Not Detected	---------	2.80E-002
BA-133	Not Detected	---------	3.67E-002
BE-7	Not Detected	---------	2.23E-001
CD-115	Not Detected	---------	2.73E-001
CE-139	Not Detected	---------	2.19E-002
CE-141	Not Detected	---------	4.10E-002
CE-144	Not Detected	---------	1.64E-001
CM-243	Not Detected	---------	1.40E-001
CO-56	Not Detected	---------	3.38E-002
CO-57	Not Detected	---------	2.09E-002
CO-58	Not Detected	---------	3.15E-002
CO-60	Not Detected	---------	3.49E-002
CR-51	Not Detected	---------	2.25E-001
CS-134	Not Detected	---------	4.13E-002
CS-137	Not Detected	---------	2.88E-002
EU-152	Not Detected	---------	6.18E-002
EU-154	Not Detected	---------	1.70E-001
EU-155	Not Detected	---------	9.75E-002
FE-59	Not Detected	---------	6.75E-002
GD-153	Not Detected	---------	5.71E-002
HG-203	Not Detected	---------	2.74E-002
I-131	Not Detected	---------	3.53E-002
IR-192	Not Detected	---------	2.50E-002
K-40	1.09E+001	1.55E+000	2.30E-001
MN-52	Not Detected	---------	5.45E-002
MN-54	Not Detected	---------	2.36E-002
MO-99	Not Detected	---------	7.77E-001
NA-22	Not Detected	---------	3.70E-002
NA-24	Not Detected	---------	7.44E+000
ND-147	Not Detected	---------	2.31E-001
NI-57	Not Detected	---------	4.65E-001
RU-103	Not Detected	---------	2.62E-002
RU-106	Not Detected	---------	2.50E-001
SB-122	Not Detected	---------	1.26E-001
SB-124	Not Detected	---------	2.79E-002
SB-125	Not Detected	---------	7.03E-002
SN-113	Not Detected	---------	3.15E-002
SR-85	Not Detected	---------	3.32E-002
TA-182	Not Detected	---------	1.45E-001
TA-183	Not Detected	---------	2.83E-001
TL-201	Not Detected	---------	2.34E-001
Y-88	Not Detected	---------	2.70E-002
ZN-65	Not Detected	---------	9.71E-002
ZR-95	Not Detected	---------	5.92E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/24/01 11:05:37 AM

Analyzed by: JP Cline 4-25-2001 Reviewed by: 4/25/01

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : 054895-004
Lab Sample ID : 10065102

Sample Description : TAV-BH-MW6-200-S
Sample Quantity : 702.200 gram
Sample Date/Time : 4/19/01 8:51:00 AM
Acquire Start Date/Time : 4/24/01 9:25:10 AM
Detector Name : LAB01
Elapsed Live/Real Time : 6000 / 6002 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	4.97E-001
RA-226	1.57E-000	5.09E-001	6.81E-001
PB-214	5.68E-001	9.43E-002	6.06E-002
BI-214	5.36E-001	1.03E-001	8.40E-002
PB-210	Not Detected	---------	7.65E+000
TH-232	5.82E-001	2.92E-001	2.02E-001
RA-228	5.01E-001	2.39E-001	1.51E-001
AC-228	6.27E-001	1.37E-001	1.04E-001
TH-228	Not Detected	---------	4.62E-001
RA-224	7.12E-001	1.82E-001	6.07E-002
PB-212	6.01E-001	1.22E-001	3.60E-002
BI-212	6.04E-001	3.09E-001	4.41E-001
TL-208	5.39E-001	1.05E-001	8.37E-002
U-235	9.40E-002	1.51E-001	1.77E-001
TH-231	Not Detected	---------	6.62E+000
PA-231	Not Detected	---------	1.21E+000
TH-227	Not Detected	---------	2.95E-001
RA-223	Not Detected	---------	1.50E-001
RN-219	~~2.22E-001~~	~~2.96E-001~~	3.65E-001 NOT DETECTED KT 4/25/01
PB-211	Not Detected	---------	8.23E-001
TL-207	Not Detected	---------	1.32E+001
AM-241	Not Detected	---------	1.70E-001
PU-239	Not Detected	---------	3.15E+002
NP-237	Not Detected	---------	1.77E+000
PA-233	Not Detected	---------	5.25E-002
TH-229	Not Detected	---------	1.54E-001

[Summary Report] - Sample ID: : 10065102

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.90E-002
AG-110m	Not Detected	---------	2.92E-002
BA-133	Not Detected	---------	4.07E-002
BE-7	Not Detected	---------	2.50E-001
CD-115	Not Detected	---------	3.00E-001
CE-139	Not Detected	---------	2.26E-002
CE-141	Not Detected	---------	4.19E-002
CE-144	Not Detected	---------	1.78E-001
CM-243	Not Detected	---------	1.47E-001
CO-56	Not Detected	---------	3.36E-002
CO-57	Not Detected	---------	2.24E-002
CO-58	Not Detected	---------	3.32E-002
CO-60	Not Detected	---------	3.53E-002
CR-51	Not Detected	---------	2.52E-001
CS-134	Not Detected	---------	4.44E-002
CS-137	Not Detected	---------	3.14E-002
EU-152	Not Detected	---------	6.72E-002
EU-154	Not Detected	---------	1.82E-001
EU-155	Not Detected	---------	1.04E-001
FE-59	Not Detected	---------	7.85E-002
GD-153	Not Detected	---------	6.28E-002
HG-203	Not Detected	---------	2.91E-002
I-131	Not Detected	---------	3.93E-002
IR-192	Not Detected	---------	2.62E-002
K-40	1.19E+001	1.70E+000	2.66E-001
MN-52	Not Detected	---------	6.13E-002
MN-54	Not Detected	---------	3.50E-002
MO-99	Not Detected	---------	8.34E-001
NA-22	Not Detected	---------	3.90E-002
NA-24	Not Detected	---------	8.58E+000
ND-147	Not Detected	---------	2.63E-001
NI-57	Not Detected	---------	5.11E-001
RU-103	Not Detected	---------	3.16E-002
RU-106	Not Detected	---------	2.83E-001
SB-122	Not Detected	---------	1.41E-001
SB-124	Not Detected	---------	3.05E-002
SB-125	Not Detected	---------	7.32E-002
SN-113	Not Detected	---------	3.35E-002
SR-85	Not Detected	---------	3.69E-002
TA-182	Not Detected	---------	1.57E-001
TA-183	Not Detected	---------	2.86E-001
TL-201	Not Detected	---------	2.63E-001
Y-88	Not Detected	---------	3.35E-002
ZN-65	Not Detected	---------	1.07E-001
ZR-95	Not Detected	---------	6.10E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/24/01 2:38:59 PM

Analyzed by: JP Kenny 4-24-2001 Reviewed by: 4/25/01

ustomer : LAI/PERRY (6135/SMO)
ustomer Sample ID : 054896-004
ab Sample ID : 10065103

ample Description : TAV-BH-MW6-220-S
ample Quantity : 534.200 gram
ample Date/Time : 4/19/01 10:50:00 AM
cquire Start Date/Time : 4/24/01 12:58:29 PM
etector Name : LAB01
lapsed Live/Real Time : 6000 / 6002 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	8.83E-001	5.65E-001	5.75E-001
RA-226	1.77E+000	9.48E-001	5.55E-001
PB-214	6.73E-001	1.14E-001	7.72E-002
BI-214	5.77E-001	1.10E-001	7.90E-002
PB-210	Not Detected	---------	9.31E+000
TH-232	6.08E-001	3.19E-001	2.54E-001
RA-228	6.49E-001	2.21E-001	2.77E-001
AC-228	6.73E-001	1.74E-001	1.77E-001
TH-228	6.25E-001	2.79E-001	6.50E-001
RA-224	7.34E-001	2.05E-001	1.09E-001
PB-212	8.02E-001	8.10E-001	4.98E-002
BI-212	7.79E-001	3.99E-001	5.68E-001
TL-208	8.24E-001	1.50E-001	9.92E-002
U-235	Not Detected	---------	2.25E-001
TH-231	Not Detected	---------	8.78E+000
PA-231	Not Detected	---------	1.62E+000
TH-227	Not Detected	---------	3.86E-001
RA-223	Not Detected	---------	1.93E-001
RN-219	Not Detected	---------	4.38E-001
PB-211	Not Detected	---------	9.48E-001
TL-207	Not Detected	---------	1.70E+001
AM-241	Not Detected	---------	2.34E-001
PU-239	Not Detected	---------	4.18E+002
NP-237	Not Detected	---------	2.28E+000
PA-233	Not Detected	---------	7.11E-002
TH-229	Not Detected	---------	2.06E-001

Summary Report] - Sample ID: : 10065103

uclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
G-108m	Not Detected	---------	5.15E-002
G-110m	Not Detected	---------	4.05E-002
A-133	Not Detected	---------	5.14E-002
E-7	Not Detected	---------	3.19E-001
D-115	Not Detected	---------	3.83E-001
E-139	Not Detected	---------	2.95E-002
E-141	Not Detected	---------	5.44E-002
E-144	Not Detected	---------	2.28E-001
M-243	Not Detected	---------	1.97E-001
O-56	Not Detected	---------	4.74E-002
O-57	Not Detected	---------	2.99E-002
O-58	Not Detected	---------	4.22E-002
O-60	Not Detected	---------	4.86E-002
R-51	Not Detected	---------	3.03E-001
S-134	Not Detected	---------	5.55E-002
S-137	Not Detected	---------	4.55E-002
U-152	Not Detected	---------	8.89E-002
U-154	Not Detected	---------	2.46E-001
U-155	Not Detected	---------	1.35E-001
E-59	Not Detected	---------	1.10E-001
D-153	Not Detected	---------	8.00E-002
G-203	Not Detected	---------	3.85E-002
I-131	Not Detected	---------	5.36E-002
R-192	Not Detected	---------	3.32E-002
K-40	1.81E+001	2.55E+000	4.49E-001
N-52	Not Detected	---------	6.84E-002
N-54	Not Detected	---------	4.55E-002
O-99	Not Detected	---------	1.16E+000
A-22	Not Detected	---------	5.90E-002
A-24	Not Detected	---------	1.40E+001
D-147	Not Detected	---------	3.52E-001
I-57	Not Detected	---------	7.26E-001
U-103	Not Detected	---------	3.99E-002
U-106	Not Detected	---------	3.59E-001
B-122	Not Detected	---------	1.85E-001
B-124	Not Detected	---------	4.12E-002
B-125	Not Detected	---------	1.04E-001
N-113	Not Detected	---------	4.68E-002
R-85	Not Detected	---------	4.82E-002
A-182	Not Detected	---------	2.18E-001
A-183	Not Detected	---------	3.96E-001
L-201	Not Detected	---------	3.39E-001
-88	Not Detected	---------	4.28E-002
N-65	Not Detected	---------	1.44E-001
R-95	Not Detected	---------	8.52E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/24/01 4:21:38 PM

Analyzed by: JP Kime 4-25-2001 Reviewed by: 4/25/01

ustomer : LAI/PERRY (6135/SMO)
ustomer Sample ID : 054897-004
ab Sample ID : 10065104

ample Description : TAV-BH-MW6-240-S
ample Quantity : 831.300 gram
ample Date/Time : 4/19/01 1:30:00 PM
cquire Start Date/Time : 4/24/01 2:41:04 PM
etector Name : LAB01
lapsed Live/Real Time : 6000 / 6002 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	4.26E-001
RA-226	1.20E+000	4.37E-001	6.08E-001
PB-214	5.19E-001	8.55E-002	5.52E-002
BI-214	5.31E-001	9.08E-002	4.73E-002
PB-210	Not Detected	---------	6.72E+000
TH-232	4.35E-001	2.25E-001	1.72E-001
RA-228	4.15E-001	1.94E-001	1.30E-001
AC-228	Not Detected	---------	1.69E-001
TH-228	3.85E-001	1.58E-001	3.35E-001
RA-224	4.35E-001	1.22E-001	5.85E-002
PB-212	4.28E-001	9.12E-002	3.16E-002
BI-212	4.61E-001	2.28E-001	3.17E-001
TL-208	4.05E-001	8.55E-002	7.77E-002
U-235	Not Detected	---------	1.59E-001
TH-231	Not Detected	---------	6.05E+000
PA-231	Not Detected	---------	1.06E+000
TH-227	Not Detected	---------	2.33E-001
RA-223	Not Detected	---------	1.32E-001
RN-219	Not Detected	---------	2.98E-001
PB-211	Not Detected	---------	6.69E-001
TL-207	Not Detected	---------	1.29E+001
AM-241	Not Detected	---------	1.61E-001
PU-239	Not Detected	---------	2.85E+002
NP-237	Not Detected	---------	1.58E+000
PA-233	Not Detected	---------	4.84E-002
TH-229	Not Detected	---------	1.34E-001

[Summary Report] - Sample ID: : 10065104

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.21E-002
AG-110m	Not Detected	---------	2.78E-002
BA-133	Not Detected	---------	3.67E-002
BE-7	Not Detected	---------	2.28E-001
CD-115	Not Detected	---------	2.52E-001
CE-139	Not Detected	---------	2.02E-002
CE-141	Not Detected	---------	3.87E-002
CE-144	Not Detected	---------	1.59E-001
CM-243	Not Detected	---------	1.30E-001
CO-56	Not Detected	---------	3.11E-002
CO-57	Not Detected	---------	2.10E-002
CO-58	Not Detected	---------	3.07E-002
CO-60	Not Detected	---------	3.71E-002
CR-51	Not Detected	---------	2.16E-001
CS-134	Not Detected	---------	3.97E-002
CS-137	Not Detected	---------	2.83E-002
EU-152	Not Detected	---------	6.32E-002
EU-154	Not Detected	---------	1.50E-001
EU-155	Not Detected	---------	9.52E-002
FE-59	Not Detected	---------	6.92E-002
GD-153	Not Detected	---------	5.50E-002
HG-203	Not Detected	---------	2.55E-002
I-131	Not Detected	---------	3.50E-002
IR-192	Not Detected	---------	2.39E-002
K-40	1.42E+001	1.97E+000	3.04E-001
MN-52	Not Detected	---------	4.85E-002
MN-54	Not Detected	---------	3.23E-002
MO-99	Not Detected	---------	7.37E-001
NA-22	Not Detected	---------	4.27E-002
NA-24	Not Detected	---------	8.24E+000
ND-147	Not Detected	---------	2.26E-001
NI-57	Not Detected	---------	5.23E-001
RU-103	Not Detected	---------	2.64E-002
RU-106	Not Detected	---------	2.40E-001
SB-122	Not Detected	---------	1.22E-001
SB-124	Not Detected	---------	2.60E-002
SB-125	Not Detected	---------	6.73E-002
SN-113	Not Detected	---------	3.16E-002
SR-85	Not Detected	---------	3.22E-002
TA-182	Not Detected	---------	1.60E-001
TA-183	Not Detected	---------	2.76E-001
TL-201	Not Detected	---------	2.33E-001
Y-88	Not Detected	---------	2.67E-002
ZN-65	Not Detected	---------	1.06E-001
ZR-95	Not Detected	---------	5.22E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/24/01 6:04:13 PM

Analyzed by: JPK 4-25-2001 Reviewed by: 4/25/01

ustomer : LAI/PERRY (6135/SMO)
ustomer Sample ID : 054898-004
ab Sample ID : 10065105

ample Description : TAV-BH-MW6-260-S
ample Quantity : 623.800 gram
ample Date/Time : 4/19/01 3:12:00 PM
cquire Start Date/Time : 4/24/01 4:23:42 PM
etector Name : LAB01
lapsed Live/Real Time : 6000 / 6002 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated

omments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	5.61E-001
RA-226	1.16E+000	5.53E-001	3.16E-001
PB-214	5.90E-001	1.01E-001	7.06E-002
BI-214	5.76E-001	1.03E-001	6.26E-002
PB-210	Not Detected	---------	8.42E+000
TH-232	6.28E-001	3.17E-001	2.24E-001
RA-228	7.25E-001	3.37E-001	1.83E-001
AC-228	5.73E-001	1.45E-001	1.42E-001
TH-228	7.50E-001	3.22E-001	4.87E-001
RA-224	7.25E-001	1.93E-001	8.88E-002
PB-212	Not Detected	---------	4.31E-002
BI-212	7.72E-001	3.19E-001	4.21E-001
TL-208	5.77E-001	1.20E-001	1.08E-001
U-235	8.62E-002	1.70E-001	2.00E-001
TH-231	Not Detected	---------	7.36E+000
PA-231	Not Detected	---------	1.42E+000
TH-227	Not Detected	---------	3.38E-001
RA-223	Not Detected	---------	1.66E-001
RN-219	Not Detected	---------	3.87E-001
PB-211	Not Detected	---------	8.66E-001
TL-207	Not Detected	---------	1.67E+001
AM-241	Not Detected	---------	2.01E-001
PU-239	Not Detected	---------	3.76E+002
NP-237	Not Detected	---------	2.03E+000
PA-233	Not Detected	---------	5.68E-002
TH-229	Not Detected	---------	1.74E-001

Summary Report] - Sample ID: : 10065105

uclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
G-108m	Not Detected	---------	4.49E-002
G-110m	Not Detected	---------	3.29E-002
A-133	Not Detected	---------	4.57E-002
E-7	Not Detected	---------	2.90E-001
D-115	Not Detected	---------	3.41E-001
E-139	Not Detected	---------	2.49E-002
E-141	Not Detected	---------	4.87E-002
E-144	Not Detected	---------	1.96E-001
M-243	Not Detected	---------	1.64E-001
O-56	Not Detected	---------	3.96E-002
O-57	Not Detected	---------	2.47E-002
O-58	Not Detected	---------	3.88E-002
O-60	Not Detected	---------	4.05E-002
R-51	Not Detected	---------	2.76E-001
S-134	Not Detected	---------	5.08E-002
S-137	Not Detected	---------	3.49E-002
U-152	Not Detected	---------	7.42E-002
U-154	Not Detected	---------	2.13E-001
U-155	Not Detected	---------	1.19E-001
E-59	Not Detected	---------	9.04E-002
D-153	Not Detected	---------	7.10E-002
G-203	Not Detected	---------	3.20E-002
I-131	Not Detected	---------	4.44E-002
R-192	Not Detected	---------	2.93E-002
K-40	1.51E+001	2.14E+000	3.71E-001
MN-52	Not Detected	---------	7.35E-002
N-54	Not Detected	---------	4.24E-002
MO-99	Not Detected	---------	9.07E-001
A-22	Not Detected	---------	4.99E-002
A-24	Not Detected	---------	1.01E+001
D-147	Not Detected	---------	3.10E-001
I-57	Not Detected	---------	6.35E-001
-103	Not Detected	---------	3.33E-002
U-106	Not Detected	---------	3.38E-001
B-122	Not Detected	---------	1.54E-001
SB-124	Not Detected	---------	3.57E-002
SB-125	Not Detected	---------	8.94E-002
SN-113	Not Detected	---------	3.97E-002
R-85	Not Detected	---------	4.19E-002
TA-182	Not Detected	---------	1.89E-001
TA-183	Not Detected	---------	3.46E-001
TL-201	Not Detected	---------	2.90E-001
Y-88	Not Detected	---------	3.10E-002
ZN-65	Not Detected	---------	1.22E-001
ZR-95	Not Detected	---------	7.31E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/24/01 7:46:51 PM

Analyzed by: JP Kinney 4-25-2001 Reviewed by: 4/25/01

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : 054899-004
Lab Sample ID : 10065106

Sample Description : TAV-BH-MW6-280-S
Sample Quantity : 698.400 gram
Sample Date/Time : 4/19/01 5:00:00 PM
Acquire Start Date/Time : 4/24/01 6:06:21 PM
Detector Name : LAB01
Elapsed Live/Real Time : 6000 / 6002 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	4.29E-001	4.14E-001	4.52E-001
RA-226	1.39E-000	5.22E-001	7.32E-001
PB-214	6.80E-001	1.07E-001	5.74E-002
BI-214	5.91E-001	1.02E-001	5.45E-002
PB-210	Not Detected	---------	7.67E+000
TH-232	4.46E-001	2.43E-001	2.13E-001
RA-228	6.51E-001	2.86E-001	1.65E-001
AC-228	5.61E-001	1.26E-001	9.97E-002
TH-228	Not Detected	---------	4.36E-001
RA-224	7.12E-001	1.85E-001	8.45E-002
PB-212	Not Detected	---------	3.72E-002
BI-212	7.27E-001	2.84E-001	3.64E-001
TL-208	5.43E-001	1.07E-001	8.65E-002
U-235	2.02E-001	1.58E-001	1.89E-001
TH-231	Not Detected	---------	6.79E+000
PA-231	Not Detected	---------	1.23E+000
TH-227	Not Detected	---------	2.89E-001
RN-223	Not Detected	---------	1.51E-001
RN-219	Not Detected	---------	3.55E-001
PB-211	Not Detected	---------	8.04E-001
TL-207	Not Detected	---------	1.44E+001
AM-241	Not Detected	---------	1.84E-001
PU-239	Not Detected	---------	3.33E+002
NP-237	Not Detected	---------	1.85E+000
PA-233	Not Detected	---------	5.45E-002
TH-229	Not Detected	---------	1.50E-001

Summary Report] - Sample ID: : 10065106

uclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
G-108m	Not Detected	---------	3.95E-002
G-110m	Not Detected	---------	3.14E-002
A-133	Not Detected	---------	4.19E-002
E-7	Not Detected	---------	2.54E-001
D-115	Not Detected	---------	3.01E-001
E-139	Not Detected	---------	2.29E-002
E-141	Not Detected	---------	4.48E-002
E-144	Not Detected	---------	1.80E-001
M-243	Not Detected	---------	1.50E-001
O-56	Not Detected	---------	3.46E-002
O-57	Not Detected	---------	2.28E-002
O-58	Not Detected	---------	3.64E-002
O-60	Not Detected	---------	3.91E-002
R-51	Not Detected	---------	2.43E-001
S-134	Not Detected	---------	4.66E-002
S-137	Not Detected	---------	3.34E-002
U-152	Not Detected	---------	6.74E-002
U-154	Not Detected	---------	1.84E-001
U-155	Not Detected	---------	1.09E-001
E-59	Not Detected	---------	7.17E-002
D-153	Not Detected	---------	6.05E-002
G-203	Not Detected	---------	2.98E-002
I-131	Not Detected	---------	4.03E-002
R-192	Not Detected	---------	2.69E-002
K-40	1.32E+001	1.86E+000	2.89E-001
MN-52	Not Detected	---------	6.08E-002
MN-54	Not Detected	---------	3.25E-002
MO-99	Not Detected	---------	8.64E-001
NA-22	Not Detected	---------	4.49E-002
NA-24	Not Detected	---------	9.96E+000
ND-147	Not Detected	---------	2.56E-001
NI-57	Not Detected	---------	5.77E-001
RU-103	Not Detected	---------	2.96E-002
RU-106	Not Detected	---------	2.69E-001
SB-122	Not Detected	---------	1.44E-001
SB-124	Not Detected	---------	3.17E-002
SB-125	Not Detected	---------	7.97E-002
SN-113	Not Detected	---------	3.60E-002
SR-85	Not Detected	---------	3.76E-002
TA-182	Not Detected	---------	1.72E-001
TA-183	Not Detected	---------	3.12E-001
TL-201	Not Detected	---------	2.73E-001
Y-88	Not Detected	---------	2.65E-002
ZN-65	Not Detected	---------	1.11E-001
ZR-95	Not Detected	---------	6.45E-002

```
*****************************************************************
                Sandia National Laboratories                    *
     Radiation Protection Sample Diagnostics Program [806 Laboratory]  *
                     4/25/01  6:45:04 AM                        *
*****************************************************************
                                                                *
 Analyzed by: JP Kane 4-25-2001     Reviewed by: 4/25/01        *
*****************************************************************
ustomer                  : LAI/PERRY (6135/SMO)
ustomer Sample ID        : LAB CONTROL SAMPLE USING CG134
ab Sample ID             : 10065107

ample Description        : MIXED_GAMMA_STANDARD_CG134
ample Quantity           :     1.000  Each
ample Date/Time          : 11/01/90  12:00:00 PM
cquire Start Date/Time   :  4/25/01   6:05:56 AM
etector Name             : LAB01
lapsed Live/Real Time    :    600 /    604 seconds

omments:
*****************************************************************
```

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	2.58E+003
RA-226	Not Detected	---------	5.31E+003
PB-214	Not Detected	---------	6.74E+002
BI-214	Not Detected	---------	6.24E+002
PB-210	Not Detected	---------	7.63E+004
TH-232	Not Detected	---------	2.05E+003
RA-228	Not Detected	---------	2.58E+003
AC-228	Not Detected	---------	1.55E+003
TH-228	Not Detected	---------	2.91E+005
RA-224	Not Detected	---------	1.26E+004
PB-212	Not Detected	---------	1.85E+004
BI-212	Not Detected	---------	1.78E+005
TL-208	Not Detected	---------	4.24E+004
U-235	Not Detected	---------	1.31E+003
TH-231	Not Detected	---------	4.19E+004
PA-231	Not Detected	---------	1.27E+004
TH-227	Not Detected	---------	2.29E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	6.00E+003
PB-211	Not Detected	---------	1.39E+004
TL-207	Not Detected	---------	2.35E+005
AM-241	8.77E+004	1.26E+004	1.83E+003
PU-239	Not Detected	---------	2.32E+006
NP-237	Not Detected	---------	1.27E+004
PA-233	Not Detected	---------	5.89E+002
TH-229	Not Detected	---------	1.06E+003

[Summary Report] - Sample ID: : 10065107

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	3.18E+002
AG-110m	Not Detected	---------	7.43E+007
BA-133	Not Detected	---------	8.27E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.20E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.44E+007
CM-243	Not Detected	---------	1.88E+003
CO-56	Not Detected	---------	3.24E+017
CO-57	Not Detected	---------	2.90E+006
CO-58	Not Detected	---------	6.04E+018
CO-60	7.94E+004	1.05E+004	9.21E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	9.92E+003
CS-137	6.89E-004	8.89E+003	4.28E+002
EU-152	Not Detected	---------	8.64E+002
EU-154	Not Detected	---------	3.23E+003
EU-155	Not Detected	---------	3.46E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	2.48E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.10E+018
K-40	Not Detected	---------	1.53E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.76E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	3.26E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.84E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	4.01E+021
SB-125	Not Detected	---------	1.60E+004
SN-113	Not Detected	---------	4.43E+012
SR-85	Not Detected	---------	2.25E+020
TA-182	Not Detected	---------	1.24E+013
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	9.10E+012
ZN-65	Not Detected	---------	4.67E+007
ZR-95	Not Detected	---------	5.27E+020

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

```
eport Date          :  4/25/01  6:16:13 AM
A File              : C:\GENIE2K\CAMFILES\LCS1.QAF
nalyst              : KICHAVE
ample ID            : 10065106
ample Quantity      :      1.00 Each
ample Date          : 11/01/90 12:00:00 PM
easurement Date     :  4/25/01  6:05:56 AM
lapsed Live Time    :       600 seconds
lapsed Real Time    :       604 seconds
```

arameter	Mean	1S Error	New Value	< LU	SD	UD	BS >
M-241 ACTIVITY	8.509E-002	2.659E-003	8.766E-002	<	:	:	: >
S-137 Activity	6.832E-002	1.243E-003	6.886E-002	<	:	:	: >
O-60 Activity	7.654E-002	2.533E-003	7.902E-002	<	:	:	: >

```
lags 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: JPKichave 4-25-2001

ANALYSIS REQUEST AND CHAIN OF CUSTODY

< 2nCi/g MWE 9/25/01
No H-3 concerns per general

Internal Lab

Page 1 of 2

Batch No. 100652 SAR/WR No.

AR/COC 604437

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped: 4-23-01 SMO USE	Logged By:		☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No. HC	Project/Task No.:	7219.01.05	☐ Waste Characterization
Project Name:	TA-V Well Borehole	Lab Contact: R Reese 505-844-7683	SMO Authorization:		-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination: RPSD	Location: N/A	Tech Area: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone: D Salmi 505-844-3110	Building: N/A	Room: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab
					-This COC Number Releases COC No(s).: 604435 604436

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
8 054901-004	TAV-BH-MW6-320-S	320	TAV	042001 1004	S	M	500 ml	None	G	SA	Gamma Spec LAB 02
01				625.19							
0 054902-004	TAV-BH-MW6-340-S	340	TAV	042001 1159	S	M	500 ml	None	G	SA	Gamma Spec
02				629.59							
0 054903-004	TAV-BH-MW6-360-S	360	TAV	042001 1447	S	M	500 ml	None	G	SA	Gamma Spec
03				564.59							
1 054906-004	TAV-BH-MW6-360-DU	380	TAV	042001 1447	S	M	500 ml	None	G	DU	Gamma Spec
04				485.59							

RMMA	☑ Yes ☐ No Ref. No.	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	
Turnaround Time	☑ Normal ☐ Rush	Entered by:	

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Required Report Date QC inits.

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN FOR BACKGROUND LEVEL

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez	[signature]	[illegible]	Weston/6135/845-3267
	G Quintana	[signature]	[illegible]	IT/6135/284-3309
	W Gibson	[signature]	[illegible]	MDM/6133/845-3267

Please list as separate report.

1. Relinquished by [signature]	Org 6135	Date 4/24/01	Time 1345	4 Relinquished by	Org.	Date	Time
1. Received by [signature]	Org 6132	Date 4/24/01	Time 1345	4. Received by	Org.	Date	Time
2. Relinquished by [signature]	Org 6132	Date 4/24/01	Time 1605	5 Relinquished by	Org.	Date	Time
2. Received by [signature]	Org 7132	Date 4/24/01	Time 1605	5. Received by	Org.	Date	Time
3 Relinquished by [signature]	Org 7132	Date 4/25/01	Time 0840	6 Relinquished by	Org.	Date	Time
3. Received by [signature]	Org. 1132	Date 4/25/01	Time 0840	6. Received by	Org.	Date	Time

ON-SITE LABORATORY

Analysis Request And Chain Of Custody (Continuation)

AR/COC- 60443

Sample No -Fraction / RPSD No -Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No / Sample Mass	Date/Time Sample Collected / Sample Quantity	Reference COV (available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054904 004 05	TAV-BH MW6-380-S	380	TAV	01/001 1614 692.79	S	M	500 ml	None	G	SA	Gamma Spec. LAB 02-
054905 004 06	TAV-BH MW6-400 S	400	TAV	01/001 1627 617.39	S	M	500 ml	None		SA	Gamma Spec.
LCS 07											

Abnormal Conditions on Receipt

LAB USE

Recipient Initials _____

```
*****************************************************************************
*                      Sandia National Laboratories                         *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/24/01  9:33:17 AM                                *
*****************************************************************************
*                                                                           *
* Analyzed by: JP Kline 4-24-2001   Reviewed by: [illegible] 4/25/01        *
*****************************************************************************
```

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : 054901-004
Lab Sample ID : 10065201

Sample Description : TAV-BH-MW6-320-S
Sample Quantity : 625.100 gram
Sample Date/Time : 4/20/01 10:04:00 AM
Acquire Start Date/Time : 4/24/01 7:52:56 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Comments:

*****

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.40E-001
RA-226	1.12E-000	5.90E-001	8.92E-001
PB-214	6.00E-001	9.38E-002	4.94E-002
BI-214	5.71E-001	1.01E-001	6.96E-002
PB-210	Not Detected	---------	3.41E+001
TH-232	6.97E-001	3.34E-001	1.88E-001
RA-228	7.85E-001	2.75E-001	1.41E-001
AC-228	7.71E-001	1.49E-001	9.42E-002
TH-228	6.53E-001	3.83E-001	5.74E-001
RA-224	6.79E-001	2.01E-001	8.52E-002
PB-212	7.58E-001	1.94E-001	3.94E-002
BI-212	7.18E-001	2.48E-001	3.07E-001
TL-208	6.86E-001	1.22E-001	9.10E-002
U 235	Not Detected	---------	2.12E-001
TH-231	Not Detected	---------	1.18E+001
PA-231	Not Detected	---------	1.31E+000
TH-227	Not Detected	---------	3.58E-001
RN-223	Not Detected	---------	2.33E-001
RN-219	Not Detected	---------	3.49E-001
PB-211	Not Detected	---------	7.73E-001
TL-207	Not Detected	---------	1.25E+001
AM-241	Not Detected	---------	4.68E-001
PU-239	Not Detected	---------	4.01E+002
NP-237	Not Detected	---------	2.17E+000
PA-233	Not Detected	---------	5.19E-002
TH-229	Not Detected	---------	2.40E-001

[Summary Report] - Sample ID: : 10065201

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.42E-002
AG-110m	Not Detected	---------	2.81E-002
BA-133	Not Detected	---------	4.49E-002
BE-7	Not Detected	---------	2.35E-001
CD-115	Not Detected	---------	2.10E-001
CE-139	Not Detected	---------	2.67E-002
CE-141	Not Detected	---------	5.04E-002
CE-144	Not Detected	---------	2.12E-001
CM-243	Not Detected	---------	1.60E-001
CO-56	Not Detected	---------	3.10E-002
CO-57	Not Detected	---------	2.84E-002
CO-58	Not Detected	---------	3.12E-002
CO-60	Not Detected	---------	3.31E-002
CR-51	Not Detected	---------	2.36E-001
CS-134	Not Detected	---------	3.83E-002
CS-137	Not Detected	---------	3.17E-002
EU-152	Not Detected	---------	8.47E-002
EU-154	Not Detected	---------	1.64E-001
EU-155	Not Detected	---------	1.31E-001
FE-59	Not Detected	---------	7.33E-002
GD-153	Not Detected	---------	1.02E-001
HG-203	Not Detected	---------	3.01E-002
I-131	Not Detected	---------	3.53E-002
IR-192	Not Detected	---------	2.53E-002
K-40	1.73E+001	2.35E+000	3.03E-001
MN-52	Not Detected	---------	4.01E-002
MN-54	Not Detected	---------	3.26E-002
MO-99	Not Detected	---------	5.71E-001
NA-22	Not Detected	---------	4.00E-002
NA-24	Not Detected	---------	2.36E+000
ND-147	Not Detected	---------	2.27E-001
NI-57	Not Detected	---------	1.57E-001
RU-103	Not Detected	---------	2.81E-002
RU-106	Not Detected	---------	2.59E-001
SB-122	Not Detected	---------	9.53E-002
SB-124	Not Detected	---------	2.74E-002
SB-125	Not Detected	---------	7.55E-002
SN-113	Not Detected	---------	3.59E-002
SR-85	Not Detected	---------	3.62E-002
TA-182	Not Detected	---------	1.43E-001
TA-183	Not Detected	---------	6.90E-001
TL-201	Not Detected	---------	4.22E-001
Y-88	Not Detected	---------	2.44E-002
ZN-65	Not Detected	---------	9.59E-002
ZR-95	Not Detected	---------	5.36E-002

```
*****************************************************************************
*                        Sandia National Laboratories                       *
*     Radiation Protection Sample Diagnostics Program [806 Laboratory]      *
*                          4/24/01 11:15:28 AM                              *
*****************************************************************************
*                                                                           *
* Analyzed by: JP Kane 4-24-2001 - Reviewed by: 4/25/01                     *
*****************************************************************************
Customer                  : LAI/PERRY (6135/SMO)
Customer Sample ID        : 054902-004
Lab Sample ID             : 10065202

Sample Description        : TAV-BH-MW6-340-S
Sample Quantity           :   629.500  gram
Sample Date/Time          :  4/20/01  11:59:00 AM
Acquire Start Date/Time   :  4/24/01   9:35:01 AM
Detector Name             : LAB02
Elapsed Live/Real Time    :   6000 /   6002 seconds

Comments:
*****************************************************************************
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Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.22E-001
RA-226	1.41E+000	4.97E-001	6.86E-001
PB-214	6.24E-001	1.05E-001	7.94E-002
BI-214	6.13E-001	1.11E-001	8.58E-002
PB-210	Not Detected	---------	3.29E+001
TH-232	6.50E-001	3.08E-001	1.52E-001
RA-228	7.05E-001	2.65E-001	1.35E-001
AC-228	6.73E-001	1.41E-001	1.14E-001
TH-228	1.09E+000	5.32E-001	7.83E-001
RA-224	7.89E-001	1.82E-001	6.63E-002
PB-212	7.06E-001	3.18E-001	3.67E-002
BI-212	7.97E-001	2.77E-001	3.52E-001
TL-208	6.72E-001	1.14E-001	6.67E-002
U-235	Not Detected	---------	2.10E-001
TH-231	Not Detected	---------	1.16E+001
PA-231	Not Detected	---------	1.23E+000
TH-227	Not Detected	---------	3.46E-001
RA-223	Not Detected	---------	2.30E-001
RN-219	Not Detected	---------	3.26E-001
PB-211	Not Detected	---------	7.35E-001
TL-207	Not Detected	---------	1.23E+001
AM-241	Not Detected	---------	4.80E-001
PU-239	Not Detected	---------	3.83E+002
NP-237	Not Detected	---------	2.13E+000
PA-233	Not Detected	---------	5.25E-002
TH-229	Not Detected	---------	2.36E-001

[Summary Report] - Sample ID: : 10065202

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.27E-002
AG-110m	Not Detected	---------	2.71E-002
BA-133	Not Detected	---------	4.60E-002
BE-7	Not Detected	---------	2.12E-001
CD-115	Not Detected	---------	1.99E-001
CE-139	Not Detected	---------	2.56E-002
CE-141	Not Detected	---------	4.98E-002
CE-144	Not Detected	---------	2.09E-001
CM-243	Not Detected	---------	1.54E-001
CO-56	Not Detected	---------	2.98E-002
CO-57	Not Detected	---------	2.71E-002
CO-58	Not Detected	---------	3.08E-002
CO-60	Not Detected	---------	3.09E-002
CR-51	Not Detected	---------	2.22E-001
CS-134	Not Detected	---------	3.84E-002
CS-137	Not Detected	---------	2.84E-002
EU-152	Not Detected	---------	8.09E-002
EU-154	Not Detected	---------	1.58E-001
EU-155	Not Detected	---------	1.29E-001
FE-59	Not Detected	---------	6.72E-002
GD-153	Not Detected	---------	9.75E-002
HG-203	Not Detected	---------	2.86E-002
I-131	Not Detected	---------	3.40E-002
IR-192	Not Detected	---------	2.51E-002
K-40	1.30E+001	1.79E+000	2.92E-001
MN-52	Not Detected	---------	4.26E-002
MN-54	Not Detected	---------	3.02E-002
MO-99	Not Detected	---------	5.22E-001
NA-22	Not Detected	---------	3.55E-002
NA-24	Not Detected	---------	2.29E+000
ND-147	Not Detected	---------	2.14E-001
NI-57	Not Detected	---------	1.48E-001
RU-103	Not Detected	---------	2.69E-002
RU-106	Not Detected	---------	2.45E-001
SB-122	Not Detected	---------	9.39E-002
SB-124	Not Detected	---------	2.64E-002
SB-125	Not Detected	---------	7.34E-002
SN-113	Not Detected	---------	3.41E-002
SR-85	Not Detected	---------	3.38E-002
TA-182	Not Detected	---------	1.40E-001
TA-183	Not Detected	---------	7.01E-001
TL-201	Not Detected	---------	4.00E-001
Y-88	Not Detected	---------	2.30E-002
ZN-65	Not Detected	---------	8.91E-002
ZR-95	Not Detected	---------	5.14E-002

```
*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                      4/24/01 12:57:46 PM                                  *
*****************************************************************************
*                                                                           *
* Analyzed by: JP Kline 4-24-2001 Reviewed by: 4/25/01                      *
*****************************************************************************
Customer                  : LAI/PERRY (6135/SMO)
Customer Sample ID        : 054903-004
Lab Sample ID             : 10065203

Sample Description        : TAV-BH-MW6-360-S
Sample Quantity           :   564.500  gram
Sample Date/Time          :  4/20/01   2:47:00 PM
Acquire Start Date/Time   :  4/24/01  11:17:16 AM
Detector Name             : LAB02
Elapsed Live/Real Time    :   6000 /   6002 seconds

Comments:
*****************************************************************************
```

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.68E-001
RA-226	1.42E-000	5.12E-001	7.07E-001
PB-214	5.97E-001	9.66E-002	5.92E-002
BI-214	5.95E-001	1.09E-001	8.59E-002
PB-210	Not Detected	---------	3.39E+001
TH-232	7.40E-001	3.49E-001	1.65E-001
RA-228	6.88E-001	3.48E-001	1.42E-001
AC-228	6.91E-001	1.42E-001	1.04E-001
TH-228	7.20E-001	3.95E-001	5.83E-001
RA-224	7.37E-001	1.77E-001	7.32E-002
PB-212	7.48E-001	1.49E-001	3.85E-002
BI-212	7.08E-001	2.60E-001	3.28E-001
TL-208	6.50E-001	1.15E-001	7.66E-002
U-235	1.29E-001	1.79E-001	2.30E-001
TH-231	Not Detected	---------	1.22E+001
PA-231	Not Detected	---------	1.30E+000
TH-227	Not Detected	---------	3.73E-001
RA-223	Not Detected	---------	2.42E-001
RN-219	Not Detected	---------	3.59E-001
PB-211	Not Detected	---------	8.06E-001
TL-207	Not Detected	---------	1.35E+001
AM-241	Not Detected	---------	4.96E-001
PU-239	Not Detected	---------	4.00E+002
NP-237	Not Detected	---------	2.21E+000
PA-233	Not Detected	---------	5.28E-002
TH-229	Not Detected	---------	2.45E-001

[Summary Report] - Sample ID: : 10065203

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.74E-002
AG-110m	Not Detected	---------	2.97E-002
BA-133	Not Detected	---------	4.70E-002
BE-7	Not Detected	---------	2.36E-001
CD-115	Not Detected	---------	2.18E-001
CE-139	Not Detected	---------	2.77E-002
CE-141	Not Detected	---------	5.31E-002
CE-144	Not Detected	---------	2.15E-001
CM-243	Not Detected	---------	1.67E-001
CO-56	Not Detected	---------	3.22E-002
CO-57	Not Detected	---------	2.95E-002
CO-58	Not Detected	---------	3.08E-002
CO-60	Not Detected	---------	3.77E-002
CR-51	Not Detected	---------	2.46E-001
CS-134	Not Detected	---------	4.14E-002
CS-137	Not Detected	---------	2.98E-002
EU-152	Not Detected	---------	8.87E-002
EU-154	Not Detected	---------	1.77E-001
EU-155	Not Detected	---------	1.35E-001
FE-59	Not Detected	---------	6.73E-002
GD-153	Not Detected	---------	9.76E-002
HG-203	Not Detected	---------	3.08E-002
I-131	Not Detected	---------	3.58E-002
IR-192	Not Detected	---------	2.59E-002
K-40	1.57E+001	2.16E+000	3.38E-001
MN-53	Not Detected	---------	4.82E-002
MN-54	Not Detected	---------	3.39E-002
MO-99	Not Detected	---------	5.99E-001
NA-22	Not Detected	---------	3.95E-002
NA-24	Not Detected	---------	2.40E+000
ND-147	Not Detected	---------	2.22E-001
NI-57	Not Detected	---------	1.72E-001
RU-103	Not Detected	---------	2.78E-002
RU-106	Not Detected	---------	2.80E-001
SB-122	Not Detected	---------	1.07E-001
SB-124	Not Detected	---------	2.79E-002
SB-125	Not Detected	---------	8.13E-002
SN-113	Not Detected	---------	3.67E-002
SR-85	Not Detected	---------	3.65E-002
TA-182	Not Detected	---------	1.52E-001
TA-183	Not Detected	---------	7.18E-001
TL-201	Not Detected	---------	4.28E-001
Y-88	Not Detected	---------	2.73E-002
ZN-65	Not Detected	---------	9.91E-002
ZR-95	Not Detected	---------	5.15E-002

```
*****************************************************************************
*                      Sandia National Laboratories                         *
*     Radiation Protection Sample Diagnostics Program [806 Laboratory]       *
*                        4/24/01  2:39:51 PM                                 *
*****************************************************************************
*                                                                           *
* Analyzed by: JPKuse 4-24-2001  Reviewed by: 4/25/01                       *
*****************************************************************************
Customer                  : LAI/PERRY (6135/SMO)
Customer Sample ID        : 054906-004
Lab Sample ID             : 10065204

Sample Description        : TAV-BH-MW6-360-DU
Sample Quantity           :   485.500  gram
Sample Date/Time          :  4/20/01   2:47:00 PM
Acquire Start Date/Time   :  4/24/01  12:59:31 PM
Detector Name             : LAB02
Elapsed Live/Real Time    :   6000 /   6002 seconds

Comments:
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Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	8.63E-001
RA-226	1.46E-000	5.29E-001	7.27E-001
PB-214	7.15E-001	1.15E-001	6.84E-002
BI-214	6.46E-001	1.15E-001	7.59E-002
PB-210	Not Detected	---------	3.82E+001
TH-232	5.50E-001	2.88E-001	2.30E-001
RA-228	8.13E-001	3.13E-001	1.58E-001
AC-228	8.99E-001	1.86E-001	1.45E-001
TH-228	1.08E+000	6.11E-001	9.17E-001
RA-224	7.97E-001	1.95E-001	9.13E-002
PB-212	8.26E-001	1.60E-001	4.24E-002
BI-212	7.99E-001	3.43E-001	4.70E-001
TL-208	7.62E-001	1.46E-001	1.27E-001
U-235	Not Detected	---------	2.56E-001
TH-231	Not Detected	---------	1.37E+001
PA-231	Not Detected	---------	1.51E+000
TH-227	Not Detected	---------	4.26E-001
RA-223	Not Detected	---------	2.78E-001
RN-219	Not Detected	---------	4.25E-001
PB-211	Not Detected	---------	9.38E-001
TL-207	Not Detected	---------	1.61E+001
AM-241	Not Detected	---------	5.61E-001
PU-239	Not Detected	---------	4.65E+002
NP-237	Not Detected	---------	2.57E+000
PA-233	Not Detected	---------	6.11E-002
TH-229	Not Detected	---------	2.71E-001

[Summary Report] - Sample ID: : 10065204

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	4.29E-002
AG-110m	Not Detected	---------	3.28E-002
BA-133	Not Detected	---------	5.47E-002
BE-7	Not Detected	---------	2.87E-001
CD-115	Not Detected	---------	2.38E-001
CE-139	Not Detected	---------	3.08E-002
CE-141	Not Detected	---------	6.02E-002
CE-144	Not Detected	---------	2.46E-001
CM-243	Not Detected	---------	1.87E-001
CO-56	Not Detected	---------	3.77E-002
CO-57	Not Detected	---------	3.30E-002
CO-58	Not Detected	---------	3.59E-002
CO-60	Not Detected	---------	3.99E-002
CR-51	Not Detected	---------	2.71E-001
CS-134	Not Detected	---------	4.63E-002
CS-137	Not Detected	---------	3.49E-002
EU-152	Not Detected	---------	9.92E-002
EU-154	Not Detected	---------	2.07E-001
EU-155	Not Detected	---------	1.52E-001
FE-59	Not Detected	---------	8.15E-002
GD-153	Not Detected	---------	1.12E-001
HG-203	Not Detected	---------	3.62E-002
I-131	Not Detected	---------	4.03E-002
IR-192	Not Detected	---------	3.05E-002
K-40	1.81E+001	2.48E+000	3.77E-001
MN-52	Not Detected	---------	4.77E-002
MN-54	Not Detected	---------	3.85E-002
MO-99	Not Detected	---------	6.67E-001
NA-22	Not Detected	---------	4.14E-002
NA-24	Not Detected	---------	2.96E+000
ND-147	Not Detected	---------	2.57E-001
NI-57	Not Detected	---------	3.20E-001
RU-103	Not Detected	---------	3.31E-002
RU-106	Not Detected	---------	3.15E-001
SB-122	Not Detected	---------	1.22E-001
SB-124	Not Detected	---------	3.12E-002
SB-125	Not Detected	---------	8.44E-002
SN-113	Not Detected	---------	3.93E-002
SR-85	Not Detected	---------	4.48E-002
TA-182	Not Detected	---------	1.74E-001
TA-183	Not Detected	---------	8.03E-001
TL-201	Not Detected	---------	4.90E-001
Y-88	Not Detected	---------	2.71E-002
ZN-65	Not Detected	---------	1.14E-001
ZR-95	Not Detected	---------	6.41E-002

```
*****************************************************************************
*                      Sandia National Laboratories                         *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/24/01  4:41:53 PM                                *
*****************************************************************************
*                                                                           *
* Analyzed by: JP Kunz 4-25-2001  Reviewed by: KG 4/25/01                   *
*****************************************************************************
Customer                  : LAI/PERRY (6135/SMO)
Customer Sample ID        : 054904-004
Lab Sample ID             : 10065205

Sample Description        : TAV-BH-MW6-380-S
Sample Quantity           :   692.700  gram
Sample Date/Time          :  4/20/01   4:44:00 PM
Acquire Start Date/Time   :  4/24/01   3:01:31 PM
Detector Name             : LAB02
Elapsed Live/Real Time    :   6000 /   6003 seconds

Comments:
*****************************************************************************
```

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.78E-001
RA-226	9.82E-001	4.67E-001	6.92E-001
PB-214	6.33E-001	1.00E-001	6.31E-002
BI-214	5.23E-001	8.98E-002	5.51E-002
PB-210	Not Detected	---------	3.08E+001
TH-232	6.11E-001	2.92E-001	1.61E-001
RA-228	7.10E-001	2.86E-001	1.25E-001
AC-228	7.25E-001	1.41E-001	9.50E-002
TH-228	9.78E-001	4.66E-001	6.82E-001
RA-224	6.84E-001	1.63E-001	8.40E-002
PB-212	6.45E-001	3.67E-001	3.46E-002
BI-212	7.85E-001	2.43E-001	2.87E-001
TL-208	6.20E-001	1.16E-001	9.93E-002
U-235	1.99E-001	1.61E-001	2.07E-001
TH-231	Not Detected	---------	1.12E+001
PA-231	Not Detected	---------	1.17E+000
TH-227	Not Detected	---------	3.19E-001
RA-223	Not Detected	---------	2.21E-001
RN-219	~~1.98E-001~~	~~2.68E-001~~	3.15E-001 NOT DETECTED KG 4/25/01
PB-211	Not Detected	---------	7.00E-001
TL-207	Not Detected	---------	1.18E+001
AM-241	Not Detected	---------	4.34E-001
PU-239	Not Detected	---------	3.66E+002
NP-237	Not Detected	---------	2.05E+000
PA-233	Not Detected	---------	4.83E-002
TH-229	Not Detected	---------	2.17E-001

[Summary Report] - Sample ID: : 10065205

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.13E-002
AG-110m	Not Detected	---------	2.52E-002
BA-133	Not Detected	---------	4.34E-002
BE-7	Not Detected	---------	2.10E-001
CD-115	Not Detected	---------	1.94E-001
CE-139	Not Detected	---------	2.42E-002
CE-141	Not Detected	---------	4.83E-002
CE-144	Not Detected	---------	2.00E-001
CM-243	Not Detected	---------	1.46E-001
CO-56	Not Detected	---------	2.91E-002
CO-57	Not Detected	---------	2.75E-002
CO-58	Not Detected	---------	2.78E-002
CO-60	Not Detected	---------	3.15E-002
CR-51	Not Detected	---------	2.09E-001
CS-134	Not Detected	---------	3.61E-002
CS-137	Not Detected	---------	2.79E-002
EU-152	Not Detected	---------	8.23E-002
EU-154	Not Detected	---------	1.53E-001
EU-155	Not Detected	---------	1.23E-001
FE-59	Not Detected	---------	6.35E-002
GD-153	Not Detected	---------	8.97E-002
HG-203	Not Detected	---------	2.75E-002
I-131	Not Detected	---------	3.29E-002
IR-192	Not Detected	---------	2.29E-002
K-40	1.61E+001	2.19E+000	3.10E-001
MN-52	Not Detected	---------	3.81E-002
MN-54	Not Detected	---------	1.48E-002
MO-99	Not Detected	---------	5.53E-001
NA-22	Not Detected	---------	3.53E-002
NA-24	Not Detected	---------	2.18E+000
ND-147	Not Detected	---------	2.11E-001
NI-57	Not Detected	---------	1.40E-001
RU-103	Not Detected	---------	2.55E-002
RU-106	Not Detected	---------	2.38E-001
SB-122	Not Detected	---------	9.09E-002
SB-124	Not Detected	---------	2.67E-002
SB-125	Not Detected	---------	6.97E-002
SN-113	Not Detected	---------	3.28E-002
SR-85	Not Detected	---------	3.35E-002
TA-182	Not Detected	---------	1.29E-001
TA-183	Not Detected	---------	6.31E-001
TL-201	Not Detected	---------	3.90E-001
Y-88	Not Detected	---------	2.39E-002
ZN-65	Not Detected	---------	8.57E-002
ZR-95	Not Detected	---------	5.06E-002

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*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/24/01  6:24:14 PM                                 *
*****************************************************************************
*                                                                           *
* Analyzed by: JP Kennel 4-25-2001 Reviewed by: [illegible] 4/25/01         *
*****************************************************************************
Customer                  : LAI/PERRY (6135/SMO)
Customer Sample ID        : 054905-004
Lab Sample ID             : 10065206

Sample Description        : TAV-BH-MW6-400-S
Sample Quantity           :   617.300  gram
Sample Date/Time          :  4/20/01   6:27:00 PM
Acquire Start Date/Time   :  4/24/01   4:43:36 PM
Detector Name             : LAB02
Elapsed Live/Real Time    :   6000 /   6002 seconds

Comments:
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Note: Ra-226 and U-235 gamma lines interfere. Either isotope may be over-estimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.08E-001
RA-226	1.13E+000	6.01E-001	9.08E-001
PB-214	6.02E-001	9.90E-002	6.87E-002
BI-214	5.51E-001	9.57E-002	5.99E-002
PB-210	Not Detected	---------	3.29E+001
TH-232	6.43E-001	3.34E-001	2.69E-001
RA-228	6.42E-001	2.72E-001	1.31E-001
AC-228	6.67E-001	1.45E-001	1.27E-001
TH-228	4.07E-001	4.90E-001	7.88E-001
RA-224	7.07E-001	1.70E-001	8.04E-002
PB-212	7.01E-001	1.41E-001	3.60E-002
BI-212	9.78E-001	3.26E-001	4.13E-001
TL-208	8.96E-001	1.11E-001	9.00E-002
U-235	Not Detected	---------	2.06E-001
TH-231	Not Detected	---------	1.14E+001
PA-231	Not Detected	---------	1.25E+000
TH-227	Not Detected	---------	3.45E-001
RA-223	Not Detected	---------	2.28E-001
RN-219	Not Detected	---------	3.29E-001
PB-211	Not Detected	---------	7.43E-001
TL-207	Not Detected	---------	1.12E+001
AM-241	Not Detected	---------	4.66E-001
PU-239	Not Detected	---------	4.00E+002
NP-237	Not Detected	---------	2.10E+000
PA-233	Not Detected	---------	4.88E-002
TH-229	Not Detected	---------	2.30E-001

[Summary Report] - Sample ID: : 10065206

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.28E-002
AG-110m	Not Detected	---------	2.54E-002
BA-133	Not Detected	---------	4.43E-002
BE-7	Not Detected	---------	2.27E-001
CD-115	Not Detected	---------	2.03E-001
CE-139	Not Detected	---------	2.48E-002
CE-141	Not Detected	---------	4.76E-002
CE-144	Not Detected	---------	2.12E-001
CM-243	Not Detected	---------	1.58E-001
CO-56	Not Detected	---------	3.06E-002
CO-57	Not Detected	---------	2.78E-002
CO-58	Not Detected	---------	2.89E-002
CO-60	Not Detected	---------	3.23E-002
CR-51	Not Detected	---------	2.20E-001
CS-134	Not Detected	---------	3.82E-002
CS-137	Not Detected	---------	2.79E-002
EU-152	Not Detected	---------	8.31E-002
EU-154	Not Detected	---------	1.57E-001
EU-155	Not Detected	---------	1.30E-001
FE-59	Not Detected	---------	6.07E-002
GD-153	Not Detected	---------	9.51E-002
HG-203	Not Detected	---------	2.96E-002
I-131	Not Detected	---------	3.54E-002
IR-192	Not Detected	---------	2.44E-002
K-40	1.40E+001	1.92E+000	2.79E-001
MN-52	Not Detected	---------	4.31E-002
MN-54	Not Detected	---------	3.13E-002
MO-99	Not Detected	---------	5.43E-001
NA-22	Not Detected	---------	3.73E-002
NA-24	Not Detected	---------	2.43E+000
ND-147	Not Detected	---------	2.17E-001
NI-57	Not Detected	---------	2.84E-001
RU-103	Not Detected	---------	2.58E-002
RU-106	Not Detected	---------	2.35E-001
SB-122	Not Detected	---------	9.87E-002
SB-124	Not Detected	---------	2.55E-002
SB-125	Not Detected	---------	7.00E-002
SN-113	Not Detected	---------	3.20E-002
SR-85	Not Detected	---------	3.42E-002
TA-182	Not Detected	---------	1.41E-001
TA-183	Not Detected	---------	6.83E-001
TL-201	Not Detected	---------	4.12E-001
Y-88	Not Detected	---------	2.37E-002
ZN-65	Not Detected	---------	9.31E-002
ZR-95	Not Detected	---------	4.76E-002

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*****************************************************************************
*                    Sandia National Laboratories                           *
*    Radiation Protection Sample Diagnostics Program [806 Laboratory]        *
*                        4/25/01  6:33:10 AM                                 *
*****************************************************************************
*                                                                           *
* Analyzed by: JP Kime 4-25-2001 Reviewed by: KS 4/25/01                    *
*****************************************************************************
Customer                  : LAI/PERRY (6135/SMO)
Customer Sample ID        : LAB CONTROL SAMPLE USING CG134
Lab Sample ID             : 10065207

Sample Description        : MIXED_GAMMA_STANDARD_CG134
Sample Quantity           :     1.000  Each
Sample Date/Time          : 11/01/90  12:00:00 PM
Acquire Start Date/Time   :  4/25/01   6:22:56 AM
Detector Name             : LAB02
Elapsed Live/Real Time    :    600 /    605 seconds

Comments:
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Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	4.16E+003
RA-226	Not Detected	---------	5.50E+003
PB-214	Not Detected	---------	6.08E+002
BI-214	Not Detected	---------	5.46E+002
PB-210	Not Detected	---------	2.52E+005
TH-232	Not Detected	---------	1.94E+003
RA-228	Not Detected	---------	2.08E+003
AC-228	Not Detected	---------	1.18E+003
TH-228	Not Detected	---------	2.70E+005
RA-224	Not Detected	---------	9.83E+003
PB-212	Not Detected	---------	2.10E+004
BI-212	Not Detected	---------	1.51E+005
TL-208	Not Detected	---------	3.54E+004
U-235	Not Detected	---------	1.54E+003
TH-231	Not Detected	---------	7.46E+004
PA-231	Not Detected	---------	1.31E+004
TH-227	Not Detected	---------	2.58E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	5.60E+003
PB-211	Not Detected	---------	1.25E+004
TL-207	Not Detected	---------	1.95E+005
AM-241	8.50E+004	1.36E+004	6.67E+003
PU-239	Not Detected	---------	2.75E+006
NP-237	Not Detected	---------	1.48E+004
PA-233	Not Detected	---------	5.49E+002
TH-229	Not Detected	---------	1.58E+003

[Summary Report] - Sample ID: : 10065207

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	2.64E+002
AG-110m	Not Detected	---------	6.52E+007
BA-133	Not Detected	---------	7.55E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.67E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.75E+007
CM-243	Not Detected	---------	1.89E+003
CO-56	Not Detected	---------	2.53E+017
CO-57	Not Detected	---------	3.63E+006
CO-58	Not Detected	---------	4.89E+018
CO-60	8.64E+004	1.12E+004	6.76E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	8.71E+003
CS-137	7.60E+004	9.82E+003	5.15E+002
EU-152	Not Detected	---------	1.07E+003
EU-154	Not Detected	---------	2.68E+003
EU-155	Not Detected	---------	4.26E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	3.87E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.05E+018
K-40	Not Detected	---------	1.18E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.42E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	2.80E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.42E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	3.54E+021
SB-125	Not Detected	---------	1.42E+004
SN-113	Not Detected	---------	4.12E+012
SR-85	Not Detected	---------	2.02E+020
TA-182	Not Detected	---------	9.05E+012
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	8.09E+012
ZN-65	Not Detected	---------	3.54E+007
ZR-95	Not Detected	---------	4.19E+020

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

Report Date : 4/25/01 6:33:13 AM
QA File : C:\GENIE2K\CAMFILES\LCS2.QAF
Analyst : KICHAVE
Sample ID : 10065207
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 4/25/01 6:22:56 AM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	< LU	SD	UD	BS >
AM-241 Activity	8.232E-002	3.560E-003	8.505E-002	<	:	:	: >
CS-137 Activity	7.184E-002	2.663E-003	7.597E-002	<	:	:	: >
CO-60 Activity	8.008E-002	3.000E-003	8.546E-002	<	:	:	: >

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

Reviewed by: JP Kirp 4-25-2001

ANALYSIS REQUEST AND CHAIN OF CUSTODY

RUSH 4/24 0930

Internal Lab

Page 1 of 1

Batch No. 100650

SAR/WR No.

AR/COC 604440

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	4-23-01 SMO USE	Logged By	☐ Characterization Only
Project/Task Manager:	Lai/Sanders	Carrier/Waybill No.	HC	Project/Task No.: 7219 01.05	☐ Waste Characterization
Project Name:	TA-V Well Borehole	Lab Contact:	R Reese 505-844-7683	SMO Authorization:	-RCRA Date =
Record Center Code:	ER/1306/DAT	Lab Destination:	RPSD	Location: N/A	-Send preliminary/copy report to:
Logbook Ref. No.:	ER 082	SMO Contact/Phone:	D Salmi 505-844-3110	Building: N/A Room: N/A	☑ Release to ERCL On-Site Lab
Service Order No.:	CFO 012-01				☑ Release to Off-Site Lab

-This COC Number Releases COC No(s).: 6044438 & 604439

Sample No.-Fraction / RPSD No.-Fraction	ER Sample ID or Sample Location Detail / RPSD Remarks/Aliquot Amounts	Beginning Depth (ft) / Screen CPM	ER Site No. / Sample Mass	Date/Time(hr) Collected / Sample Quantity	Reference LOV(available at SMO): Sample Matrix	Container Type	Container Volume	Preservative	Collection Method	Sample Type	Analysis Request
054907-004	TAV-BH-MW6-420-S	420	TAV	042101 0842	S	M	500ml	None	G	SA	
01				620g							Gamma Spec
054909-004	TAV-BH-MW6-460-S	460	TAV	042101 1154	S	M	500ml	None	G	SA	Gamma Spec
02			666.7g								
054910-004	TAV-BH-MW6-480-S	480	TAV	042101 1436	S	M	500ml	None	G	SA	Gamma Spec
03				717.7g							
054911-004	TAV-BH-MW6-500-S	500	TAV	042101 1649	S	M	500ml	None	G	SA	Gamma Spec
04				625.39							

RMMA	☑ Yes ☐ No Ref. No	Sample Tracking	Smo Use
Sample Disposal	☑ Return to Client ☐ Disposal by Lab	Date Entered(mm/dd/yy)	
Turnaround Time	☑ Normal ☐ Rush	Entered by:	

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Raw Data Package ☑ Yes ☐ No

Required Report Date | QC Inits.

*Please send report to:
M Sanders 284-2486 MS1089/Org 6135
mrsande@sandia.gov
RUN BACKGROUND PLEASE

Sample Team Members	Name	Signature	Init	Company/Organization/Phone/Cellular
	M Sanchez			Weston/6135/845-3267
	G Quintana			IT/6135/284-3309
	W Gibson			MDM/6133/845-3267

Please list as separate report.

1. Relinquished by		Org 6135	Date 4-23-01	Time 1330	4 Relinquished by		Org 06133	Date 4/24/01	Time 0926
1. Received by	SMO	Org 6137	Date 4/23/01	Time 1330	4 Received by		Org 6172	Date 4/24/01	Time 0926
2. Relinquished by	SMO	Org 6137	Date 4/23/01	Time 1600	5 Relinquished by		Org	Date	Time
2. Received by		Org 7132	Date 4/23/01	Time 1600	5 Received by		Org	Date	Time
3 Relinquished by		Org 7132	Date 4-24-01	Time 0837	6 Relinquished by		Org	Date	Time
3. Received by		Org 6135	Date 4-24-01	Time 0837	6 Received by		Org	Date	Time

ICS 05

Radiation Protection Sample Diagnostics Program (806 Laboratory)
4/23/01 5:21:15 PM

Analyzed by: 4/24/01 Reviewed by: 4-24-2001

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : 054907-004
Lab Sample ID : 10065001

Sample Description : TAV-BH-MW6-420-S
Sample Quantity : 620.000 gram
Sample Date/Time : 4/21/01 8:42:00 AM
Acquire Start Date/Time : 4/23/01 3:40:54 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.43E-001
RA-226	2.29E+000	7.66E-001	1.06E-000
PB-214	6.24E-001	9.85E-002	5.65E-002
BI-214	5.50E-001	9.61E-002	6.20E-002
PB-210	Not Detected	---------	3.39E+001
TH-232	7.60E-001	3.63E-001	2.04E-001
RA-228	5.96E-001	3.08E-001	1.24E-001
AC-228	7.48E-001	1.48E-001	1.04E-001
TH-228	7.16E-001	4.21E-001	6.34E-001
RA-224	8.06E-001	1.84E-001	5.39E-002
PB-212	7.33E-001	1.47E-001	3.72E-002
BI-212	8.11E-001	3.24E-001	4.42E-001
TL-208	6.66E-001	1.13E-001	6.73E-002
U-235	Not Detected	---------	2.14E-001
TH-231	Not Detected	---------	1.18E+001
PA-231	Not Detected	---------	1.31E+000
TH-227	Not Detected	---------	3.55E-001
RA-223	Not Detected	---------	2.14E-001
RN-219	Not Detected	---------	3.39E-001
PB-211	Not Detected	---------	7.85E-001
TL-207	Not Detected	---------	1.19E+001
AM-241	Not Detected	---------	4.95E-001
PU-239	Not Detected	---------	3.96E+002
NP-237	Not Detected	---------	2.20E+000
PA-233	Not Detected	---------	5.22E-002
TH-229	Not Detected	---------	2.37E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: [illegible]

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.55E-002
AG-110m	Not Detected	---------	2.70E-002
BA-133	Not Detected	---------	4.45E-002
BE-7	Not Detected	---------	2.17E-001
CD-115	Not Detected	---------	1.26E-001
CE-139	Not Detected	---------	2.62E-002
CE-141	Not Detected	---------	4.86E-002
CE-144	Not Detected	---------	2.13E-001
CM-243	Not Detected	---------	1.58E-001
CO-56	Not Detected	---------	3.17E-002
CO-57	Not Detected	---------	2.75E-002
CO-58	Not Detected	---------	3.02E-002
CO-60	Not Detected	---------	3.59E-002
CR-51	Not Detected	---------	2.23E-001
CS-134	Not Detected	---------	3.84E-002
CS-137	Not Detected	---------	2.95E-002
EU-152	Not Detected	---------	8.23E-002
EU-154	Not Detected	---------	1.71E-001
EU-155	Not Detected	---------	1.32E-001
FE-59	Not Detected	---------	6.43E-002
GD-153	Not Detected	---------	1.00E-001
HG-203	Not Detected	---------	2.96E-002
I-131	Not Detected	---------	3.01E-002
IR-192	Not Detected	---------	2.47E-002
K-40	1.70E-001	2.31E-000	2.85E-001
MN-52	Not Detected	---------	3.66E-002
MN-54	Not Detected	---------	3.27E-002
MO-99	Not Detected	---------	3.72E-001
NA-22	Not Detected	---------	3.70E-002
NA-24	Not Detected	---------	4.09E-001
ND-147	Not Detected	---------	2.11E-001
NI-57	Not Detected	---------	8.14E-002
RU-103	Not Detected	---------	2.69E-002
RU-106	Not Detected	---------	2.55E-001
SB-122	Not Detected	---------	6.56E-002
SB-124	Not Detected	---------	2.70E-002
SB-125	Not Detected	---------	7.31E-002
SN-113	Not Detected	---------	3.54E-002
SR-85	Not Detected	---------	3.48E-002
TA-182	Not Detected	---------	1.38E-001
TA-183	Not Detected	---------	5.77E-001
TL-201	Not Detected	---------	2.94E-001
Y-88	Not Detected	---------	2.21E-002
ZN-65	Not Detected	---------	9.19E-002
ZR-95	Not Detected	---------	5.03E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program (806 Laboratory)
4/23/01 7:03:35 PM

Analyzed by: 4/24/01 Reviewed by: 4-24-2001

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : 054909-004
Lab Sample ID : 10065002

Sample Description : TAV-BH-MW6-460-S
Sample Quantity : 665.700 gram
Sample Date/Time : 4/21/01 11:54:00 AM
Acquire Start Date/Time : 4/23/01 5:22:59 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram
U-238	Not Detected	---------	6.91E-001
RA-226	1.17E-000	4.73E-001	6.77E-001
PB-214	5.72E-001	9.53E-002	7.01E-002
BI-214	5.13E-001	8.93E-002	5.69E-002
PB-210	Not Detected	---------	3.19E+001
TH-232	5.76E-001	2.77E-001	1.53E-001
RA-228	7.81E-001	3.12E-001	1.32E-001
AC-228	6.71E-001	1.41E-001	1.18E-001
TH-228	9.01E-001	4.43E-001	6.49E-001
RA-224	7.46E-001	1.72E-001	6.58E-002
PB-212	6.56E-001	8.55E-001	3.55E-002
BI-212	6.17E-001	2.23E-001	2.80E-001
TL-208	5.68E-001	1.07E-001	8.16E-002
U-235	Not Detected	---------	1.98E-001
TH-231	Not Detected	---------	1.11E+001
PA-231	Not Detected	---------	1.20E+000
TH-227	Not Detected	---------	3.27E-001
RA-223	Not Detected	---------	1.99E-001
RN-219	Not Detected	---------	3.18E-001
PB-211	Not Detected	---------	6.88E-001
TL-207	Not Detected	---------	1.21E+001
AM-241	Not Detected	---------	4.31E-001
PU-239	Not Detected	---------	3.78E+002
NP-237	Not Detected	---------	2.04E+000
PA-233	Not Detected	---------	5.03E-002
TH-229	Not Detected	---------	2.20E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] - Sample ID: : 10063002

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.23E-002
AG-110m	Not Detected	---------	2.65E-002
BA-133	Not Detected	---------	4.25E-002
BE-7	Not Detected	---------	2.20E-001
CD-115	Not Detected	---------	1.14E-001
CE-139	Not Detected	---------	2.42E-002
CE-141	Not Detected	---------	4.53E-002
CE-144	Not Detected	---------	2.04E-001
CM-243	Not Detected	---------	1.50E-001
CO-56	Not Detected	---------	3.08E-002
CO-57	Not Detected	---------	2.59E-002
CO-58	Not Detected	---------	2.75E-002
CO-60	Not Detected	---------	3.13E-002
CR-51	Not Detected	---------	2.14E-001
CS-134	Not Detected	---------	3.74E-002
CS-137	Not Detected	---------	2.83E-002
EU-152	Not Detected	---------	7.74E-002
EU-154	Not Detected	---------	1.56E-001
EU-155	Not Detected	---------	1.19E-001
FE-59	Not Detected	---------	6.50E-002
GD-153	Not Detected	---------	9.12E-002
HG-203	Not Detected	---------	2.74E-002
I-131	Not Detected	---------	2.83E-002
IR-192	Not Detected	---------	2.43E-002
K-40	1.85E+001	2.50E+000	2.49E-001
MN-52	Not Detected	---------	3.48E-002
MN-54	Not Detected	---------	3.15E-002
MO-99	Not Detected	---------	3.37E-001
NA-22	Not Detected	---------	3.74E-002
NA-24	Not Detected	---------	3.51E-001
ND-147	Not Detected	---------	1.98E-001
NI-57	Not Detected	---------	6.31E-002
RU-103	Not Detected	---------	2.47E-002
RU-106	Not Detected	---------	2.31E-001
SB-122	Not Detected	---------	5.91E-002
SB-124	Not Detected	---------	2.59E-002
SB-125	Not Detected	---------	6.90E-002
SN-113	Not Detected	---------	3.21E-002
SR-85	Not Detected	---------	3.36E-002
TA-182	Not Detected	---------	1.38E-001
TA-183	Not Detected	---------	4.98E-001
TL-201	Not Detected	---------	2.62E-001
Y-88	Not Detected	---------	2.15E-002
ZN-65	Not Detected	---------	8.85E-002
ZR-95	Not Detected	---------	5.00E-002

Sandia National Laboratories

Radiation Protection Sample Diagnostics Program [806 Laboratory]

4/23/01 8:45:55 PM

Analyzed by: 4/24/01 Reviewed by: JP Kline 4-24-2001

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : 054910-004
Lab Sample ID : 10065003

Sample Description : TAV-BH-MW6-480-S
Sample Quantity : 717.700 gram
Sample Date/Time : 4/21/01 2:36:00 PM
Acquire Start Date/Time : 4/23/01 7:05:20 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.93E-001
RA-226	1.69E-000	5.97E-001	8.36E-001
PB-214	5.76E-001	9.11E-002	5.50E-002
BI-214	5.82E-001	9.74E-002	5.51E-002
PB-210	Not Detected	---------	3.20E+001
TH-232	7.95E-001	3.66E-001	1.43E-001
RA-228	9.02E-001	2.76E-001	1.12E-001
AC-228	8.33E-001	1.63E-001	1.23E-001
TH-228	1.02E+000	4.40E-001	6.28E-001
RA-224	8.22E-001	1.86E-001	7.75E-002
PB-212	8.51E-001	1.48E-001	3.51E-002
BI-212	8.46E-001	3.75E-001	5.38E-001
TL-208	7.64E-001	1.22E-001	5.66E-002
U-235	8.62E-002	1.58E-001	2.02E-001
TH-231	Not Detected	---------	1.10E+001
PA-231	Not Detected	---------	1.22E+000
TH-227	Not Detected	---------	3.48E-001
RA-223	Not Detected	---------	1.98E-001
RN-219	Not Detected	---------	3.05E-001
PB-211	Not Detected	---------	6.98E-001
TL-207	Not Detected	---------	1.16E+001
AM-241	Not Detected	---------	4.50E-001
PU-239	Not Detected	---------	3.78E+002
NP-237	Not Detected	---------	2.12E+000
PA-233	Not Detected	---------	4.79E-002
TH-229	Not Detected	---------	2.22E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

(Summary Report) Sample --

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.22E-002
AG-110m	Not Detected	---------	2.57E-002
BA-133	Not Detected	---------	4.14E-002
BE-7	Not Detected	---------	2.17E-001
CD-115	Not Detected	---------	1.15E-001
CE-139	Not Detected	---------	2.51E-002
CE-141	Not Detected	---------	4.53E-002
CE-144	Not Detected	---------	2.02E-001
CM-243	Not Detected	---------	1.48E-001
CO-56	Not Detected	---------	2.84E-002
CO-57	Not Detected	---------	2.68E-002
CO-58	Not Detected	---------	2.75E-002
CO-60	Not Detected	---------	2.94E-002
CR-51	Not Detected	---------	1.97E-001
CS-134	Not Detected	---------	3.61E-002
CS-137	Not Detected	---------	2.87E-002
EU-152	Not Detected	---------	8.07E-002
EU-154	Not Detected	---------	1.56E-001
EU-155	Not Detected	---------	1.28E-001
FE-59	Not Detected	---------	3.95E-002
GD-153	Not Detected	---------	9.54E-002
HG-203	Not Detected	---------	2.74E-002
I-131	Not Detected	---------	2.82E-002
IR-192	Not Detected	---------	2.27E-002
K-40	1.43E+001	1.94E-000	2.62E-001
MN-52	Not Detected	---------	3.04E-002
MN-54	Not Detected	---------	3.05E-002
MO-99	Not Detected	---------	3.23E-001
NA-22	Not Detected	---------	3.41E-002
NA-24	Not Detected	---------	3.13E-001
ND-147	Not Detected	---------	1.95E-001
NI-57	Not Detected	---------	6.62E-002
RU-103	Not Detected	---------	2.43E-002
RU-106	Not Detected	---------	2.31E-001
SB-122	Not Detected	---------	6.17E-002
SB-124	Not Detected	---------	2.49E-002
SB-125	Not Detected	---------	6.81E-002
SN-113	Not Detected	---------	3.19E-002
SR-85	Not Detected	---------	3.17E-002
TA-182	Not Detected	---------	1.30E-001
TA-183	Not Detected	---------	5.21E-001
TL-201	Not Detected	---------	2.68E-001
Y-88	Not Detected	---------	2.20E-002
ZN-65	Not Detected	---------	8.52E-002
ZR-95	Not Detected	---------	4.81E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/23/01 10:28:21 PM

Analyzed by: 4/24/01 Reviewed by: 4-24-2001

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : 054911-004
Lab Sample ID : 10065004

Sample Description : TAV-BH-MW6-500-S
Sample Quantity : 625.300 gram
Sample Date/Time : 4/21/01 4:49:00 PM
Acquire Start Date/Time : 4/23/01 8:47:40 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.68E-001
RA-226	1.62E+000	5.17E-001	6.90E-001
PB-214	6.77E-001	1.10E-001	7.66E-002
BI-214	6.14E-001	1.05E-001	6.45E-002
PB-210	Not Detected	---------	3.44E+001
TH-232	8.16E-001	3.83E-001	1.82E-001
RA-228	7.48E-001	2.78E-001	1.43E-001
AC-228	7.64E-001	1.60E-001	1.35E-001
TH-228	7.29E-001	4.66E-001	7.11E-001
RA-224	9.14E-001	2.04E-001	6.10E-002
PB-212	7.81E-001	2.47E-001	3.63E-002
BI-212	8.72E-001	2.70E-001	3.19E-001
TL-208	7.41E-001	1.22E-001	6.31E-002
U-235	Not Detected	---------	2.18E-001
TH-231	Not Detected	---------	1.21E+001
PA-231	Not Detected	---------	1.32E+000
TH-227	Not Detected	---------	3.60E-001
RA-223	Not Detected	---------	2.16E-001
RN-219	Not Detected	---------	3.37E-001
PB-211	Not Detected	---------	7.63E-001
TL-207	Not Detected	---------	1.23E+001
AM-241	Not Detected	---------	4.88E-001
PU-239	Not Detected	---------	4.11E+002
NP-237	Not Detected	---------	2.13E+000
PA-233	Not Detected	---------	5.41E-002
TH-229	Not Detected	---------	2.44E-001

Note: Ra-226 and U-235 gamma peaks interfere. Either isotope may be over-estimated.

[Summary Report] Sample --

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.54E-002
AG-110m	Not Detected	---------	2.70E-002
BA-133	Not Detected	---------	4.63E-002
BE-7	Not Detected	---------	2.31E-001
CD-115	Not Detected	---------	1.22E-001
CE-139	Not Detected	---------	2.63E-002
CE-141	Not Detected	---------	4.94E-002
CE-144	Not Detected	---------	2.18E-001
CM-243	Not Detected	---------	1.55E-001
CO-56	Not Detected	---------	3.15E-002
CO-57	Not Detected	---------	2.79E-002
CO-58	Not Detected	---------	2.96E-002
CO-60	Not Detected	---------	3.24E-002
CR-51	Not Detected	---------	2.21E-001
CS-134	Not Detected	---------	3.96E-002
CS-137	Not Detected	---------	2.88E-002
EU-152	Not Detected	---------	8.43E-002
EU-154	Not Detected	---------	1.72E-001
EU-155	Not Detected	---------	1.31E-001
FE-59	Not Detected	---------	6.37E-002
GD-153	Not Detected	---------	1.01E-001
HG-203	Not Detected	---------	2.94E-002
I-131	Not Detected	---------	3.03E-002
IR-192	Not Detected	---------	2.49E-002
K-40	1.57E+001	2.14E+000	2.59E-001
MN-52	Not Detected	---------	3.68E-002
MN-54	Not Detected	---------	3.22E-002
MO-99	Not Detected	---------	3.69E-001
NA-22	Not Detected	---------	3.80E-002
NA-24	Not Detected	---------	3.35E-001
ND-147	Not Detected	---------	1.97E-001
NI-57	Not Detected	---------	7.57E-002
RU-103	Not Detected	---------	2.63E-002
RU-106	Not Detected	---------	2.61E-001
SB-122	Not Detected	---------	6.23E-002
SB-124	Not Detected	---------	2.82E-002
SB-125	Not Detected	---------	7.59E-002
SN-113	Not Detected	---------	3.60E-002
SR-85	Not Detected	---------	3.64E-002
TA-182	Not Detected	---------	1.47E-001
TA-183	Not Detected	---------	5.65E-001
TL-201	Not Detected	---------	2.84E-001
Y-88	Not Detected	---------	2.56E-002
ZN-65	Not Detected	---------	9.53E-002
ZR-95	Not Detected	---------	5.26E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program [806 Laboratory]
4/24/01 6:09:23 AM

Analyzed by: 4/24/01 Reviewed by: 4-24-2001

Customer : LAI/PERRY (6135/SMO)
Customer Sample ID : LAB CONTROL SAMPLE USING CG134
Lab Sample ID : 10065005

Sample Description : MIXED_GAMMA_STANDARD_CG134
Sample Quantity : 1.000 Each
Sample Date/Time : 11/01/90 12:00:00 PM
Acquire Start Date/Time : 4/24/01 5:59:09 AM
Detector Name : LAB02
Elapsed Live/Real Time : 600 / 605 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---------	4.09E+003
RA-226	Not Detected	---------	5.61E+003
PB-214	Not Detected	---------	6.18E+002
BI-214	Not Detected	---------	5.38E+002
PB-210	Not Detected	---------	2.60E+005
TH-232	Not Detected	---------	1.95E+003
RA-228	Not Detected	---------	1.98E+003
AC-228	Not Detected	---------	1.19E+003
TH-228	Not Detected	---------	2.73E+005
RA-224	Not Detected	---------	1.20E+004
PB-212	Not Detected	---------	2.08E+004
BI-212	Not Detected	---------	1.49E+005
TL-208	Not Detected	---------	3.67E+004
U-235	Not Detected	---------	1.58E+003
TH-231	Not Detected	---------	7.32E+004
PA-231	Not Detected	---------	1.28E+004
TH-227	Not Detected	---------	2.54E+003
RA-223	Not Detected	---------	1.00E+026
RN-219	Not Detected	---------	5.78E+003
PB-211	Not Detected	---------	1.30E+004
TL-207	Not Detected	---------	1.88E+005
AM-241	8.53E+004	1.37E+004	6.67E+003
PU-239	Not Detected	---------	2.72E+006
NP-237	Not Detected	---------	1.49E+004
PA-233	Not Detected	---------	5.42E+002
TH-229	Not Detected	---------	1.60E+003

[Summary Report] - Sample ID: : 10065005

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-108m	Not Detected	---------	2.52E+002
AG-110m	Not Detected	---------	6.53E+007
BA-133	Not Detected	---------	7.54E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	4.62E+010
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	1.72E+007
CM-243	Not Detected	---------	1.87E+003
CO-56	Not Detected	---------	2.55E+017
CO-57	Not Detected	---------	3.57E+006
CO-58	Not Detected	---------	4.71E+018
CO-60	8.68E+004	1.13E+004	7.84E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	8.51E+003
CS-137	7.52E+004	9.72E+003	3.55E+002
EU-152	Not Detected	---------	1.05E+003
EU-154	Not Detected	---------	2.56E+003
EU-155	Not Detected	---------	4.15E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	3.96E+007
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.00E+018
K-40	Not Detected	---------	1.25E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	1.42E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	2.75E+003
NA-24	Not Detected	---------	1.00E+026
ND-147	Not Detected	---------	1.00E+026
NI-57	Not Detected	---------	1.00E+026
RU-103	Not Detected	---------	1.00E+026
RU-106	Not Detected	---------	3.51E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	3.42E+021
SB-125	Not Detected	---------	1.41E+004
SN-113	Not Detected	---------	4.20E+012
SR-85	Not Detected	---------	1.95E+020
TA-182	Not Detected	---------	9.26E+012
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	7.41E+012
ZN-65	Not Detected	---------	3.59E+007
ZR-95	Not Detected	---------	4.10E+020

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*****************************************************************************
*                    Sandia National Laboratories                           *
*              Radiation Protection Sample Diagnostics Program              *
*                      Quality Assurance Report                             *
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Report Date : 4/24/01 6:09:27 AM
QA File : C:\GENIE2K\CAMFILES\LCS2.QAF
Analyst : KICHAVE
Sample ID : 10065005
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 4/24/01 5:59:09 AM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 605 seconds

Parameter	Mean	1S Error	New Value	< LU	SD	UD	BS >
AM-241 Activity	8.232E-002	3.560E-003	8.534E-002	<			>
CS-137 Activity	7.163E-002	2.662E-003	7.521E-002	<			>
CO-60 Activity	8.007E-002	2.995E-003	8.615E-002	<	In		>

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: 4/24/01