9-1-2005

Justification for Class III Permit Modification September 2005, DSS Site 1113, Operable Unit 1295, Building 6597 Drywell at Technical Area V

Sandia National Laboratories/NM

This work supported by the United States Department of Energy under contract DE-AC04-94I85000.

Sandia National Laboratories

Drain and Septic Systems - Areas of Concern (AOCs) 276, 1004, 1031, 1034, 1035, 1036, 1052, 1078, 1079, 1080, 1081, 1084, 1087, 1092, 1098, 1102, 1104, 1113, and 1120 (Poster 2/2)

Environmental Restoration Project

Summary of Data Used for NFA Justification

- Soil samples were analyzed at on- and off-site laboratories for VOCs, SVOCs, PCBs, HE compounds, metals, cyanide, gross alpha/beta activity, and radionuclides by gamma spectroscopy.
- There were VOCs detected at the 19 sites, SVOCs were detected at 15 of the sites, PCBs were detected at 9 sites, and cyanide was identified at 14 of the sites. HE compounds were detected at one of the sites (AOC 1113).
- Barium was detected at concentrations above the background value at six sites. Chromium and arsenic were detected at concentrations above background values at five sites. Silver was detected at concentrations above the background value at three sites, lead was detected above the background value at two sites, and mercury was detected above the background value at one site. No other metals were detected above background concentrations.
- Uranium-235 was detected at an activity slightly above the background activity at 5 of the 19 sites and, although not detected, the MDA for U-235 exceeded the background activity at 14 sites and the MDA for U-238 exceeded the background activity at one site. Gross alpha activity was slightly above background activity at five of the 19 sites, and gross beta activity was above the background activity at one site.
- All confirmatory soil sample analytical results for each site were used for characterizing that site, for performing the risk screening assessment, and as justification for the NFA proposal for the site.

Recommended Future Land Use

- Industrial land use was established for these 19 AOC sites.

Results of Risk Analysis

- Risk assessment results for industrial and residential land-use scenarios are calculated per NMED risk assessment guidance as presented in "Supplemental Risk Document Supporting Class 3 Permit Modification Process."
- Because COCs were present in concentrations greater than background-screening levels or because constituents were present that did not have background-screening numbers, it was necessary to perform risk assessments for these all of these AOCs. The risk assessment analysis evaluated the potential for adverse health effects for industrial and residential land-use scenarios.
- The maximum concentration value for lead was 22.2 J mg/kg at AOC 1081 and 11.9 mg/kg at AOC 1087: these exceed the background value of 11.8 mg/kg. The EPA intentionally does not provide any human health toxicological data on lead; therefore, no risk parameter values could be calculated. The NMED guidance for lead screening concentrations for construction and industrial land-use scenarios are 750 and 1,500 mg/kg, respectively. The EPA screening guidance value for a residential land-use scenario is 400 mg/kg. The maximum concentration for lead at these two sites are less than all the screening values; therefore, lead was eliminated from further consideration in the human health risk assessment for each site.
- The non-radiological total human health HIs for 18 of the 19 AOCs are below NMED guidelines for a residential land-use scenario.
- For four sites, the total estimated excess cancer risks are at or slightly above the residential land-use scenario guideline. However, the incremental excess cancer risk values for these four sites are below the NMED residential land-use scenario guideline.
- For one of the 19 sites (AOC 1081), the total HI and the estimated excess cancer risk are above the NMED guidelines for the residential land-use scenario due to elevated levels of arsenic and silver. However, the total HI and estimated excess cancer risk values are below the NMED guidelines for the industrial land-use scenario.
- The total human health TEDEs for industrial land-use scenarios ranged from 0.001 to 0.46 mrem/yr, all of which are substantially below the EPA numerical guideline of 15 mrem/yr. The total human health TEDEs for residential land-use scenarios ranged from 0.0052 to 0.12 mrem/yr, all of which are substantially below the EPA numerical guideline of 75 mrem/yr. Therefore, these AOCs are eligible for unrestricted radiological release.
- Using the SNL predictive ecological risk and scoping assessment methodologies, it was concluded that a complete ecological pathway for each of 18 of the sites was not associated with the respective COPELs for that site. Thus, a more detailed ecological risk assessment to predict the level of risk was not deemed necessary for these sites.
- Ecological risks associated with AOC 1084 were predicted incorporating potential receptors and site-specific COPECs. The HQ values predicted were less than one, with the exception of barium. For barium, the contribution from background concentrations accounts for the majority (52%) of the HQ values. Therefore, ecological risks associated with this site are expected to be low.
- In conclusion, human health and ecological risks are acceptable for 18 sites for a residential land-use scenario and for all 19 for an industrial land-use scenario per NMED guidance. Thus, 18 of these sites are proposed for CAC without institutional controls, and one site (AOC 1081) is proposed for CAC with institutional controls.

The total HIs and excess cancer risk values for the nonradiological COCs at the 19 AOCs are as follows:

The total HIs and excess cancer risk values for the nonradiological COCs at the 19 AOCs are as follows:

AOC Number	Site Name	Residential Land-Use Scenario	
		Total Hazard Index	Excess Cancer Risk
276	Former Bldg 829X Silver Recovery Sump	0.27	2E-5 Total[a]/3.95E-6 Incremental
1004	Bldg 6969 Septic System	0.08	2E-6 Total
1031	Former Bldgs. 6589 and 6600 Septic System	0.25	1E-5 Total[a]/2.55E-6 Incremental
1034	Bldg 6710 Septic System	0.00	2E-9 Total
1035	Bldg 6715 Septic System	0.04	3E-9 Total
1036	Bldg 6922 Septic System	0.26	1E-5 Total[a]/8.35E-7 Incremental
1052	Bldg 803 Seepage Pit	0.00	2E-6 Total
1078	Bldg 6640 Septic System	0.27	1E-5 Total[a]/3.72E-7 Incremental
1079	Bldg 6643 Septic System	0.00	3E-8 Total
1080	Bldg 6644 Septic System	0.00	4E-8 Total
1084	Bldg 6505 Septic System	0.08	None
1087	Bldg 6743 Seepage Pit	0.00	4E-9 Total
1092	MO 228-230 Septic System	0.06	None
1098	TA-V Plenum Rooms Drywell	0.03	3E-7 Total
1102	Former Bldg 889 Septic System	0.00	1E-10 Total
1104	Bldg 6595 Seepage Pit	0.00	2E-6 Total
1113	Bldg 6597 Drywell	0.14	1E-7 Total
1120	Bldg 6643 Drywell	0.12	1E-6 Total
NMED Guidance for Residential Land Use		< 1	<1E-5

AOC Number	Site Name	Industrial Land-Use Scenario	
			Excess Cancer Risk
1081	Bldg 6650 Septic System	0.39	5E-6 Total
NMED Guidance for Industrial Land Use		< 1	<1E-5

[a]Maximum value exceeds NMED guidance for specified land-use scenario, therefore, incremental values are shown.

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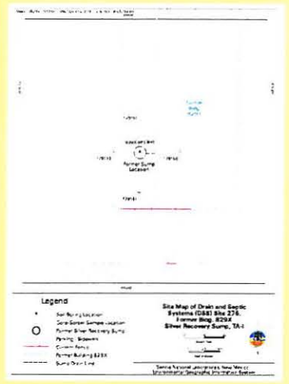
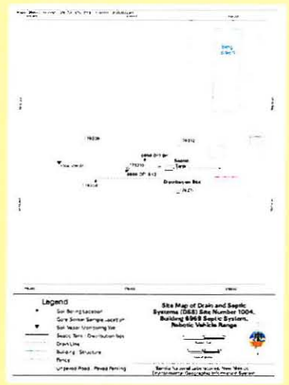
This work supported by the
United States Department of Energy
under contract DE-AC04-94185000.

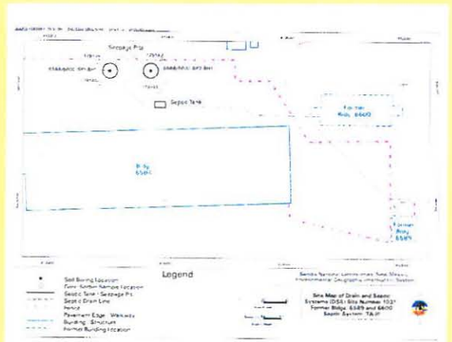
Sandia National Laboratories

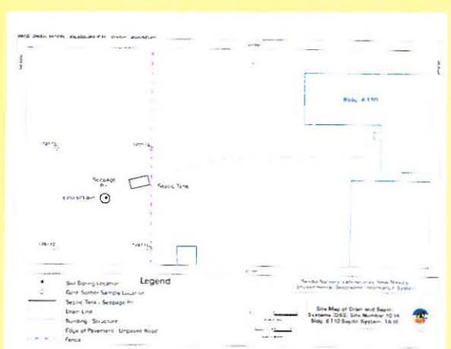
Drain and Septic Systems (DSS) Areas of Concern (AOCs)
276, 1004, 1031, 1034, 1035
1036, 1052

Environmental Restoration Project



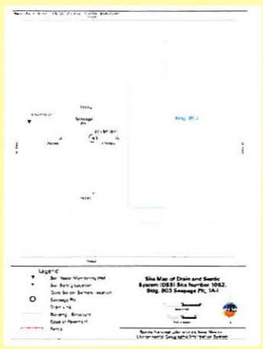


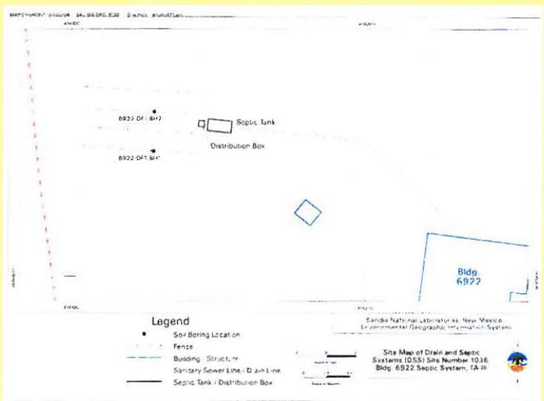




Septic system demolition and backfilling.

Three-foot long Geoprobe soil sampling device used to collect soil samples.





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Drain and Septic Systems - Areas of Concern (AOCs) 276, 1004, 1031, 1034, 1035, 1036, 1052, 1078, 1079, 1080, 1081, 1084, 1087, 1092, 1098, 1102, 1104, 1113, and 1120 (Poster 1/2)

This work supported by the United States Department of Energy under contract DE-AC04-94AL85000.

Sandia National Laboratories

Environmental Restoration Project

Site History

Drain and septic system site histories for the 19 AOCs are as follows:

AOC Number	Site Name	Location	Year Building and System Built	Year Drain or Septic System Abandoned	Year(s) Septic Tank Effluent Sampled	Year Septic Tank Pumped For the last Time
276	Former Bldg 829X Silver Recovery Sump	TA-I	1948, 1978	1994	No septic tank at this site	NA
1004	Bldg 6969 Septic System	Robotic Vehicle Range	1958	System is active	Periodically since 1992	Periodically
1031	Former Bldgs 6589 and 6600 Septic System	TA-III	1967	1991 (septic tank and seepage pits backfilled in 2002)	1990-1991, 1992, 1995	1996
1034	Bldg 6710 Septic System	TA-III	1958	Early 1990s	1990-1991, 1992, 1995	1996
1035	Bldg 6715 Septic System	TA-III	1962	Early 1990s	1990-1991, 1992, 1995	1996
1036	Bldg 6922 Septic System	TA-III	1955	1991	1990-1991, 1992, 1995, 2005	2005
1052	Bldg 803 Seepage Pit	TA-I	1957	Unknown	No septic tank at this site	NA
1078	Bldg 6640 Septic System	TA-III	1959	1991	1990-1991	Unknown (backfilled in 1991)
1079	Bldg 6643 Septic System	TA-III	1989	1991	1990-1991, 1992, 1995, 2005	2005
1080	Bldg 6644 Septic System	TA-III	1989	1991	1990-1991, 1992, 1995	1996
1081	Bldg 6650 Septic System	TA-III	1967 (southern systems) Early 1980s (northern systems)	1991	1992-1995 (south septic tank) 2004 (north septic tank)	1996 (south septic tank) Unknown (north septic tank)
1084	Bldg 6505 Septic System	TA-III	1954	1991	1990-1991	Unknown (backfilled before 2003)
1087	Bldg 6743 Seepage Pit	TA-III	1967	2004-2005	No septic tank at this site	NA
1092	MO 228-230 Septic System	TA-III	1988	1991	1990-1991	Unknown (backfilled before 2003)
1098	TA-V Plenum Rooms Drywell	TA-X	1958	Early 1990s	No septic tank at this site	NA
1102	Former Bldg 889 Septic System	TA-I	Early 1950s	Early 1990s	1992-1995	Unknown (removed prior to 1999)
1104	Bldg 6595 Seepage Pit	TA-V	1966	Early 1990s	No septic tank at this site	NA
1113	Bldg 6597 Drywell	TA-V	1971	Prior to 2002	No septic tank at this site	NA
1120	Bldg 6643 Drywell	TA-III	1989	1991	No septic tank at this site	NA

Depth to Groundwater

Depth to groundwater at these 19 AOCs is as follows:

AOC Number	Site Name	Location	Groundwater Depth (ft bgs)
276	Former Bldg 829X Silver Recovery Sump	TA-I	555
1004	Bldg 6969 Septic System	Robotic Vehicle Range	548
1031	Former Bldgs. 6589 and 6600 Septic System	TA-III	486
1034	Bldg 6710 Septic System	TA-III	470
1035	Bldg 6715 Septic System	TA-III	470
1036	Bldg 6922 Septic System	TA-III	490
1052	Bldg 803 Seepage Pit	TA-I	552
1078	Bldg 6640 Septic System	TA-III	476
1079	Bldg 6643 Septic System	TA-III	487
1080	Bldg 6644 Septic System	TA-III	480
1081	Bldg 6650 Septic System	TA-III	480
1084	Bldg 6505 Septic System	TA-III	508
1087	Bldg 6743 Seepage Pit	TA-III	461
1092	MO 228-230 Septic System	TA-III	488
1098	TA-V Plenum Rooms Drywell	TA-V	509
1102	Former Bldg 889 Septic System	TA-I	535
1104	Bldg 6595 Seepage Pit	TA-V	507
1113	Bldg 6597 Drywell	TA-V	515
1120	Bldg 6643 Drywell	TA-III	483

Constituents of Concern

- VOCs
- SVOCs
- PCBs
- HE Compounds
- Metals
- Cyanide
- Radionuclides

Investigations

- A backhoe was used to positively locate buried components (drainfield drain lines, drywells) for placement of soil vapor samplers, and soil borings.
- Ten of the 19 AOCs were selected by NMED for passive soil-vapor sampling to screen for VOCs; no significant VOC contamination was identified at any of the ten sites.
- Soil samples were collected from directly beneath drainfield drain lines, seepage pits, and drywells to determine if COCs were released to the environment from drain systems.
- Four of the sites were selected by NMED for active soil vapor sampling to screen for VOCs. Each of the active soil-vapor monitoring wells was 150 ft deep with vapor sampling ports at 5, 20, 70, 100, and 150-ft bgs. The VOC concentrations were significantly lower than the 10 ppmv action level established by NMED.

The years that site-specific characterization activities were conducted and soil sampling depths at each of these 19 AOC sites are as follows:

AOC Number	Site Name	Buried Components (Drain Lines, Drywells) Located With a Backhoe	Soil Sampling Beneath Drainlines, Seepage Pits, Drywells	Type(s) of Drain System, and Soil Sampling Depths (ft bgs)	Passive Soil Vapor Sampling	Active Soil Vapor Monitor Well Installation and Sampling
276	Former Bldg 829X Silver Recovery Sump	None	1994, 2002	Silver Recovery Sump 8, 13	2002	None
1004	Bldg 6969 Septic System	2002	2002	Drainfield 8, 13	2002	2003
1031	Former Bldgs 6589 and 6600 Septic System	2002	2002	Seepage Pits 15, 20	2002	None
1034	Bldg 6710 Septic System	None	2002	Seepage Pit 14, 19	2002	None
1035	Bldg 6715 Septic System	None	2002	Seepage Pit 11, 16	2002	None
1036	Bldg 6922 Septic System	1997	1998, 1999	Drainfield 5, 10	None	None
1052	Bldg 803 Seepage Pit	None	2002	Seepage Pit 22, 27	2002	2003
1078	Bldg 6640 Septic System	2002	2002	Drainfield 5, 10	None	None
1079	Bldg 6643 Septic System	2002	2002	Drainfield 11, 16	None	None
1080	Bldg 6644 Septic System	2002	2002	Drainfield Borehole 1 & 2 5, 10 Borehole 3, 6, 11	None	None
1081	Bldg 6650 Septic System	2003 (north septic tank)	2002	South seepage pit 10, 12, 15, 17 North seepage pit 10, 12, 15, 17, 20, 24, 25	2002	2003
1084	Bldg 6505 Septic System	2002	2002	Drainfield 3, 8	2002	None
1087	Bldg 6743 Septic System	None	2002	Seepage Pit 8, 13	2002	None
1092	MO 228-230 Septic System	2002 2003	2002	Drainfield 6, 11	None	2003
1098	TA-V Plenum Rooms Drywell	None	2002	Drywell 10, 15	None	None
1102	Former Bldg 889 Septic System	1999 2003	2002	Seepage Pit 25, 30	None	None
1104	Bldg 6595 Seepage Pit	None	2002	Seepage Pit 11, 16	None	None
1113	Bldg 6597 Drywell	2002	2002	Drywell 5, 10	None	None
1120	Bldg 6643 Drywell	2002	2002	Drywell 8, 13	2002	None

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Justification for Class III Permit Modification

September 2005

DSS Site 1113
Operable Unit 1295
Building 6597 Drywell at
Technical Area V

CAC (SWMU Assessment Report) Submitted December 2004
RSI Submitted March 2005
RSI Submitted April 2005

Environmental
Restoration
Project

United States Department of Energy
Sandia Site Office

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Sandia National Laboratories

Justification for Class III Permit Modification

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Environmental
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United States Department of Energy
Sandia Site Office

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CAC

Sandia National Laboratories/New Mexico
Environmental Restoration Project

SWMU ASSESSMENT REPORT AND PROPOSAL FOR CORRECTIVE ACTION COMPLETE DRAIN AND SEPTIC SYSTEMS SITE 1113, BUILDING 6597 DRYWELL

December 2004

United States Department of Energy
Sandia Site Office

National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

DEC 1 6 2004

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Road East, Building 1
Santa Fe, NM 87505

Dear Mr. Bearzi:

On behalf of the Department of Energy (DOE) and Sandia Corporation, DOE is submitting the enclosed Solid Waste Management Unit (SWMU) Assessment Reports and Proposals for Corrective Action Complete for Drain and Septic Systems (DSS) Sites 276, 1004, 1031, 1052, 1080, 1087, 1090, 1102, and 1113 at Sandia National Laboratories, New Mexico, EPA ID No. NM5890110518. These documents are compiled as DSS Round 7 and No Further Action (NFA) Batch 25.

This submittal includes descriptions of the site characterization work and risk assessments for the above referenced DSS Sites. The risk assessments conclude that for these sites: (1) there is no significant risk to human health under either the industrial or residential land-use scenarios; and (2) that there are no ecological risks associated with these sites.

Based on the information provided, DOE and Sandia are requesting a determination of Corrective Action Complete without controls for these DSS sites.

If you have any questions, please contact John Gould at (505) 845-6089.

Sincerely,

Patty Wagner
Manager

Enclosure

cc w/enclosure:
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M. J. Davis, SNL, MS 1089
ESHSEC Records Center, MS 1087

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ACRONYMS AND ABBREVIATIONS

AOP	Administrative Operating Procedure
BA	butyl acetate
bgs	below ground surface
CAC	Corrective Action Complete
COC	constituent of concern
DSS	Drain and Septic Systems
EB	equipment blank
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
FIP	Field Implementation Plan
HE	high explosive
HI	hazard index
HWB	Hazardous Waste Bureau
KAFB	Kirtland Air Force Base
MDA	minimum detectable activity
MDL	method detection limit
mrem	millirem
NFA	no further action
NMED	New Mexico Environment Department
OU	Operable Unit
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPSD	Radiation Protection Sample Diagnostics
SAP	Sampling and Analysis Plan
SNL/NM	Sandia National Laboratories/New Mexico
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TA	Technical Area
TB	trip blank
TEDE	total effective dose equivalent
TOP	Technical Operating Procedure
VOC	volatile organic compound
yr	year

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1.0 PROJECT BACKGROUND

Environmental characterization of Sandia National Laboratories/New Mexico (SNL/NM) drain and systems (DSS) started in the early 1990s. These units consist of either septic systems (one or more septic tanks plumbed to either drainfields or seepage pits), or other types of miscellaneous drain units without septic tanks (including drywells or french drains, seepage pits, and surface outfalls). Initially, 23 of these sites were designated as Solid Waste Management Units (SWMUs) under Operable Unit (OU) 1295, Septic Tanks and Drainfields. Characterization work at 22 of these 23 SWMUs has taken place since 1994 as part of SNL/NM Environmental Restoration (ER) Project activities. The twenty-third site did not require any characterization, and an administrative proposal for no further action (NFA) was granted in July 1995.

Numerous other DSS sites that were not designated as SWMUs were also present throughout SNL/NM. An initial list of these non-SWMU sites was compiled and summarized in an SNL/NM document dated July 8, 1996; the list included a total of 101 sites, facilities, or systems (Bleakly July 1996). For tracking purposes, each of these 101 individual DSS sites was designated with a unique four-digit site identification number starting with 1001. This numbering scheme was devised to clearly differentiate these non-SWMU sites from existing SNL/NM SWMUs, which have been designated by one- to three-digit numbers. As work progressed on the DSS site evaluation project, it became apparent that the original 1996 list was in need of field verification and updating. This process included researching SNL/NM's extensive library of facilities engineering drawings and conducting field verification inspections jointly with SNL/NM ER personnel and New Mexico Environment Department (NMED)/Hazardous Waste Bureau (HWB) regulatory staff from July 1999 through January 2000. The goals of this additional work included the following:

- Determine to the degree possible whether each of the 101 systems included on the 1996 list was still in existence, or had ever existed.
- For systems confirmed or believed to exist, determine the exact or apparent locations and components of those systems (septic tanks, drainfields, seepage pits, etc.).
- Identify which systems would, or would not, need initial shallow investigation work as required by the NMED.
- For systems requiring characterization, determine the specific types of shallow characterization work (including passive soil-vapor sampling and/or shallow soil borings) that would be required by the NMED.

A number of additional drain systems were identified from the engineering drawings and field inspection work. It was also determined that some of the sites on the 1996 list actually contained more than one individual drain or septic system that had been combined under one four-digit site number. In order to reduce confusion, a decision was made to assign each individual system its own unique four-digit number. A new site list containing a total of 121 individual DSS sites was generated in 2000. Of these 121 sites, the NMED required environmental assessment work at a total of 61. No characterization was required at the remaining 60 sites because the sites either were found not to exist, were the responsibility of other non-SNL/NM organizations, were already designated as individual SWMUs, or were

considered by the NMED to pose no threat to human health or the environment. Subsequent backhoe excavation at DSS Site 1091 confirmed that the system did not exist, which decreased the number of DSS sites requiring characterization to 60.

Concurrent with the field inspection and site identification work, NMED/HWB and SNL/NM ER Project technical personnel worked together to reach consensus on a staged approach and specific procedures that would be used to characterize the DSS sites, as well as the remaining OU 1295 Septic Tanks and Drainfield SWMUs that had not been approved for NFA. These procedures are described in detail in the "Sampling and Analysis Plan [SAP] for Characterizing and Assessing Potential Releases to the Environment From Septic and Other Miscellaneous Drain Systems at Sandia National Laboratories/New Mexico" (SNL/NM October 1999), which was approved by the NMED/HWB on January 28, 2000 (Bearzi January 2000). A follow-on document, "Field Implementation Plan [FIP], Characterization of Non-Environmental Restoration Drain and Septic Systems" (SNL/NM November 2001), was then written to formally document the updated DSS site list and the specific site characterization work required by the NMED for each of the 60 DSS sites. The FIP was approved by the NMED in February 2002 (Moats February 2002).

2.0 DSS SITE 1113: BUILDING 6597 DRYWELL

2.1 Summary

The SNL/NM ER Project conducted an assessment of DSS Site 1113, the Building 6597 Drywell. There are no known or specific environmental concerns at this site. The assessment was conducted to determine whether environmental contamination was released to the environment via the drywell present at the site. This report provides documentation that the site was specifically characterized, that no significant releases of contaminants to the environment occurred via the Building 6597 Drywell, and that it does not pose a threat to human health or the environment under either the industrial or residential land-use scenarios. Current operations at the site are conducted in accordance with applicable laws and regulations that are protective of the environment.

Review and analysis of all relevant data for DSS Site 1113 indicate that concentrations of constituents of concern (COCs) at this site were found to be below applicable risk assessment action levels. Thus, a determination of Corrective Action Complete (CAC) without controls (NMED April 2004) is recommended for DSS Site 1113 based upon sampling data demonstrating that COCs released from the site into the environment pose an acceptable level of risk.

2.2 Site Description and Operational History

2.2.1 Site Description

DSS Site 1113 is located in SNL/NM Technical Area (TA)-V on federally owned land controlled by Kirtland Air Force Base (KAFB) and permitted to the U.S. Department of Energy. The site is located approximately 650 feet southeast of the entrance to TA-V (Figure 2.2.1-1) and approximately 28 feet east of Building 6597 (Figure 2.2.1-2). An inspection conducted at the site on July 15, 1999, indicated that the unit was apparently connected to a floor drain inside a small attached mechanical equipment room on the east side of Building 6597 (Figure 2.2.1-3).

The surface geology at DSS Site 1113 is characterized by a veneer of aeolian sediments underlain by Upper Santa Fe Group alluvial fan deposits that interfinger with sediments of the ancestral Rio Grande west of the site. These deposits extend to, and probably far below, the water table at this site. The alluvial fan materials originated in the Manzanita Mountains east of DSS Site 1113, and typically consist of a mixture of silts, sands, and gravels that are poorly sorted, and exhibit moderately connected lenticular bedding. Individual beds range from 1 to 5 feet in thickness with a preferred east-west orientation and have moderate to low hydraulic conductivities (SNL/NM March 1996). Vegetation in the undisturbed and unpaved areas around TA-V primarily consists of desert grasses, shrubs, and cacti.

The ground surface in the vicinity of the site is flat to very slightly sloping to the west. The closest major drainage is the Arroyo del Coyote, located approximately 0.75 miles northeast of the site. No perennial surface-water bodies are present in the vicinity of the site. Average annual rainfall in the SNL/NM and KAFB area, as measured at Albuquerque International Sunport, is 8.1 inches (NOAA 1990). Infiltration of precipitation is almost nonexistent as virtually

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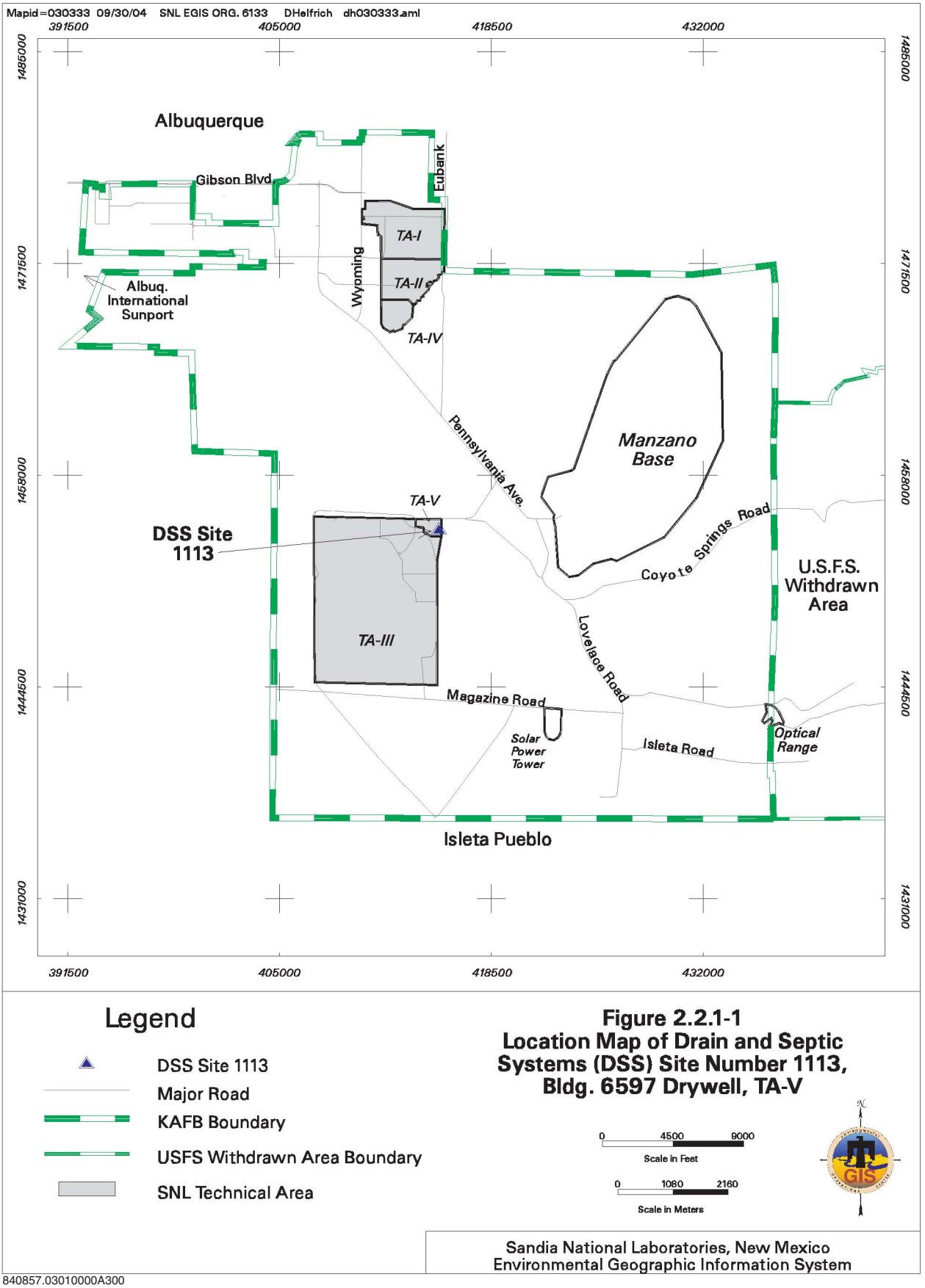


Legend

- DSS Site 1113
- Major Road
- KAFB Boundary
- USFS Withdrawn Area Boundary
- SNL Technical Area

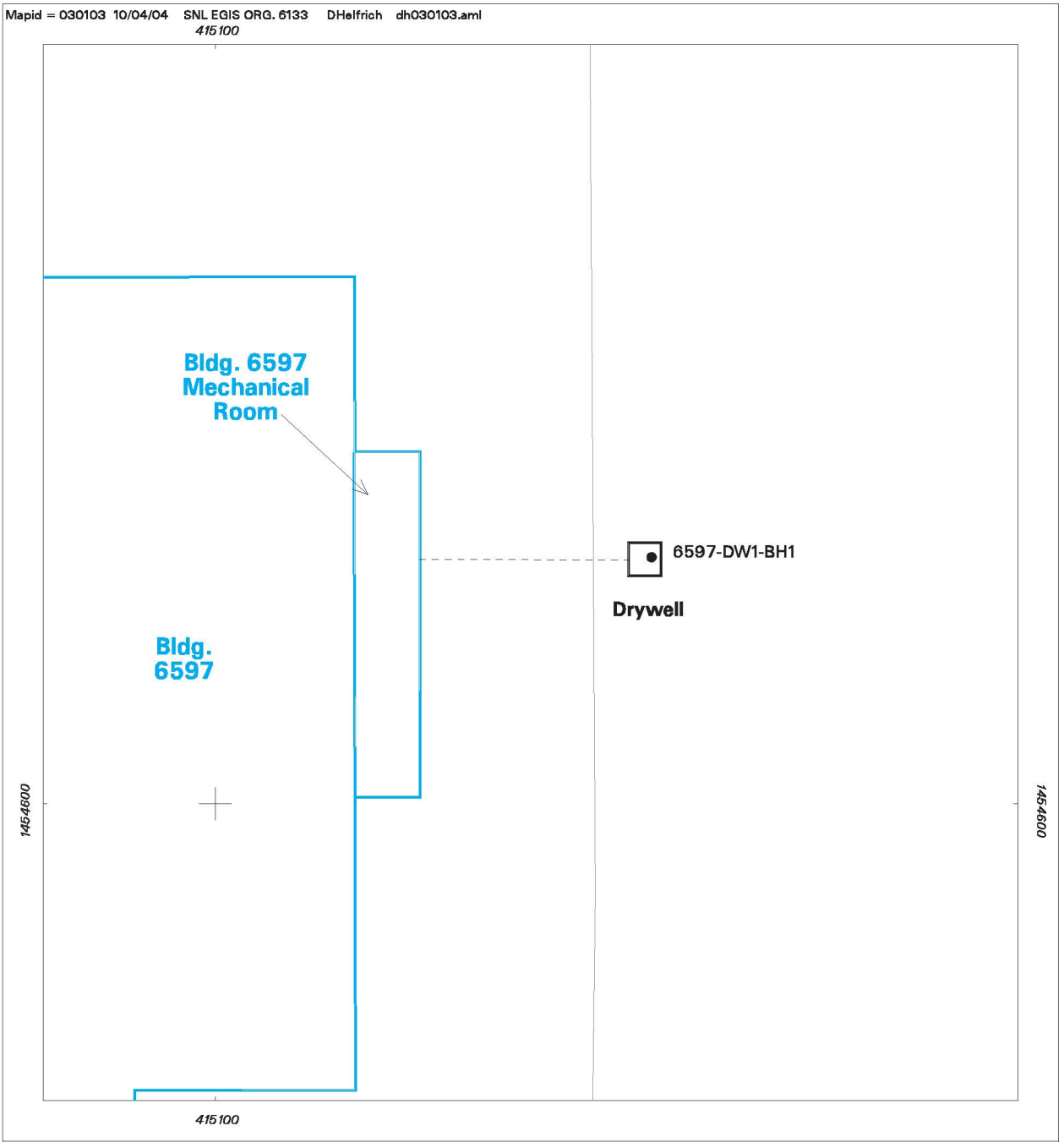
Figure 2.2.1-1
Location Map of Drain and Septic Systems (DSS) Site Number 1113, Bldg. 6597 Drywell, TA-V

0 4500 9000
Scale in Feet

0 1080 2160
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

840857.03010000A300



Legend

- Soil Boring Location
- Drywell
- Drain Line
- Building / Structure
- Edge of Pavement

Figure 2.2.1-2
Site Map of Drain and Septic Systems (DSS) Site Number 1113, Building 6597 Drywell, TA-V

0 10 20
Scale in Feet

0 2.4 4.8
Scale in Meters

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

840857.03010000 A301

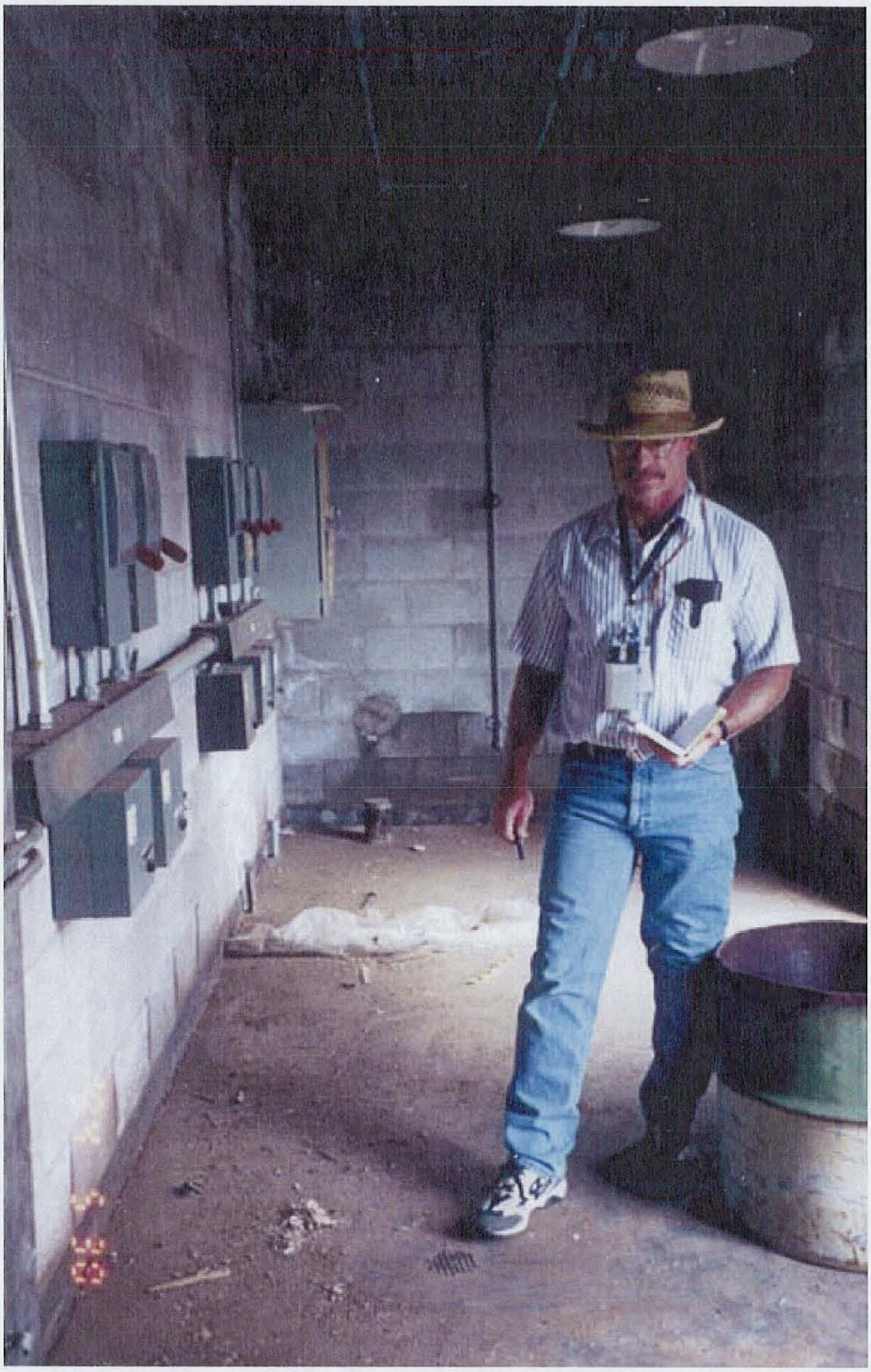


Figure 2.2.1-3
Floor drain inside the Building 6597 mechanical room that was connected to the Building 6597 drywell. View to the north. July 15, 1999

all of the moisture subsequently undergoes evapotranspiration. The estimates of evapotranspiration rates for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL/NM March 1996).

The site lies at an average elevation of approximately 5,439 feet above mean sea level (SNL/NM April 2003). Depth to groundwater is approximately 515 feet below ground surface (bgs) at the site. Groundwater flow is thought to be generally to the west in this area (SNL/NM March 2002). The nearest production wells to DSS Site 1113 are KAFB-4 and KAFB-11, located approximately 2.9 and 3.0 miles northwest and northeast of the site, respectively. The nearest groundwater monitoring wells are the TAV-MW6 and TAV-MW7 well pair, located approximately 500 feet northwest of the site.

2.2.2 Operational History

Available information indicates that Building 6597, currently known as the Radiation Simulation Development Facility, was constructed in 1971 (SNL/NM March 2003), and it is assumed the drywell was constructed at the same time. Because operational records are not available, the site investigation was planned to be consistent with other DSS site investigations and to sample for possible COCs that may have been released during facility operations. During the April 2002 backhoe excavation of the unit, it was determined that the drain pipe to the drywell had been disconnected between the edge of the asphalt pavement and the drywell (Figure 2.2.1-2) prior to the backhoe excavation of the unit.

2.3 Land Use

2.3.1 Current Land Use

The current land use for DSS Site 1113 is industrial.

2.3.2 Future/Proposed Land Use

The projected future land use for DSS Site 1113 is industrial (DOE et al. September 1995).

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3.0 INVESTIGATORY ACTIVITIES

3.1 Summary

Two assessment investigations have been conducted at DSS Site 1113. In April 2002, a backhoe was used to physically locate the buried Building 6597 drywell (Investigation 1). In September 2002, subsurface soil samples were collected from a single boring drilled through the center of, and beneath, the drywell (Investigation 2). Both investigations were required by the NMED/HWB to adequately characterize the site and were conducted in accordance with procedures presented in the SAP (SNL/NM October 1999) and FIP (SNL/NM November 2001) described in Chapter 1.0. These investigations are discussed in the following sections.

3.2 Investigation 1—Backhoe Excavation

On April 4, 2002, a backhoe was used to determine the location, dimensions, and depth of the DSS Site 1113 drywell. It was found to consist of a 4-foot-square and 4-foot-deep unlined hole with a gravel aggregate layer from 2 to 4 feet bgs. The center of the unit was determined to be located approximately 28 feet east of the Building 6597 mechanical room. No visible evidence of stained or discolored soil or odors indicating residual contamination was observed during the excavation. No samples were collected during the backhoe excavation at the site.

3.3 Investigation 2—Soil Sampling

Once the drywell was located, soil sampling was conducted in accordance with the rationale and procedures in the SAP (SNL/NM October 1999) approved by the NMED. On September 26, 2002, soil samples were collected from a single borehole drilled through the center of, and beneath, the drywell. The soil boring location is shown on Figure 2.2.1-2. Figure 3.3-1 shows soil samples being collected from beneath the DSS Site 1113 drywell. A summary of the borehole, sample depths, sample analyses, analytical methods, laboratories, and sample date is presented in Table 3.3-1.

3.3.1 Soil Sampling Methodology

An auger drill rig was used to sample the drywell borehole at two depth intervals. The shallow sample interval started approximately 1 foot below the bottom of the drywell aggregate to ensure that only soil, and not aggregate, was collected in the samples, and the lower (deep) interval started at 5 feet below the top of the upper sample interval. Once the auger rig had reached the top of the sampling interval, a 3- or 4-foot-long by 1.5-inch inside diameter Geoprobe™ sampling tube lined with a butyl acetate (BA) sampling sleeve was inserted into the borehole and hydraulically driven downward 3 or 4 feet to fill the tube with soil.

Once the sample tube was retrieved from the borehole, the sample for volatile organic compound (VOC) analysis was immediately collected by slicing off a 3- to 4-inch section from the lower end of the BA sleeve and capping the section ends with Teflon® film, then a rubber end cap, and finally sealing the tube with tape.

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Figure 3.3-1
Collecting soil samples with the Geoprobe™ from beneath the Building 6597 drywell, located in the gravel area near the edge of the asphalt pavement.
View to the southwest. September 26, 2002

Table 3.3-1
Summary of Area Sampled, Analytical Methods, and Laboratories Used for
DSS Site 1113, Building 6597 Drywell Soil Samples

Sampling Area	Number of Borehole Locations	Top of Sampling Intervals in Each Borehole (ft bgs)	Total Number of Soil Samples	Analytical Parameters and EPA Methods[a]	Analytical Laboratory	Date Samples Collected
Drywell	1	5, 10	2	VOCs EPA Method 8260	GEL	09-26-02
	1	5, 10	2	SVOCs EPA Method 8270	GEL	09-26-02
	1	5, 10	2	PCBs EPA Method 8082	GEL	09-26-02
	1	5, 10	2	HE Compounds EPA Method 8330	GEL	09-26-02
	1	5, 10	2	RCRA Metals EPA Methods 6000/7000	GEL	09-26-02
	1	5, 10	2	Hexavalent Chromium EPA Method 7196A	GEL	09-26-02
	1	5, 10	2	Total Cyanide EPA Method 9012A	GEL	09-26-02
	1	5, 10	2	Gamma Spectroscopy EPA Method 901.1	RPSD	09-26-02
	1	5, 10	2	Gross Alpha/Beta Activity EPA Method 900.0	GEL	09-26-02

[a]EPA November 1986.
bgs = Below ground surface.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
ft = Foot (feet).
GEL = General Engineering Laboratories, Inc.
HE = High explosive(s).
PCB = Polychlorinated biphenyl.
RCRA = Resource Conservation and Recovery Act.
RPSD = Radiation Protection Sample Diagnostics Laboratory.
SVOC = Semivolatile organic compound.
VOC = Volatile organic compound.

For the non-VOC analyses, the soil remaining in the BA liner was emptied into a decontaminated mixing bowl, and aliquots of soil were transferred into appropriate sample containers for analysis. On occasion, the amount of soil recovered in the first sampling run was insufficient for sample volume requirements. In this case, additional sampling runs were completed until an adequate soil volume was recovered. Soil recovered from these additional runs was emptied into the mixing bowl and blended with the soil already collected. Aliquots of the blended soil were then transferred into sample containers and submitted for analysis.

All samples were documented and handled in accordance with applicable SNL/NM operating procedures and transported to on- and off-site laboratories for analysis.

3.3.2 Soil Sampling Results and Conclusions

Analytical results for the soil samples collected at DSS Site 1113 are presented and discussed in this section.

VOCs

VOC analytical results for the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-1. Method detection limits (MDLs) for the VOC soil analyses are presented in Table 3.3.2-2. A total of eight individual VOCs were detected in the two VOC soil samples collected at this site, and none were detected in the associated trip blank (TB). These eight compounds most likely reflect residual contamination from discharges to the drywell.

SVOCs

Semivolatile organic compound (SVOC) analytical results for the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-3. MDLs for the SVOC soil analyses are presented in Table 3.3.2-4. The SVOC bis(2-ethylhexyl) phthalate was detected in both soil samples, and also may reflect residual contamination from discharges to the drywell.

PCBs

Polychlorinated biphenyl (PCB) analytical results for the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-5. MDLs for the PCB soil analyses are presented in Table 3.3.2-6. No PCBs were detected in the samples.

HE Compounds

High explosive (HE) compound analytical results for the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-7. MDLs for the HE soil analyses are presented in Table 3.3.2-8. Three HE compounds were detected in these samples. One HE compound (2-nitrotoluene) was detected in the 5-foot sample, and two HE compounds (HMX and nitrobenzene) were detected in the 10-foot sample.

Table 3.3.2-1
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, VOC Analytical Results
September 2002
(Off-Site Laboratory)

Sample Attributes			VOCs (EPA Method 8260[a]) (µg/kg)							
Record Number[b]	ER Sample ID	Sample Depth (ft)	2-Butanone	2-Hexanone	4-Methyl-2-pentanone	Acetone	Ethylbenzene	Tetrachloroethene	Toluene	Xylene
605783	6597-DW1-BH1-5-S	5	**54.9 J**	ND (3.77)	ND (4.03)	**9.22**	**0.552 J (1)**	**0.536 J (1)**	**25.6**	**1.67 J**
605783	6597-DW1-BH1-10-S	10	**106 J**	**142 J**	**21.7 J**	**256**	**2.48 J**	**16.1 J**	**10.6 J**	**11.9 J**
Quality Assurance/Quality Control Samples (µg/L)										
605783	6580-SP1-TB[c]	NA	ND (2.31)	ND (1.45)	ND (1.78)	ND (4.5)	ND (0.21)	ND (0.33)	ND (0.39)	ND (0.25)

Note: Values in **bold** represent detected analytes.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
[c]ER sample ID reflects the final site for VOC samples included in this shipment.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = Analytical result was qualified as an estimated value.
J ( ) = The reported value is greater than or equal to the MDL but is less than the practical quantitation limit, shown in parentheses.
MDL = Method detection limit.
µg/kg = Microgram(s) per kilogram.
µg/L = Microgram(s) per liter.
NA = Not applicable.
ND ( ) = Not detected above the MDL, shown in parentheses.
S = Soil sample.
SP = Seepage Pit.
TB = Trip blank.
VOC = Volatile organic compound.

Table 3.3.2-2
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, VOC Analytical MDLs
September 2002
(Off-Site Laboratory)

Analyte	EPA Method 8260[a] Detection Limit (µg/kg)
Acetone	3.52
Benzene	0.45
Bromodichloromethane	0.49
Bromoform	0.49
Bromomethane	0.5
2-Butanone	3.74
Carbon disulfide	2.36
Carbon tetrachloride	0.49
Chlorobenzene	0.41
Chloroethane	0.81
Chloroform	0.52
Chloromethane	0.37
Dibromochloromethane	0.5
1,1-Dichloroethane	0.47
1,2-Dichloroethane	0.43
1,1-Dichloroethene	0.5
cis-1,2-Dichloroethene	0.47
trans-1,2-Dichloroethene	0.53
1,2-Dichloropropane	0.48
cis-1,3-Dichloropropene	0.43
trans-1,3-Dichloropropene	0.25
Ethylbenzene	0.38
2-Hexanone	3.77
Methylene chloride	1.35
4-Methyl-2-pentanone	4.03
Styrene	0.39
1,1,2,2-Tetrachloroethane	0.91
Tetrachloroethene	0.38
Toluene	0.34
1,1,1-Trichloroethane	0.53
1,1,2-Trichloroethane	0.54
Trichloroethene	0.45
Vinyl acetate	1.78
Vinyl chloride	0.56
Xylene	0.39

[a]EPA November 1986.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
MDL = Method detection limit.
µg/kg = Microgram(s) per kilogram.
VOC = Volatile organic compound.

Table 3.3.2-3
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, SVOC Analytical Results
September 2002
(Off-Site Laboratory)

Sample Attributes			SVOCs (EPA Method 8270[a]) (µg/kg)
Record Number[b]	ER Sample ID	Sample Depth (ft)	bis(2-Ethylhexyl) phthalate
605783	6597-DW1-BH1-5-S	5	**3,600**
605783	6597-DW1-BH1-10-S	10	**3,920**

Note: Values in **bold** represent detected analytes.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
µg/kg = Microgram(s) per kilogram.
S = Soil sample.
SVOC = Semivolatile organic compound.

Table 3.3.2-4
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, SVOC Analytical MDLs
September 2002
(Off-Site Laboratory)

Analyte	EPA Method 8270[a] Detection Limit (µg/kg)
Acenaphthene	80
Acenaphthylene	167
Anthracene	167
Benzo(a)anthracene	167
Benzo(a)pyrene	167
Benzo(b)fluoranthene	167
Benzo(g,h,i)perylene	167
Benzo(k)fluoranthene	167
4-Bromophenyl phenyl ether	340
Butylbenzyl phthalate	287
Carbazole	167
4-Chlorobenzenamine	1670
bis(2-Chloroethoxy)methane	123
bis(2-Chloroethyl)ether	373
bis-Chloroisopropyl ether	110
4-Chloro-3-methylphenol	1670
2-Chloronaphthalene	137
2-Chlorophenol	153
4-Chlorophenyl phenyl ether	197
Chrysene	167
o-Cresol	260
Dibenz[a,h]anthracene	167
Dibenzofuran	170
1,2-Dichlorobenzene	100
1,3-Dichlorobenzene	113
1,4-Dichlorobenzene	157
3,3'-Dichlorobenzidine	1670
2,4-Dichlorophenol	207
Diethylphthalate	177
2,4-Dimethylphenol	1670
Dimethylphthalate	183
Di-n-butyl phthalate	240
Dinitro-o-cresol	1670
2,4-Dinitrophenol	1670
2,4-Dinitrotoluene	253
2,6-Dinitrotoluene	333
Di-n-octyl phthalate	303
Diphenyl amine	223
bis(2-Ethylhexyl) phthalate	300
Fluoranthene	167
Fluorene	40
Hexachlorobenzene	200

Refer to footnotes at end of table.

Table 3.3.2-4 (Concluded)
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, SVOC Analytical MDLs
September 2002
(Off-Site Laboratory)

Analyte	EPA Method 8270[a] Detection Limit (µg/kg)
Hexachlorobutadiene	127
Hexachlorocyclopentadiene	1670
Hexachloroethane	220
Indeno(1,2,3-cd)pyrene	167
Isophorone	160
2-Methylnaphthalene	167
4-Methylphenol	333
Naphthalene	167
2-Nitroaniline	1670
3-Nitroaniline	1670
4-Nitroaniline	370
Nitrobenzene	203
2-Nitrophenol	170
4-Nitrophenol	1670
n-Nitrosodipropylamine	227
Pentachlorophenol	1670
Phenanthrene	167
Phenol	127
Pyrene	167
1,2,4-Trichlorobenzene	127
2,4,5-Trichlorophenol	173
2,4,6-Trichlorophenol	273

[a]EPA November 1986.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
MDL = Method detection limit.
µg/kg = Microgram(s) per kilogram.
SVOC = Semivolatile organic compound.

Table 3.3.2-5
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, PCB Analytical Results
September 2002
(Off-Site Laboratory)

Sample Attributes			PCBs (EPA Method 8082[a]) (µg/kg)
Record Number[b]	ER Sample ID	Sample Depth (ft)	
605783	6597-DW1-BH1-5-S	5	R
605783	6597-DW1-BH1-10-S	10	R

[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
µg/kg = Microgram(s) per kilogram.
ND = Not detected.
PCB = Polychlorinated biphenyl.
R = Value rejected during data validation.
S = Soil sample.

Table 3.3.2-6
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, PCB Analytical MDLs
September 2002
(Off-Site Laboratory)

Analyte	EPA Method 8082[a] Detection Limit (µg/kg)
Aroclor-1016	1
Aroclor-1221	2.82
Aroclor-1232	1.67
Aroclor-1242	1.67
Aroclor-1248	1
Aroclor-1254	0.5
Aroclor-1260	1

[a]EPA November 1986.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
MDL = Method detection limit.
µg/kg = Microgram(s) per kilogram.
PCB = Polychlorinated biphenyl.

Table 3.3.2-7
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, HE Compound Analytical Results
September 2002
(Off-Site Laboratory)

Sample Attributes			HE (EPA Method 8330[a]) (µg/kg)						
Record Number[b]	ER Sample ID	Sample Depth (ft)	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Amino-4,6-dinitrotoluene	2-Nitrotoluene	4-Amino-2,6-dinitrotoluene	HMX	Nitrobenzene
605783	6597-DW1-BH1-5-S	5	ND (55)	R	R	**92.1 J**	ND (34.1)	ND (48)	ND (48)
605783	6597-DW1-BH1-10-S	10	R	ND (48)	ND (18.1)	ND (24)	R	**106 J**	**1410 J**

Note: Values in **bold** represent detected analytes.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
HE = High explosive(s).
ID = Identification.
J = Analytical result was qualified as an estimated value.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
MDL =Method Detection Limit
µg/kg = Microgram(s) per kilogram.
ND = Not detected.
ND ( ) = Not detected above the MDL, shown in parentheses.
R = Value rejected during data validation.
S = Soil sample.

Table 3.3.2-8
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, HE Compound Analytical MDLs
September 2002
(Off-Site Laboratory)

Analyte	EPA Method 8330[a] Detection Limit (µg/kg)
2-Amino-4,6-dinitrotoluene	18.1
4-Amino-2,6-dinitrotoluene	34.1
1,3-Dinitrobenzene	34.1
2,4-Dinitrotoluene	55
2,6-Dinitrotoluene	48
HMX	48
Nitrobenzene	48
2-Nitrotoluene	24
3-Nitrotoluene	24
4-Nitrotoluene	24
RDX	48
Tetryl	22.1
1,3,5-Trinitrobenzene	29
2,4,6-Trinitrotoluene	48

[a]EPA November 1986.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
HE = High explosive(s).
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
MDL = Method detection limit.
µg/kg = Microgram(s) per kilogram.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Tetryl = Methyl-2,4,6-trinitrophenylnitramine.

RCRA Metals and Hexavalent Chromium

Resource Conservation and Recovery Act (RCRA) metals and hexavalent chromium analytical results for the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-9. MDLs for the metals in soil analyses are presented in Table 3.3.2-10. Barium was detected above the NMED-approved background in the 10-foot-bgs sample, and no other metal concentrations exceeded the corresponding background concentrations.

Total Cyanide

Total cyanide analytical results for the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-11. MDLs for the cyanide soil analyses are presented in Table 3.3.2-12. Low concentrations of cyanide were detected in both samples from the borehole.

Table 3.3.2-9
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, Metals Analytical Results
September 2002
(Off-Site Laboratory)

Sample Attributes			Metals (EPA Method 6000/ 7000/7471[a]) (mg/kg)								
Record Number[b]	ER Sample ID	Sample Depth (ft)	Arsenic	Barium	Cadmium	Chromium	Chromium (VI)	Lead	Mercury	Selenium	Silver
605783	6597-DW1-BH1-5-S	5	2.91	75.5 J	0.151 J (0.485)	5.85	ND (0.271)	3.65	0.00181 J (0.00987)	0.328 J (0.485)	ND (0.0876)
605783	6597-DW1-BH1-10-S	10	3.8	**303 J**	0.209 J (0.481)	10.2	0.348 J (0.498)	6.08	0.00203 J (0.00866)	0.544 J	ND (0.0867)
Background Concentration—Southwest Area Supergroup[c]			4.4	214	0.9	15.9	1	11.8	<0.1	<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.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
J = Analytical result was qualified as an estimated value.
J ( ) = The reported value is greater than or equal to the MDL but is less than the practical quantitation limit, shown in parentheses.
MDL = Method detection limit.
mg/kg = Milligram(s) per kilogram.
ND ( ) = Not detected above the MDL, shown in parentheses.
S = Soil sample.

Table 3.3.2-10
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, Metals Analytical MDLs
September 2002
(Off-Site Laboratory)

Analyte	EPA Method 6000/7000/7471[a] Detection Limit (µg/kg)
Arsenic	0.198–0.2
Barium	0.0641–0.0648
Cadmium	0.046–0.0464
Chromium	0.155–0.156
Chromium (VI)	0.269–0.271
Lead	0.273–0.275
Mercury	0.000851–0.00097
Selenium	0.156–0.157
Silver	0.0867–0.0876

[a]EPA November 1986.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
MDL = Method detection limit.
µg/kg = Microgram(s) per kilogram.

Table 3.3.2-11
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, Total Cyanide Analytical Results
September 2002
(Off-Site Laboratory)

Sample Attributes			Metals (EPA Method 9012[a]) (mg/kg)
Record Number[b]	ER Sample ID	Sample Depth (ft)	Total Cyanide
605783	6597-DW1-BH1-5-S	5	**0.573**
605783	6597-DW1-BH1-10-S	10	**0.416**

Note: Values in **bold** exceeded background soil concentrations.
[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
mg/kg = Milligram(s) per kilogram.
S = Soil sample.

Table 3.3.2-12
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, Total Cyanide Analytical MDLs
September 2002
(Off-Site Laboratory)

Analyte	EPA Method 9012[a] Detection Limit (mg/kg)
Total Cyanide	0.0419

[a]EPA November 1986.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency
MDL = Method detection limit.
mg/kg = Milligram(s) per kilogram.

Radionuclides

Analytical results for the gamma spectroscopy analysis of the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-13. No activities above NMED-approved background levels were detected in any sample analyzed. However, although not detected, the minimum detectable activity (MDA) for one of the two uranium-235 analyses exceeded the background activity because the standard gamma spectroscopy count time for soil samples (6,000 seconds) was not sufficient to reach the NMED-approved background activity established for SNL/NM soils. Even though the MDA may be slightly elevated, it is still very low, and the risk assessment outcome for the site is not significantly impacted by its use.

Gross Alpha/Beta Activity

Gross alpha/beta activity analytical results for the two soil samples collected from the drywell borehole are summarized in Table 3.3.2-14. No gross alpha or beta activity was detected above the New Mexico-established background levels (Miller September 2003) in either of the samples. These results indicate no significant levels of radioactive material are present in the soil at the site.

3.3.3 Soil Sampling Quality Assurance/Quality Control Samples and Data Validation Results

Throughout the DSS Project, quality assurance (QA)/quality control (QC) samples were collected at an approximate frequency of 1 per 20 field samples. These included duplicate, equipment blank (EB), and TB samples. Typically, samples were shipped to the laboratory in batches of up to 20 samples, so that any one shipment might contain samples from several sites. Aqueous EB samples were collected at an approximate frequency of 1 per 20 site samples. The EB samples were analyzed for the same analytical suite as the soil samples in that shipment. The analytical results for the EB samples appear only on the data tables for the site where they were collected. However, the results were used in the data validation process for all the samples in that batch.

Table 3.3.2-13
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, Gamma Spectroscopy Analytical Results
September 2002
(On-Site Laboratory)

Sample Attributes			Activity (EPA Method 901.1[a]) (pCi/g)							
Record Number[b]	ER Sample ID	Sample Depth (ft)	Cesium-137		Thorium-232		Uranium-235		Uranium-238	
			Result	Error[c]	Result	Error[c]	Result	Error[c]	Result	Error[c]
605790	6597-DW1-BH1-5-S	5	ND (0.0228)	--	0.461	0.231	0.147	0.144	ND (0.581)	--
605790	6597-DW1-BH1-10-S	10	ND (0.0262)	--	0.773	0.361	**ND (0.206)**	--	ND (0.659)	--
Background Concentration—Southwest Area Supergroup[d]			0.079	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.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
MDA = Minimum detectable activity.
NA = Not applicable.
ND ( ) = Not detected above the MDA, shown in parentheses.
ND ( ) = Not detected, but the MDA (shown in parentheses) exceeds background activity.
pCi/g = Picocurie(s) per gram.
S = Soil sample.
-- = Error not calculated for nondetect results.

Table 3.3.2-14
Summary of DSS Site 1113, Building 6597 Drywell
Confirmatory Soil Sampling, Gross Alpha/Beta Activity Analytical Results
September 2002
(Off-Site Laboratory)

Sample Attributes			Activity (EPA Method 900.0[a]) (pCi/g)			
			Gross Alpha		Gross Beta	
Record Number[b]	ER Sample ID	Sample Depth (ft)	Result	Error[c]	Result	Error[c]
605783	6597-DW1-BH1-5-S	5	6.94	1.57	13.7	1.39
605783	6597-DW1-BH1-10-S	10	8.42	2.09	13.4	1.32
Background Activity[d]			17.4	NA	35.4	NA

[a]EPA November 1986.
[b]Analysis request/chain-of-custody record.
[c]Two standard deviations about the mean detected activity.
[d]Miller September 2003.
BH = Borehole.
DSS = Drain and Septic Systems.
DW = Drywell.
EPA = U.S. Environmental Protection Agency.
ER = Environmental Restoration.
ft = Foot (feet).
ID = Identification.
NA = Not applicable.
pCi/g = Picocurie(s) per gram.
S = Soil sample.

Aqueous TB samples, for VOC analysis only, were included in every sample cooler containing VOC soil samples. The analytical results for the TB samples appear on the VOC data tables for the sites in that shipment. The results were used in the data validation process for all the samples in that batch. No VOCs were detected in the TB for DSS Site 1113 (Table 3.3.2-1).

No EB or duplicate samples were collected at this site.

All laboratory data were reviewed and verified/validated according to "Verification and Validation of Chemical and Radiochemical Data," Technical Operating Procedure (TOP) 94-03, Rev. 0 (SNL/NM July 1994) or SNL/NM ER Project "Data Validation Procedure for Chemical and Radiochemical Data," Administrative Operating Procedure (AOP) 00-03 (SNL/NM December 1999). Annex A contains the data validation reports for the samples collected at this site. In addition, SNL/NM Department 7713 (Radiation Protection Sample Diagnostics [RPSD] Laboratory) reviewed all gamma spectroscopy results according to "Laboratory Data Review Guidelines," Procedure No. RPSD-02-11, Issue No. 2 (SNL/NM July 1996).

The viscous nature of the SVOC sample extracts analyzed at the laboratory required dilution, which resulted in elevated SVOC MDLs. No PCBs were detected in the samples, but the PCB analyses were rejected during data validation due to low surrogate recoveries at the analytical laboratory. Three HE compounds were reported as not detected and were also qualified as rejected during data validation because they failed to meet laboratory QA/QC acceptance criteria. The data validation reports for the DSS Site 1113 samples are provided in Annex A of

this document. The data are acceptable for use in this request for a determination of CAC without controls, except as noted above.

3.4 Site Sampling Data Gaps

Analytical data from the site assessment were sufficient for characterizing the nature and extent of possible COC releases. There are no further data gaps regarding characterization of DSS Site 1113.

4.0 CONCEPTUAL SITE MODEL

The conceptual site model for DSS Site 1113, the Building 6597 Drywell, is based upon the COCs identified in the soil samples collected from beneath the drywell at this site. This section summarizes the nature and extent of contamination and the environmental fate of the COCs.

4.1 Nature and Extent of Contamination

Potential COCs at DSS Site 1113 are VOCs, SVOCs, PCBs, HE compounds, cyanide, RCRA metals, hexavalent chromium, and radionuclides. Eight VOCs, one SVOC, three HE compounds, and cyanide were detected in the soil samples collected at this site, and no PCBs were identified. Barium was detected above the background concentration in one sample, and none of the other seven RCRA metals nor hexavalent chromium were detected at concentrations above the approved maximum background concentrations for SNL/NM Southwest Area Supergroup soils (Dinwiddie September 1997). When a metal concentration exceeded its maximum background screening value, it was considered further in the risk assessment process. None of the four representative gamma spectroscopy radionuclides were detected at activities exceeding the corresponding background levels. However, the MDA for one of the uranium-235 analyses exceeded the corresponding background activity for that radionuclide. Finally, no gross alpha/beta activity was detected above the New Mexico-established background levels.

4.2 Environmental Fate

Potential COCs may have been released into the vadose zone via effluent discharged from the drywell. Possible secondary release mechanisms include the uptake of COCs that may have been released into the soil beneath the drywell (Figure 4.2-1). The depth to groundwater at the site (approximately 515 feet bgs) most likely precludes migration of potential COCs into the groundwater system. The potential pathways to receptors include soil ingestion, dermal contact, and inhalation, which could occur as a result of receptor exposure to contaminated subsurface soil at the site. No intake routes through plant, meat, or milk ingestion are considered appropriate for either the industrial or residential land-use scenarios. Annex B provides additional discussion on the fate and transport of COCs at DSS Site 1113.

Table 4.2-1 summarizes the potential COCs for DSS Site 1113. All potential COCs were retained in the conceptual model and were evaluated in both the human health and ecological risk assessments. The current and future land use for DSS Site 1113 is industrial (DOE et al. September 1995).

The potential human receptors at the site are considered to be an industrial worker and resident. The exposure routes for the receptors are dermal contact and ingestion/inhalation; however, these are realistic possibilities only if contaminated soil is excavated at the site. The major exposure route modeled in the human health risk assessment is soil ingestion for COCs. The inhalation pathway is included because of the potential to inhale dust and volatiles. The dermal pathway is included because of the potential for receptors to be exposed to the contaminated soil.

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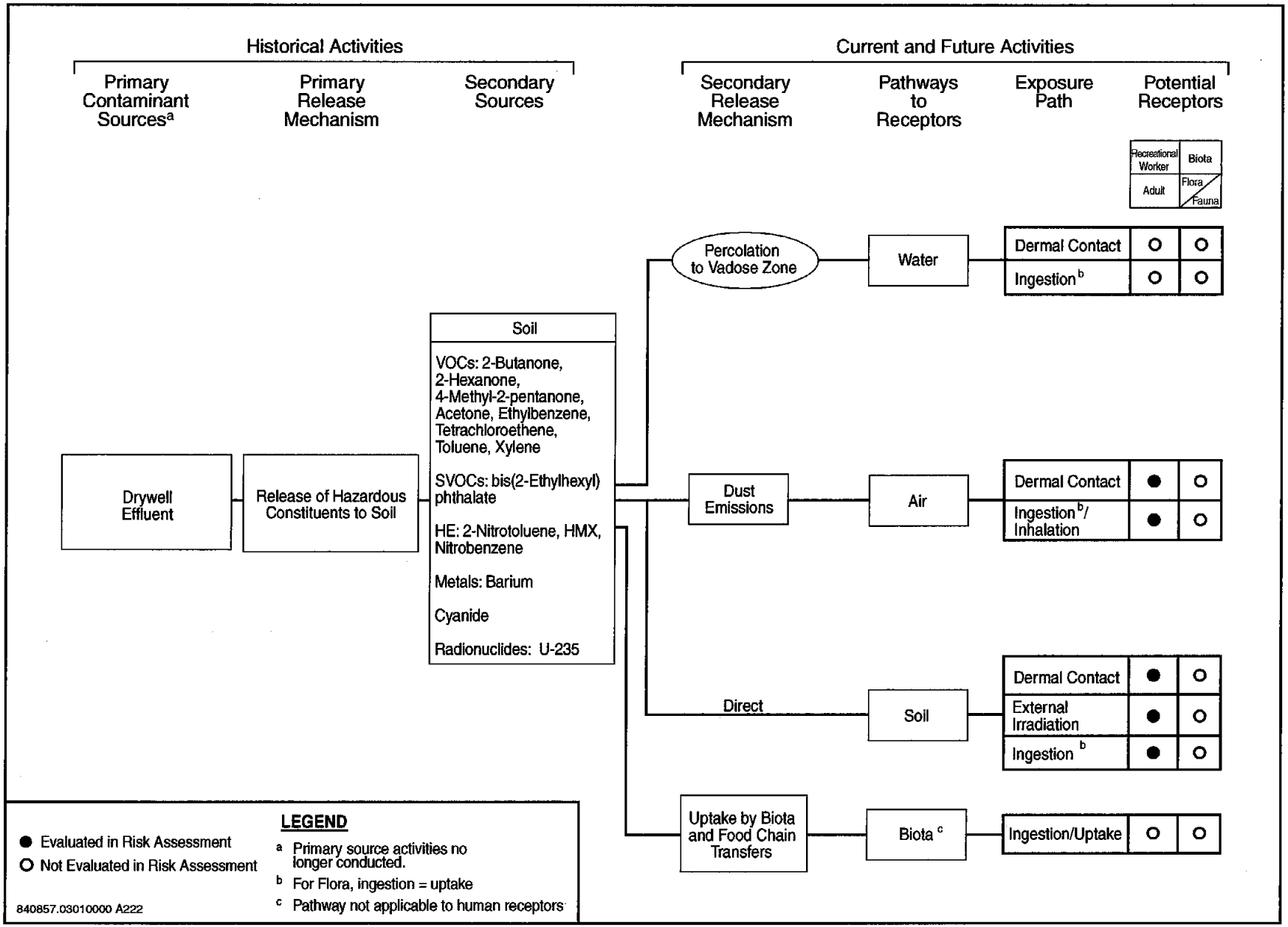

Figure 4.2-1

Conceptual Site Model Flow Diagram for DSS Site 1113, Building 6597 Drywell

Table 4.2-1
Summary of Potential COCs for DSS Site 1113, Building 6597 Drywell

COC Type		Number of Samples[a]	COCs Detected or with Concentrations Greater than Background or Nonquantified Background	Maximum Background Limit/ Southwest Area Supergroup[b] (mg/kg)	Maximum Concentration[c] (All Samples) (mg/kg)	Average Concentration[d] (mg/kg)	Number of Samples Where COCs Detected or with Concentrations Greater than Background or Nonquantified Background[e]
VOCs		2	2-Butanone	NA	0.106 J	0.0805	2
		2	2-Hexanone	NA	0.142 J	0.0719	1
		2	4-Methyl-2-pentanone	NA	0.0217 J	0.0119	1
		2	Acetone	NA	0.256	0.1326	2
		2	Ethyl benzene	NA	0.00248 J	0.0015	2
		2	Tetrachloroethene	NA	0.0161 J	0.0083	2
		2	Toluene	NA	0.0256	0.0181	2
		2	Xylene	NA	0.0119 J	0.0068	2
SVOCs		2	bis(2-Ethylhexyl) phthalate	NA	3.92	3.76	2
PCBs		2	None	NA	NA	NA	None
HE Compounds		2	2-Nitrotoluene	NA	0.0921 J	0.0521	1
		2	HMX	NA	0.106 J	0.065	1
		2	Nitrobenzene	NA	1.410 J	0.717	1
RCRA Metals		2	Barium	214	303 J	189.26	1
Hexavalent Chromium		2	None	NA	NA	NA	None
Cyanide		2	Cyanide	NC	0.573	0.494	2
Radionuclides (pCi/g)	Gamma Spectroscopy	2	Uranium-235	0.16	ND (0.206)	NC[f]	1
	Gross Alpha	2	None	NA	NA	NA	None
	Gross Beta	2	None	NA	NA	NA	None

[a]Number of samples includes duplicates and splits.
[b]Dinwiddie September 1997.
[c]Maximum concentration is either the maximum amount detected, or for radionuclides, the greater of either the maximum detection or the maximum MDA above background.
[d]Average concentration includes all samples except blanks. The average is calculated as the sum of detected amounts and one-half of the MDLs for nondetect results, divided by the number of samples.
[e]See appropriate data table for sample locations.
[f]An average MDA is not calculated because of the variability in instrument counting error and the number of reported nondetect activities for gamma spectroscopy.

Table 4.2-1 (Concluded)
Summary of Potential COCs for DSS Site 1113, Building 6597 Drywell

COC = Constituent of concern.
DSS = Drain and Septic Systems.
HE = High explosive(s).
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
J = Analytical result was qualified as an estimated value.
MDA = Minimum detectable activity.
MDL = Method detection limit.
mg/kg = Milligram(s) per kilogram.
NA = Not applicable.
NC = Not calculated.
ND ( ) = Not detected above the MDA, shown in parentheses.
PCB = Polychlorinated biphenyl.
pCi/g = Picocurie(s) per gram.
RCRA = Resource Conservation and Recovery Act.
SVOC = Semivolatile organic compound.
VOC = Volatile organic compound.

No pathways to groundwater and no intake routes through flora or fauna are considered appropriate for either the industrial or residential land-use scenarios. Annex B provides additional discussion of the exposure routes and receptors at DSS Site 1113.

4.3 Site Assessment

Site assessment at DSS Site 1113 included risk assessments for both human health and ecological risk. This section briefly summarizes the site assessment results, and Annex B discusses the risk assessment performed for DSS Site 1113 in more detail.

4.3.1 Summary

The site assessment concluded that DSS Site 1113 poses no significant threat to human health under either the industrial or residential land-use scenarios. Ecological risks were found to be insignificant because no pathways exist.

4.3.2 Risk Assessments

Risk assessments were performed for both human health and ecological risk at DSS Site 1113. This section summarizes the results.

4.3.2.1 Human Health

DSS Site 1113 has been recommended for an industrial land-use scenario (DOE et al. September 1995). Because VOCs, SVOCs, HE compounds, cyanide, barium, and uranium-235 were detected, are present above background, or have MDAs above background, it was necessary to perform a human health risk assessment analysis for the site, which included these COCs. Annex B provides a complete discussion of the risk assessment process, results, and uncertainties. The risk assessment process provides a quantitative evaluation of the potential adverse human health effects from constituents in the site's soil by calculating the hazard index (HI) and excess cancer risk for both industrial and residential land-use scenarios.

The HI calculated for the COCs at DSS Site 1113 is 0.02 for the industrial land-use scenario, which is less than the numerical standard of 1.0 suggested by risk assessment guidance (EPA 1989). The incremental HI risk, determined by subtracting risk associated with background from potential nonradiological COC risk (without rounding), is 0.02. The excess cancer risk for DSS Site 1113 COCs is 3E-8 for an industrial land-use scenario. NMED guidance states that cumulative excess lifetime cancer risk must be less than 1E-5 (Bearzi January 2001); thus the excess cancer risk for this site is below the suggested acceptable risk value. The incremental excess cancer risk is 2.53E-8. Both the incremental HI and excess cancer risk are below NMED guidelines.

The HI calculated for the COCs at DSS Site 1113 is 0.14 for the residential land-use scenario, which is less than the numerical standard of 1.0 suggested by risk assessment guidance (EPA 1989). The incremental HI risk, determined by subtracting risk associated with background from potential nonradiological COC risk (without rounding), is 0.10. The excess cancer risk for DSS

Site 1113 COCs is 1E-7 for a residential land-use scenario. NMED guidance states that cumulative excess lifetime cancer risk must be less than 1E-5 (Bearzi January 2001); thus the excess cancer risk for this site is below the suggested acceptable risk value. The incremental excess cancer risk is 9.97E-8. Both the incremental HI and incremental excess cancer risk are below NMED guidelines.

For the radiological COCs, one of the constituents (uranium-235) had an MDA value greater than the corresponding background value. The incremental total effective dose equivalent (TEDE) and corresponding estimated cancer risk from radiological COCs are much less than U.S. Environmental Protection Agency (EPA) guidance values; the estimated TEDE is 6.6E-3 millirem (mrem)/year (yr) for the industrial land-use scenario, which is much less than the EPA's numerical guidance of 15 mrem/yr (EPA 1997a). The corresponding incremental estimated cancer risk value is 5.6E-8 for the industrial land-use scenario. Furthermore, the incremental TEDE for the residential land-use scenario that results from a complete loss of institutional control is 1.7E-2 mrem/yr with an associated risk of 1.6E-7. The guideline for this scenario is 75 mrem/yr (SNL/NM February 1998). Therefore, DSS Site 1113 is eligible for unrestricted radiological release.

The incremental nonradiological and radiological carcinogenic risks are tabulated and summed in Table 4.3.2-1.

Table 4.3.2-1
Summation of Incremental Nonradiological and Radiological Risks from DSS Site 1113, Building 6597 Drywell Carcinogens

Scenario	Nonradiological Risk	Radiological Risk	Total Risk
Industrial	2.53E-8	5.6E-8	8.1E-8
Residential	9.97E-8	1.6E-7	2.6E-7

DSS = Drain and Septic Systems.

Uncertainties associated with the calculations are considered small relative to the conservatism of the risk assessment analysis. Therefore, it is concluded that this site poses insignificant risk to human health under both the industrial and residential land-use scenarios.

4.3.2.2 Ecological

An ecological assessment that corresponds with the procedures in the EPA's Ecological Risk Assessment Guidance for Superfund (EPA 1997b) also was performed as set forth by the NMED Risk-Based Decision Tree in the "RPMP [RCRA Permits Management Program] Document Requirement Guide" (NMED March 1998). An early step in the evaluation compared COC concentrations and identified potentially bioaccumulative constituents (see Annex B, Sections IV, VII.2, and VII.2.1). This methodology also required developing a site conceptual model and a food web model, as well as selecting ecological receptors, as presented in "Predictive Ecological Risk Assessment Methodology, Environmental Restoration Program, Sandia National Laboratories, New Mexico" (IT July 1998). The risk assessment also includes the estimation of exposure and ecological risk.

All COCs at DSS Site 1113 are located at depths of 5 feet bgs or greater. Therefore, no complete ecological pathways exist at this site, and a more detailed ecological risk assessment is not necessary.

4.4 Baseline Risk Assessments

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

4.4.1 Human Health

Because the results of the human health risk assessment summarized in Section 4.3.2.1 indicate that DSS Site 1113 poses insignificant risk to human health under both the industrial and residential land-use scenarios, a baseline human health risk assessment is not required for this site.

4.4.2 Ecological

Because the results of the ecological risk assessment summarized in Section 4.3.2.2 indicate that no complete pathways exist at DSS Site 1113, a baseline ecological risk assessment is not required for the site.

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5.0 RECOMMENDATION FOR CORRECTIVE ACTION COMPLETE WITHOUT CONTROLS DETERMINATION

5.1 Rationale

Based upon field investigation data and the human health and ecological risk assessment analyses, a determination of CAC without controls is recommended for DSS Site 1113 for the following reasons:

- The soil has been sampled for all potential COCs.
- No COCs are present in the soil at levels considered hazardous to human health for either an industrial or residential land-use scenario.
- None of the COCs warrant ecological concern because no complete pathways exist at the site.

5.2 Criterion

Based upon the evidence provided in Section 5.1, a determination of CAC without controls (NMED April 2004) is recommended for DSS Site 1113. This is consistent with the NMED's NFA Criterion 5, which states, "the SWMU/AOC [Area of Concern] has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use" (NMED March 1998).

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ANNEX A
DSS Site 1113
Soil Sample Data Validation Results

RECORDS CENTER CODE: ER/1295/DSS/DAT

SMO ANALYTICAL DATA ROUTING FORM

PROJECT NAME: DSS Soil Sampling
PROJECT/TASK: 7223_02.03.02
SNL TASK LEADER: Collins
ORG/MS/CF0#: 6133/1089/CF032-02
SMO PROJECT LEAD: Herrera
SAMPLE SHIP DATE: 10/3/2002

ARCOC	LAB	LAB ID	PRELIM DATE	FINAL DATE	EDD	EDD ON Q	BY
605783	GEL	68288A		11/1/2002	X	X	JAC
605784	GEL	68288B		11/1/2002	X	X	JAC

	NAME	DATE
CORRECTIONS REQUESTED/RECEIVED:	W. Patencia	11/8/02 / 11/15/02
PROBLEM #:	5226	11/8/02
REVIEW COMPLETED BY/DATE:	W. Patencia	11/7/02
FINAL TRANSMITTED TO/DATE:		
SENT TO VALIDATION BY/DATE:	Conn	11/18/02
RUSH VALIDATION REQUIRED EST. TAT:		
VALIDATION COMPLETED BY/DATE:	N	12.07.02
TO ERDMS OR RECORDS CENTER BY/DATE:	~~CONN~~ Conn	~~10/31/2002~~ 12/18/02

COMMENTS:

CONTRACT LABORATORY
ANALYSIS REQUEST AND CHAIN OF CUSTODY

Page 1 of 2

Internal Lab

Batch No. N/A

SMO Use

AR/COC 605783

Dept. No./Mail Stop:	6135/1089	Date Samples Shipped:	10-3-02	Project/Task No.:	7223.02.03.02
Project/Task Manager:	~~Mike Sanders~~ Sue Collins	Carrier/Waybill No.	14254	SMO Authorization:	
Project Name:	DSS soil sampling	Lab Contact:	Edie Kent 803-556-8171	Contract #:	PO 21671
Record Center Code:	ER/1295/DSS/DAT	Lab Destination:	GEL		SEE ATTACHED BOTTLE ORDER
Logbook Ref. No.:	ER 090	SMO Contact/Phone:	Pam Puissant/505-844-3185		
Service Order No.	CF032-03	Send Report to SMO:	Wendy Palencia/505-844-3132		
Location	Tech Area				
Building 6596,97,98	Room				

☐ **Waste Characterization** -Send preliminary/copy report to:

☐ **Released by COC No.:**

☑ **Validation Required**

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

Reference LOV(available at SMO)

Sample No.-Fraction	ER Sample ID or Sample Location Detail	Pump Depth (ft)	ER Site No.	Date/Time(hr) Collected	Sample Matrix	Container Type	Container Volume	Preserv-ative	Collection Method	Sample Type	Parameter & Method Requested	Lab Sample ID
060046-001	6596/1105-DW1-BH1-10-S	10'	1105	9-26-02/0925	S	AS	4oz	4c	G	SA	VOC(8260B)	
060047-001	6596/1105-DW1-BH1-15-S	15'		0940	S	AS	4oz	4c	G	SA	VOC(8260B)	
060046-002	6596/1105-DW1-BH1-10-S	10'		0930	S	AG	500ml	4c	G	SA	see below for parameter	
060047-002	6596/1105-DW1-BH1-15-S	15'		0945	S	AG	500ml	4c	G	SA	see below for parameter	
060048-001	6596/1105-DW1-BH1-10-DU	10'		0925	S	AS	4oz	4c	G	SA	VOC(8260B)	
060049-001	6596/1105-DW1-BH1-10-DU	10'		0930	S	AG	500ml	4c	G	SA	see below for parameter	
060050-001	6597/1113-DW1-BH1-5-S	5'	1113	1015	S	AS	4oz	4c	G	SA	VOC(8260B)	
060051-001	6597/1113-DW1-BH1-10-S	10'		1140	S	AS	4oz	4c	G	SA	VOC(8260B)	
060050-002	6597/1113-DW1-BH1-5-S	5'		1020	S	AG	500ml	4c	G	SA	see below for parameter	
060051-002	6597/1113-DW1-BH1-10-S	10'		1145	S	AG	500ml	4c	G	SA	see below for parameter	

RMMA ☐ Yes ☑ No Ref. No.

Sample Disposal ☐ Return to Client ☑ Disposal by lab

Turnaround Time ☑ Normal ☐ Rush

Return Samples By: Level of Rush:

Sample Tracking Smo Use
Date Entered(mm/dd/yy) 10/07/02
Entered by: RK
QC inits. JAC

Special Instructions/QC Requirements
EDD ☑ Yes ☐ No
Level C Package ☑ Yes ☐ No

	Name	Signature	Init	Company/Organization/Phone/Cellular
Sample Team Members	J.Lee			Weston/6135/505-284-3309
	~~W.Gibson~~			~~MDM/6135/505-845-3267~~
	G.Quintana			Shaw/6135/505-284-3309

*Send report to: Mike Sanders, Dept6135/MS/1089, Phone/505-284/2478

SVOC(8270C_ PCB(8082)HE(8330) Total Cyanide(9010) Cr6+(7197) RCRA metals(6020, 7000,7471)Gross alpha-beta(900)

*Please list as separate report.

Abnormal Conditions on Receipt

Lab Use

1.Relinquished by		Org. 6135	Date 10/3/02	Time 1015	4.Relinquished by	Org.	Date	Time
1. Received by		Org. 6137	Date 10/3/02	Time 1015	4. Received by	Org.	Date	Time
2.Relinquished by		Org. 6137	Date 10/3/02	Time 1120	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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Site: DSS soil sampling **ARCOC:** 605783 and 605784 **Data:** Organic, Inorganic and Radiochemistry

Sample ID	All SVOC(8270) compounds	129-00-0 (pyrene)	95-95-4 (2,4,5-trichlorophenol)	86-73-7 (fluorene)	117-81-7 (bis(2-ethylhexyl)phthalate)	100-02-7 4-nitrophenol	87-86-5 (pentachlorophenol)	121-14-2 (2,4-dinitrotoluene)	All PCB (8082) compounds	All HE(8330) compounds	479-45-9 (tetryl)	606-20-2 (2,6-dinitrotoluene)	35572-78-2 (2-amino-4,6-dinitrotoluene)	88-72-2 (2-nitrotoluene)	1946-51-0 (4-amino-2,6-dinitrotoluene)	121-14-2 (2,4-dinitrotoluene)	2691-41-0 (HMX)	98-95-3 (nitrobenzene)	Metals	7440-39-3 (barium)	7440-47-3 (chromium)	7782-49-2 (selenium)	7439-97-6 (mercury)	General Chemistry	18540-29-9 (hexavalent chromium)	5955-70-0 (total cyanide)	Radiochemistry
060078-002 Stack S.Pit/1098-SP1-EB	P2																									
060078-004 Stack S.Pit/1098-SP1-EB										P2	R, P2															
060078-005 Stack S.Pit/1098-SP1-EB																									UJ,A2	
060078-006 Stack S.Pit/1098-SP1-EB																								UJ,HT		
060078-007 Stack S.Pit/1098-SP1-EB																				J,B3	J,B3	J,B3	J,B,B3			
060046-002 6596/1105-DW1-BH1-10-S																				J, A2		J,B2,B3	J,B2			
060047-002 6596/1105-DW1-BH1-15-S																				J, A2		J,B2,B3	J,B2			
060049-001 6596/1105-DW1-BH1-10-DU		J																		J, A2		J,B2,B3	J,B2			
060050-002 6597/1113-DW1-BH1-5-S									R, A1			R	R	J						J, A2		J,B2,B3	J,B2			
060061-002 6597/1113-DW1-BH1-10-S									R, A1						R,A1	R,A1	J, A1	J, A1		J, A2		J,B2,B3	J,B2			
060052-002 6580/1037-SP1-BH1-5-S																				J, A2		UJ,B3	J,B2			
060053-002 6580/1037-SP1-BH1-10-S																				J, A2		J,B2,B3	J,B2			
060055-002 Stack S.Pit/1098-SP1-BH1-10-S																				J, A2		J,B2,B3	J,B2			
060056-002 Stack S.Pit/1098-SP1-BH1-15-S		J																		J, A2		J,B2,B3	J,B2			
060059-002 6595/1104-SP1-BH1-11-S																				J, A2		J,B2,B3	J,B2			J,B,B3
060060-002 6595/1104-SP1-BH1-16-S			J, A1	J, A1	J, A1	R, A2	R, A2	R, A2, P1												J, A2		J,B2,B3	J,B2			J,B,B3

All QC acceptance criteria were met. No data will be qualified.

Validated By: [signature]

Date: 12/06/02

Site: DSS soil sampling **ARCOC:** 605783 and 605784 **Data:** Organic

Sample ID	All VOC(8260) compounds	79-01-6 (trichloroethene)	75-25-2 (bromoform)	79-34-5 (1,1,2,2-tetrachloroethane)	79-00-5 (1,1,2-trichloroethane)	108-90-7 (chlorobenzene)	124-48-1 (dibromochloromethane)	100-42-5 (styrene)	10061-02-6 (trans-1,3-dichloropropene)	591-78-6 (2-hexanone)	108-10-1 (4-methyl-2-pentanone)	100-41-4 (ethylbenzene)	127-18-4 (tetrachloroethene)	108-88-3 (toluene)	1330-20-7 (total xylenes)	67-64-1 (acetone)	78-93-3 (2-butanone)
060054-001 6580/1037-SP1-TB	UJ, HT																
060046-001 6596/1105-DW1-BH1-10-S		UJ															
060047-001 6596/1105-DW1-BH1-15-S		UJ															
060048-001 6596/1105-DW1-BH1-10-DU		UJ															
060050-001 6597/1113-DW1-BH1-5-S		UJ	UJ									J,A1	J, A1	J, A1	J, A1	J,A1	J,A1
060051-001 6597/1113-DW1-BH1-10-S		UJ	R	UJ	UJ	UJ	UJ	UJ	UJ	J, A1	J, A1	J, A1	J, A1	J, A1	J, A1	J,A1	J,A1
060052-001 6580/1037-SP1-BH1-5-S		UJ															
060053-001 6580/1037-SP1-BH1-10-S		UJ															
060055-001 Stack S.Pit/1098-SP1-BH1-10-S		UJ															
060056-001 Stack S.Pit/1098-SP1-BH1-15-S		UJ															
060059-001 6595/1104-SP1-BH1-11-S		UJ	UJ							J,A1		J, A1	J, A1	J, A1		J,A1	J,A1
060060-001 6595/1104-SP1-BH1-16-S		J,A1	R					J, A1				J, A1	J, A1	J, A1	J, A1	J,A1	J,A1

Validated By: K Neal **Date:** 12/06/02

Analytical Quality Associates, Inc.
616 Maxine NE
Albuquerque, NM 87123
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MEMORANDUM

DATE: December 02, 2002

TO: File

FROM: Linda Thal

SUBJECT: Radiochemical Data Review and Validation - SNL
Site: DSS soil sampling
ARCOC 605783 and 605784
GEL SDG # 68288 and 68295
Project/Task No. 7223.02.03.02

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. This validation was performed according to SNL/NM ER Project AOP 00-03.

Summary

All samples were prepared and analyzed with approved procedures using method EPA 900.0 (Gross Alpha/Beta). No problems were identified with the data package that resulted in the qualification of data.

Data are acceptable and 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 the instruments used were properly calibrated.

Blanks

No target analytes were detected in the method blank or equipment blank at concentrations > the associated MDAs.

Matrix Spike (MS) Analysis

The MS/MSD analyses met all QC acceptance criteria.

Laboratory Control Sample (LCS) Analysis

The LCS analyses met all QC acceptance criteria.

Replicates

The replicate analyses met all QC acceptance criteria.

Tracer/Carrier Recoveries

No tracer/carrier required.

Negative Bias

All sample results met negative bias QC acceptance criteria.

Detection Limits/Dilutions

All detection limits were properly reported. No samples were diluted.

Other QC

An equipment blank and a field duplicate were submitted on the ARCOC. There are no "required" validation procedures for field duplicates. No field blank was submitted on the ARCOC.

No raw data was submitted with the package.

No other specific issues were identified which affect data quality.

Reviewed By: KAS **Level:** I **Date:** 12/10/02

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MEMORANDUM

DATE: 12/02/02

TO: File

FROM: Linda Thal

SUBJECT: Inorganic Data Review and Validation - SNL
Site: DSS soil sampling
ARCOC # 605783 and 605784
GEL SDG # 68288 and 68295
Project/Task No. 7223.02.03.02

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM ER Project AOP 00-03.

Summary

The samples were prepared and analyzed with approved procedures using methods SW-846 6010 (ICP-AES metals), SW-846 7471/7470 (Hg), SW-846 9012A (total CN) and SW-846 7196A (hexavalent chromium).

Problems were identified with the data package that resulted in the qualification of data.

ICP-AES – Metals Batch # 206907 (Samples 68288-012 through –022)
Selenium was detected in the ICB at a negative value with an absolute value > DL but < RL. Selenium was also detected in the CCB and the EB at a value > DL but < RL. All associated sample results, with the exception of sample 68288-017, had values > DL but < 5X DL and < 5X the blank values and will be qualified "J, B2, B3". Sample 68288-017 was non-detect and will be qualified "UJ, B3".

The MS %R for barium (131%) was > QC acceptance criteria (75-125%). The replicate RPD for barium (55%) was > QC acceptance criteria (<35%). All associated sample results were detects and will be qualified "J, A2".

Hg – Batch # 207430 (Samples 68288-012 through –022)
Mercury was detected in the EB at the RL. All associated sample results were detects, <10X the blank value and will be qualified "J, B2".

ICP-AES – Metals Batch # 206624 (Sample 68295 –010)

Barium, chromium and selenium were detected in the ICB and/or CCB at values > DL but < RL. Sample 68295 –010 results were detects, < 5X the blank values and will be qualified "J, B3".

Hg – Batch # 207410 (Sample 68295-010)
Mercury was detected in the MB and the CCB at a value >DL but < RL. The sample result was a detect, <5X the blank values and will be qualified "J, B, B3".

Total Cyanide – Batch # 206731 (Samples 68288-012 through –022)
The MB and the ICB had a value > DL but < RL. Samples 68288-021 and –022 had values > DL but < 5X the blank value and will be qualified "J, B, B3".

Total Cyanide – Batch # 207325 (Sample 68295-008)
The MS (69%) had a %R >30% but < 75%. The sample result was non-detect and will be qualified "UJ, A2".

Hexavalent Chromium – Batch # 206338 (Sample 68295-009)
Sample 68295-009 was received by the laboratory and analyzed after the holding time had expired, but within 2X the holding time. The sample result was non-detect and will be qualified "UJ, HT".

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

Holding Times/Preservation

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

Calibration

All Analyses: The initial and continuing calibration data met QC acceptance criteria.

Blanks

All Analyses: All blank criteria were met except as mentioned above in the summary section and as follows:

ICP-AES – Metals Batch # 206907 (Samples 68288-012 through –022)
Barium and chromium were detected in the EB at values > DL but < RL. All associated sample results were > 5X the blank values and will not be qualified.

ICP-AES – Metals Batch # 206624 (Sample 68295 –010)
Cadmium and arsenic were detected in the ICB and/or CCB at values > DL but < RL. The sample results were non-detect and no data will be qualified.

Total Cyanide – Batch # 206731 (Samples 68288-012 through –022)
The MB and the ICB had a value > DL but < RL. Samples 68288-015 and –016 had values > RL and > 5X the blank values and will not be qualified. All remaining samples (excluding samples 68288-021 and –022) were non-detect and will not be qualified.

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

All Analyses: The LCS/LCSD met QC acceptance criteria.

Matrix Spike (MS) Analysis

All Analyses: The MS met QC acceptance criteria except as mentioned above in the summary section and as follows:

ICP-AES – Metals Batch # 206624 (Sample 68295 –010)
The sample used for the MS was of similar matrix from another SNL SDG. No data will be qualified as a result.

Hg – Batch # 207410 (Sample 68295-010)
The sample used for the MS was of similar matrix from another SNL SDG. No data will be qualified as a result.

Hexavalent Chromium - Batch #207514 (Samples 68288-012 through –022)
Two MSs were performed. One of the two MS %Rs (72%) was slightly < QC acceptance criteria (75-125%). According to an email included with the data package, SNL has approved using GEL acceptance limits (49-130%) for hexavalent chromium. No data will be qualified.

Replicate Analysis

All Analyses: The replicate analysis met QC acceptance criteria except as mentioned above in the summary section and as follows:

ICP-AES – Metals Batch # 206624 (Sample 68295 –010)
The sample used for the replicate was of similar matrix from another SNL SDG. No data will be qualified as a result.

Hg – Batch # 207410 (Sample 68295-010)
The sample used for the replicate was of similar matrix from another SNL SDG. No data will be qualified as a result.

ICP Interference Check Sample (ICS)

ICP-AES (All batches): The ICS-AB met QC acceptance criteria.

All Other Analyses: No ICS required.

ICP Serial Dilution

ICP-AES (All batches): The serial dilution met QC acceptance criteria.

> ICP-AES – Metals Batch # 206624 (Sample 68295 –010)
> The sample used for the serial dilution was of similar matrix from another SNL SDG. No data will be qualified as a result.

All Other Analyses: No serial dilutions required.

Detection Limits/Dilutions

All Analyses: All detection limits were properly reported.

ICP-AES: All soil samples were diluted 2X with the exception of samples 68288-017 and –018 that were diluted 5X and 10X, respectively, for chromium.

Hexavalent Chromium: Sample 68288-015 and –016 were diluted 5X due to turbidity.

All Other Analyses: No dilutions were performed.

Other QC

All Analyses: An equipment blank and a field duplicate were submitted on the ARCOC. There are no "required" validation procedures for field duplicates. No field blank was submitted on the ARCOC.

It should be noted that the COC requested that metals be analyzed by method SW-846 6020.

No raw data was submitted with the package.

No other specific issues were identified which affect data quality.

Reviewed By: KAS **Level:** I **Date:** 12/10/02

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Email: minteer@aol.com

MEMORANDUM

DATE: 11/25/02

TO: File

FROM: Linda Thal

SUBJECT: Organic Data Review and Validation - SNL
Site: DSS soil sampling
ARCOC # 605783, -84
GEL SDG # 68288 and 68295
Project/Task No. 7223.02.03.02

See the attached Data Validation Worksheets for supporting documentation on the data review and validation. Data are evaluated using SNL/NM ER Project AOP 00-03.

Summary

The samples were prepared and analyzed with approved procedures using methods SW-846 8260A/B (VOC), 8270C (SVOC), 8082 (PCBs) and 8330 (HEs). Problems were identified with the data package that resulted in the qualification of data.

VOC Batch # 207083 (Samples 68288-001 through –011)

The RF for trichloroethene in the initial calibration was < specified minimum (0.30) but > 0.01. Samples 68288-001 through –010 were non-detect and will be qualified "UJ"; sample 68288-011 had a value > DL and will be qualified "J".

The %R for surrogate 1,4-dichlorobenzene-d4 is out of criteria high in samples 68288-004, -005, -010, and –011, and that for surrogate toluene-d8 is out of criteria high in samples 68288-005 and –011. Thus, all detects for these samples will be qualified "J,A1."

The area count for internal standard 3 (1,4-Dichlorobenzene-d4) was out of criteria low in samples 68288-004, -005, -010 and –011. Bromoform is the only compound associated with this internal standard and was non-detect in all samples. Samples 68288-004 and –010 had internal standard area counts >25% but <50% and will be qualified "UJ". Samples 68288-005 and –011 had an area count <25% and will be qualified "R".

The area count for internal standard 2 (chlorobenzene-d5) was out of criteria low (>25% but <50%) in sample 68288-005. All non-detect compounds associated with this internal standard (1,1,2,2-tetrachloroethane; 1,1,2-trichloroethane; chlorobenzene; dibromochloromethane, styrene and trans-1,3-dichloropropene) will be qualified "UJ". All detects (2-hexanone; 4-methyl-2-pentanone; ethylbenzene; tetrachloroethene; toluene and total xylenes) will be qualified "J".

VOC Batch # 207726 (Samples 68295-001 through -004)
Sample 68295-001 was analyzed passed its method specified hold time. All sample results were non-detect and will be qualified "UJ, HT".

SVOC Batch # 206457 (Samples 68288-012 through -022)
Pyrene (27%) had a %D >20% but <40% with a negative bias in the CCV preceding samples 68288-012 through –014, and –017 through –021. Sample 68288-014 and –020 had a value > DL and will be qualified "J".

Sample 68288-022 had surrogate recoveries (nitrobenzene-d5, phenol-d5 and 2,4,6-tribromophenol) > QC acceptance criteria (see DV Worksheet). All compounds that are detect will be qualified "J, A1" (see SFS).

The MS/MSD had 0%R for 4-nitrophenol and pentachlorophenol. The MSD had 0%R for 2,4-dinitrotoluene with a RPD of 200%. Sample 68288-022 was used for the MS/MSD. It is the only sample that had surrogate failures. It was also diluted 10X due to its viscous nature. Using professional judgment, the MS/MSD qualifiers will be applied to sample 68288-022 only. All failing compounds were non-detect and will be qualified "R, A2". 2,4-Dinitrotoluene will also have a "P1" descriptor flag.

SVOC Batch # 206445 (Sample 68295-005)
The MS/MSD extracted with this batch was from a different client. As there is no measure of precision for this sample, all results will be qualified "P2".

HE Batch # 206554 (Samples 68288-012 through -022)
2,6-Dinitrotoluene and 2-amino-4,6-dinitrotoluene were detected in sample 68288-015 at a value > DL but < RL. The confirmation RPD between the primary and secondary column was > 75%, and therefore the sample results will be qualified "R".
2-Nitrotoluene was detected in sample 68288-015 at a value > RL. The confirmation RPD between the primary and secondary column was >25% but < 75%. The highest value is reported and will be qualified "J".

4-Amino-2,6-dinitrotoluene and 2,4-dinitrotoluene were detected in sample 68288-016 at a value > RL. The confirmation RPD between the primary and secondary column was > 75%, and therefore the sample results will be qualified "R".
HMX and Nitrobenzene were detected in sample 68288-016 at a value > RL. The confirmation RPD between the primary and secondary column was < 10%. However the %R for the surrogate (330%) was > QC acceptance criteria (71-118%) due to matrix interference and this matrix interference should be taken into account when assessing sample results. The sample results will be qualified "J, A1," and the "A1" descriptor flag will be added to the 4-amino-2,6-dinitrotoluene and 2,4-dinitrotoluene qualifiers.

HE Batch # 206481 (Sample 68295-007)
Tetryl was detected in the sample at a value > DL but < RL. The confirmation RPD between the primary and secondary column was > 75%, and therefore the sample result will be qualified "R".

The MS/MSD extracted with this batch was from another SDG and failed %R for several spiked compounds as well as surrogate recovery. Using professional judgment, this data will not be used to qualify sample 68295-007. As there is no other measure of precision all the sample results for 68295-007 will be qualified "P2".

PCB Batch # 206286 (Samples 68288-012 through -022)

Sample 68288-015 had a %R for both surrogates of < 10%. Sample 68288-016 had a %R for DCB (surrogate) of < 10% and a %R >10% but < lower QC acceptance criteria for 4cmx (surrogate). The sample results were non-detect and will be qualified "R, A1".

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

Holding Times/Preservation

All Analyses: The samples were properly preserved and analyzed within the method prescribed holding time except as mentioned above in the summary section.

Calibration

All Analyses: All initial and continuing calibration acceptance criteria were met except as mentioned above in the summary section and as follows:

VOC Batch # 207083
Chloroethane had %D > 20% but < 40% in the CCV preceding the samples. All associated sample results were non-detect and will not be qualified.

VOC Batch # 207726 (Samples 68295-001 through -004)
Bromomethane and carbon disulfide had %Ds > 20% but < 40% in the CCV preceding the samples. The sample results were non-detect and will not be qualified.

SVOC Batch # 206457 (Samples 68288-012 through -022)
Pyrene (27%) had a %D >20% but <40% with a negative bias in the CCV preceding samples 68288-012 through –014, and –017 through –021. All associated sample results were non-detect (excluding 68288-014 and –020) and will not be qualified.

Several other compounds (see Data Validation Worksheet) had CCV %Ds > 20% but < 40% in the CCVs preceding the samples. All associated sample results were non-detect and will not be qualified.

SVOC Batch # 206445 (Sample 68295-005)
Several compounds (see Data Validation Worksheet) had CCV %Ds > 20% but < 40% in the CCV preceding the sample. All associated sample results were non-detect and will not be qualified.

Blanks

All Analyses: All method blank, equipment blank and trip blank acceptance criteria were met except as mentioned above in the summary section and as follows:

HE - Batch # 206554 (Samples 68288-012 through -022)
Tetryl was observed in the equipment blank (sample 68295-007) associated with these samples. All sample results were non-detect for tetryl and no data will be qualified.

Surrogates

All Analyses: All surrogate acceptance criteria were met except as mentioned above in the summary section.

Internal Standards (ISs)

All Analyses: All internal standard acceptance criteria were met except as mentioned above in the summary section.

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

All Analyses: All MS/MSD acceptance criteria were met except as mentioned above in the summary section and as follows:

VOC Batch # 207726 (Samples 68295-001 through -004)
It should be noted that the sample used for the MS/MSD was of similar matrix from another SNL SDG. No data will be qualified.

SVOC Batch # 206457 (Samples 68288-012 through -022)
Several compounds (see DV worksheet) had %Rs < QC acceptance criteria (75 – 125%). Using professional judgment, no data will be qualified.

PCB Batch # 206677 (Sample 68295-006)
No MS/MSD was extracted with this sample. An LCS/LCSD was extracted and met all QC acceptance criteria for accuracy and precision.

Laboratory Control Samples (LCS/LCSD) Analysis

All Analyses: The LCS/LCSD acceptance criteria were met with the following exceptions:

VOC Batch # 207726 (Samples 68295-001 through -004)
The QC acceptance criteria for the LCS were met by the successful analysis of a second source CCV.

VOC Batch # 207726 and 207083
It should be noted that no compound was associated with internal standard 1,4-dichlorobenzene-d4. No data will be qualified as a result.

SVOC Batch #s 206457 and 206445
It should be noted that no compound was associated with internal standard perylene-d12. No data will be qualified as a result.

Detection Limits/Dilutions

All Analyses: All detection limits were properly reported.

VOC and HE: Samples were not diluted.

SVOC: Samples 68288-015, -016 and –022 were diluted 10X due to the viscous nature of the sample.

PCB: Samples 68288-021 and –022 were diluted 10X due to the viscous nature of the sample.

Confirmation Analyses

VOC and SVOC: No confirmation analyses required.

PCB: All confirmation acceptance criteria were met.

HE: The confirmation analysis met acceptance criteria except as mentioned above in the summary section.

Other QC

VOC: Trip blanks, an equipment blank and a field duplicate were submitted on the ARCOC.However, there are no "required" validation procedures for assessing a field duplicate.
It should be noted that vinyl acetate is on the TAL for soils but not for waters.

SVOC, PCB and HE: An equipment blank and a field duplicate were submitted on the ARCOC. However, there are no "required" validation procedures for assessing a field duplicate.
No field blank was submitted on the ARCOC.

No raw data were submitted with the package.

No other specific issues were identified which affect data quality.

Reviewed By: KAS **Level:** I **Date:** 12/10/02

Data Validation Summary

Site/Project: OSS Soil Sampling Project/Task #: 7223.02.03.02 # of Samples: 22 & 11 Matrix: Soils & H2O

AR/COC #: 605783, 605784 Laboratory Sample IDs: 68288 - 001 thru - 022

Laboratory: GEL 68295 - 001 thru - 011

Laboratory Report #: 68288

QC Element	Analysis									
	Organics				Inorganics				RAD	Other (Hexavalent Chromium)
	VOC	SVOC	Pesticide/ PCB	HPLC (HE)	ICP/AES	GFAA/ AA	CVAA (Hg)	CN		
1. Holding Times/Preservation	✓ / UJ, HT	✓	✓	✓	✓	NA	✓	✓	✓	✓ / UJ, HT
2. Calibrations	J, UJ / ✓	J / ✓	✓	✓	✓		✓	✓	✓	✓
3. Method Blanks	✓	✓	✓	✓	J, B2, B3 ✓ / J, B2, B3		J, B2 / J, B, B3	J, B, B3 / ✓	✓	✓
4. MS/MSD	✓	K, A2, P1 / P2	✓	✓ / P2	J, A2 / ✓		✓	✓ / UJ, A2	✓	✓
5. Laboratory Control Samples	✓	✓	✓	✓	✓		✓	✓	✓	✓
6. Replicates					J / ✓		✓	✓	✓	✓
7. Surrogates	J, A1 / ✓	J, A1 / ✓	R, A1 / ✓	J, A1 / ✓						NA
8. Internal Standards	J, UJ, R / ✓	✓								
9. TCL Compound Identification	✓	✓								
10. ICP Interference Check Sample					✓					
11. ICP Serial Dilution					✓					
12. Carrier/Chemical Tracer Recoveries									✓	
13. Other QC	DUP EB TB	DUP EB	DUP EB	DUP EB	DUP EB		DUP EB	DUP EB	DUP EB	DUP EB

R, * J

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

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

Reviewed By: KMal Date: 12.02.02

Holding Time and Preservation

Site/Project: DSJ Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68288 - 001 thru - 022

Laboratory: GEL Laboratory Report #: 68288 68295 - 001 thru - 011

# of Samples: 22 & 11 Matrix: Soil & Water

Sample ID	Analytical Method	Holding Time Criteria	Days Holding Time was Exceeded	Preservation Criteria	Preservation Deficiency	Comments
68295 - 001	SW-846 8260B	14 days	1 day	NA	NA	UJ, HT
68295 - 009	SW-846 7196A	24 hours	8.05 hours	NA	NA	UJ, HT
	6011 Anal.	10.3 4.10 10.04 17.15				

Reviewed By: [signature] Date: 12.02.02

WS 1062 Soils

Volatile Organics (SW 846 Method 8260)

Site/Project: DSO Soil Sampling AR/COC #: 605783, -84 # of Samples: 11 Matrix: Soil

Laboratory: GEL Laboratory Report #: 68288 Laboratory Sample IDs: 68288 - 001 thru - 011

Methods: SW- 846 - 8260A Batch #s: 207083

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	1&3 Field Dup. RPD	Equip. Blanks	All Trip Blanks		
1	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓	✓	✓							✓	✓	✓		
2	79-34-5	1,1,2,2-tetrachloroethane		0.30																
2	79-00-5	1,1,2-trichloroethane		0.10																
1	75-34-3	**1,1-dichloroethane**		0.10																
1	75-35-4	**1,1-dichloroethene**		0.20						✓			✓	✓	✓					
1	107-06-2	**1,2-dichloroethane**		0.10																
1	540-59-0	**1,2-dichloroethene(total)**		0.01																
1	78-87-5	**1,2-dichloropropane**	✓	0.01																
1	78-93-3	**2-butanone (MEK) (10xblk)**	✓	0.01																
1	110-75-8	2-chloroethyl vinyl ether																		
2	591-78-6	2-hexanone (MBK)	✓	0.01																
2	108-10-1	4-methyl-2-pentanone (MIBK)		0.10																
1	67-64-1	**acetone(10xblk)**		0.01	✓	✓	✓													
1	71-43-2	**benzene**		0.50						✓			✓	✓	✓					
1	75-27-4	bromodichloromethane		0.20																
3	75-25-2	bromoform		0.10																
1	74-83-9	bromomethane		0.10																
1	75-15-0	carbon disulfide		0.10																
1	56-23-5	**carbon tetrachloride**		0.10																
2	108-90-7	**chlorobenzene**		0.50						✓			✓	✓	✓					
1	75-00-3	chloroethane		0.01				+23												
1	67-66-3	**chloroform**		0.20				✓												
1	74-87-3	chloromethane		0.10																
1	10061-01-5	cis-1,3-dichloropropene		0.20																
2	124-48-1	dibromochloromethane		0.10																
2	100-41-4	ethylbenzene		0.10																
1	75-09-2	methylene chloride (10xblk)		0.01	✓	✓	✓													
2	100-42-5	styrene		0.30																
2	127-18-4	**tetrachloroethene**		0.20																
2	108-88-3	toluene(10xblk)		0.40						✓			✓	✓	✓					
2	10061-02-6	trans-1,3-dichloropropene		0.10																
1	79-01-6	**trichloroethene**		0.30		.233				✓			✓	✓	✓					
1	75-01-4	**vinyl chloride**		0.10		✓														
2	1330-20-7	xylenes(total)		0.30																
	cis - 1,2 - Dichloroethene																			
	trans - 1,2 - Dichloroethene																			

Comments: Vinyl Acetate (soils only)

Notes: Shaded rows are RCRA compounds

Reviewed By: K Mac Date: 11.22.02

1	71-55-6	1,1,1-trichloroethane	0.10					UJ											
2	79-34-5	1,1,2,2-tetrachloroethane	0.30					UJ											
2	79-00-5	1,1,2-trichloroethane	0.10																
1	75-34-3	**1,1-dichloroethane**	0.10																
1	75-35-4	**1,1-dichloroethene**	0.20																
1	107-06-2	**1,2-dichloroethane**	0.10																
1	540-59-0	**1,2-dichloroethene(total)**	0.01																
1	78-87-5	**1,2-dichloropropane**	0.01																
1	78-93-3	**2-butanone (MEK) (10xblk)**	0.01																
1	110-75-8	2-chloroethyl vinyl ether																	
2	591-78-6	2-hexanone (MBK)	0.01					J J AI											
2	108-10-1	4-methyl-2-pentanone (MIBK)	0.10					J J AI											
1	67-64-1	**acetone(10xblk)**	0.01																
1	71-43-2	**benzene**	0.50																
1	75-27-4	bromodichloromethane	0.20																
3	75-25-2	bromoform	0.10	UJ				R		UJ			R						
1	74-83-9	bromomethane	0.10																
1	75-15-0	carbon disulfide	0.10																
1	56-23-5	**carbon tetrachloride**	0.10																
2	108-90-7	**chlorobenzene**	0.50					UJ											
1	75-00-3	chloroethane	0.01																
1	67-66-3	**chloroform**	0.20																
1	74-87-3	chloromethane	0.10																
1	10061-01-5	cis-1,3-dichloropropene	0.20																
2	124-48-1	dibromochloromethane	0.10					UJ											
2	100-41-4	ethylbenzene	0.10					J J AI					J AI						
1	75-09-2	methylene chloride (10xblk)	0.01																
2	100-42-5	styrene	0.30					UJ					J A						
2	127-18-4	**tetrachloroethene**	0.20					J J AI					J AI						
2	108-88-3	toluene(10xblk)	0.40					J J AI					J AI						
2	10061-02-6	trans-1,3-dichloropropene	0.10					UJ J AI											
1	79-01-6	**trichloroethene**	0.30																
1	75-01-4	**vinyl chloride**	0.10																
2	1330-20-7	xylenes(total)	0.30					J J AI					J AI						
					SAMPENO	K		S											

IS

Comments:

Notes: Shaded rows are RCRA compounds.

Reviewed By: 10 1 Date:

SWT ↑ detect J

IS low < 25% detect J NOT R

IS < 50% " " UJ

Surr ② 5-11 5 ③ already B-18 Surrogates 4, 2, 1, 3 BCB ↑ only bromoform already qualified based on IS

WS lot 2 soils

Volatile Organics

Site/Project: _____ AR/COC #: 605783, -84 Batch #s: _____

Laboratory: _____ Laboratory Report #: _____ # of Samples: _____ Matrix: _____

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

> 744883 > 393137

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
68288 - 004	BFB 183% (69-138)	✓	Tol-d8 (67-139) ✓	✓	✓	✓	✓	<50% >25% ↓ 302782	✓
- 005	214	✓	142	✓	✓	<50% >25% ↓ 642787	✓	<25% ↓ 121815	✓
- 010	211	✓	✓	✓	✓	✓	✓	<50% >25% ↓ 268286	✓
- 011	294	✓	147	✓	✓	✓	✓	<25% ↓ 107732	✓
The samples were reanalyzed with similar results confirming matrix effects.									

SMC 1: 4-Bromofluorobenzene
SMC 2: Dibromofluoromethane
SMC 3: Toluene-d8

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

Comments:

Low IS 1, 4 – High surr. BFB High TNL

Low IS Chlor – High surr ~~BFB~~ J Tol d8 High TNL.

4 Dichloro IS <50% >25% Detects J NDs go UJ. SA 004 & 010 Bromoform "UJ"

<25% Detects J NDs go R SA 005 & 011 Bromoform "R"

Xylenes J
Trans 1,3 ND
Tol J
Tetrachloro J

B-19

2. Chlorobenze d5 Detects J NDs UJ SA 005 1,1,2 - ND 2 hex J Chlorobenzene ND Ethyl J
1,1,2 - ND 4 MIBK J Dibromo ND Styrene ND

WS 2 of 2 TB/EB

Volatile Organics (SW 846 Method 8260)

Site/Project: DSS Soil Sampling AR/COC #: 605783, -84 # of Samples: 4 Matrix: Aqueous

Laboratory: GEL Laboratory Report #: 68288 Laboratory Sample IDs: 68295 - 001 thru - 004

Methods: SW - 846 8260B Batch #s: 207726

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	AH Trip Blanks
1	71-55-6	1,1,1-trichloroethane	✓	0.10		✓	✓	✓	✓		NA					NA	NA	NA
2	79-34-5	1,1,2,2-tetrachloroethane		0.30														
2	79-00-5	1,1,2-trichloroethane		0.10														
1	75-34-3	**1,1-dichloroethane**		0.10														
1	75-35-4	**1,1-dichloroethene**		0.20						✓			✓	✓	✓			
1	107-06-2	**1,2-dichloroethane**		0.10														
1	540-59-0	**1,2-dichloroethene(total)**		0.01														
1	78-87-5	**1,2-dichloropropane**	✓	0.01														
1	78-93-3	**2-butanone (MEK) (10xblk)**	✓	0.01														
1	110-75-8	2-chloroethyl vinyl ether																
2	591-78-6	2-hexanone (MBK)	✓	0.01														
2	108-10-1	4-methyl-2-pentanone (MIBK)		0.10														
1	67-64-1	**acetone(10xblk)**		0.01	✓	✓	✓											
1	71-43-2	**benzene**		0.50						✓			✓	✓	✓			
1	75-27-4	bromodichloromethane		0.20														
3	75-25-2	bromoform		0.10	✓	✓	✓											
1	74-83-9	bromomethane		0.10				+23										
1	75-15-0	carbon disulfide		0.10				-22										
1	56-23-5	**carbon tetrachloride**		0.10				✓										
2	108-90-7	**chlorobenzene**		0.50						✓			✓	✓	✓			
1	75-00-3	chloroethane		0.01														
1	67-66-3	**chloroform**		0.20														
1	74-87-3	chloromethane		0.10														
1	10061-01-5	cis-1,3-dichloropropene		0.20														
2	124-48-1	dibromochloromethane		0.10	✓	✓	✓											
2	100-41-4	ethylbenzene		0.10														
1	75-09-2	methylene chloride (10xblk)		0.01	✓	✓	✓											
2	100-42-5	styrene		0.30														
2	127-18-4	**tetrachloroethene**		0.20														
2	108-88-3	toluene(10xblk)		0.40						✓			✓	✓	✓			
2	10061-02-6	trans-1,3-dichloropropene		0.10	✓	✓	✓											
1	79-01-6	**trichloroethene**		0.30		.288 / .3				✓			✓	✓	✓			
1	75-01-4	**vinyl chloride**		0.10														
2	1330-20-7	xylenes(total)		0.30														
		cis - 1,2 - Dichloroethene																
		trans - 1,2 - Dichloroethene																

Comments: -001 UJ, HT NCR# 7119 **Notes:** Shaded rows are RCRA compounds.

Reviewed By: [signature] Date: 11.22.02

MS/MSD 68152 SNA SOG

CCV & LCS same fue

WS 2 of 2 TB/EB

Volatile Organics

Site/Project: _____ AR/COC #: 605783, - 84 Batch #s: _____

Laboratory: _____ Laboratory Report #: _____ # of Samples: _____ Matrix: _____

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
IN CRITERIA									

SMC 1: 4-Bromofluorobenzene
SMC 2: Dibromofluoromethane
SMC 3: Toluene-d8

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

Comments:

1 of 2 soil

Semivolatile Organics (SW 846 Method 8270)

Site/Project: DSS Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68288 - 012 thru - 022

Laboratory: GEL Laboratory Report #: 68288

Methods: SW-846 8270C

# of Samples: 11 Matrix: SOILS Batch #s: 206457

IS	BNA	CAS #	NAME	TCL	Min. RF	Intercept	Calib. RF >.05	Calib. RSD/ R^2 <20%/ 0.99	CCV %D 20% 2 3 4	Method Blanks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD 12&14	Equip. Blanks 68295-005	Field Blanks		
2	BN	120-82-1	1,2,4-Trichlorobenzene	✓	0.20		✓	✓	✓ ✓ ✓	✓	✓	NA		✓	✓	✓	✓	✓	NA		
1	BN	95-50-1	1,2-Dichlorobenzene		0.40																
1	BN	541-73-1	1,3-Dichlorobenzene		0.60																
1	BN	106-46-7	1.4-Dichlorobenzene		0.50						✓			✓	✓	✓					
3	A	95-95-4	2,4,5-Trichlorophenol		0.20						✓			50	46	✓					
3	A	88-06-2	2,4,6-Trichlorophenol		0.20						✓			56	57	✓					
2	A	120-83-2	2,4-Dichlorophenol		0.20																
2	A	105-67-9	2,4-Dimethylphenol		0.20																
3	A	51-28-5	2,4-dinitrophenol		0.01	✓	✓	✓	+8 +29 +25												
3	BN	121-14-2	2.4-Dinitrotoluene		0.20				✓ ✓ ✓		✓			✓	0	200					
3	BN	606-20-2	2,6-Dinitrotoluene		0.20																
3	BN	91-58-7	2-Chloronaphthalene		0.80																
1	A	95-57-8	2-Chlorophenol		0.80						✓			✓	✓	✓					
2	BN	91-57-6	2-Methylnaphthalene		0.40																
1	A	95-48-7	2-Methylphenol (o-cresol)		0.70						✓			40	38	✓					
3	BN	88-74-4	2-Nitroaniline		0.01																
2	A	88-75-5	2-Nitrophenol		0.10																
5	BN	91-94-1	3,3'-Dichlorobenzidine		0.01																
3	BN	99-09-2	3-Nitroaniline		0.01	✓	✓	✓													
4	A	534-52-1	4,6-Dinitro-2-methylphenol		0.01	✓	✓	✓	+24												
4	BN	101-55-3	4-Bromophenyl-phenylether		0.10				✓												
3	BN	7005-72-3	4-Chlorophenyl-phenylether		0.40																
2	A	59-50-7	4-Chloro-3-methylphenol		0.20						✓			✓	✓	✓					
2	BN	106-47-8	4-Chloroaniline		0.01																
1	A	106-44-5	4-Methylphenol (p-cresol)		0.60																

Comments: m,p - cresol ✓

Notes: Shaded rows are RCRA compounds.

✓ 41 39 ✓

Reviewed By: [signature] Date: 12.05.02

WS lot 2 soil

Semivolatile Organics

Site/Project: _____ AR/COC #: 605783, -84 Batch #s: _____

Laboratory: _____ Laboratory Report #: _____ # of Samples: _____ Matrix: _____

IS	BNA	CAS #	NAME	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blanks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Field Blanks		
							>.05	<20% / 0.99	20%												
3	BN	100-01-6	4-Nitroaniline	✓	0.01	✓	✓	✓	✓ ✓ ✓	✓		NA					✓	✓	NA		
3	A	100-02-7	4-Nitrophenol		0.01						✓			0	0	✓					
3	BN	83-32-9	Acenaphthene		0.90						✓			✓	✓	✓					
3	BN	208-96-8	Acenaphthylene		0.90																
4	BN	120-12-7	Anthracene		0.70																
5	BN	56-55-3	Benzo(a)anthracene		0.80																
6	BN	50-32-8	Benzo(a)pyrene		0.70																
6	BN	205-99-2	Benzo(b)fluoranthene		0.70																
6	BN	191-24-2	Benzo(g,h,i)perylene		0.50				-21 ✓ ✓												
6	BN	207-08-9	Benzo(k)fluoranthene		0.70				✓ ✓ ✓												
2	BN	111-91-1	bis(2-Chloroethoxy)methane		0.30				-28 -27 -24												
1	BN	111-44-4	bis(2-Chloroethyl)ether		0.70				-28 -30 -30												
1	BN	108-60-1	bis(2-chloroisopropyl)ether		0.01				-21 -32 -27												
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate		0.01				✓ ✓ ✓												
5	BN	85-68-7	Butylbenzylphthalate		0.01																
4	BN	86-74-8	Carbazole		0.01																
5	BN	218-01-9	Chrysene		0.70																
6	BN	53-70-3	Dibenz(a,h)anthracene		0.40																
3	BN	132-64-9	Dibenzofuran		0.80																
3	BN	84-66-2	Diethylphthalate		0.01																
3	BN	131-11-3	Dimethylphthalate		0.01																
4	BN	84-74-2	Di-n-butylphthalate		0.01																
6	BN	117-84-0	Di-n-octylphthalate		0.01																
4	BN	206-44-0	Fluoranthene		0.60																
3	BN	86-73-7	Fluorene		0.90																
4	BN	118-74-1	Hexachlorobenzene		0.10						✓			69	✓	✓					
2	BN	87-68-3	Hexachlorobutadiene		0.01						✓			63	69	✓					
3	BN	77-47-4	Hexachlorocyclopentadiene		0.01																
1	BN	67-72-1	Hexachloroethane		0.30						✓			49	53	✓					

Comments:

WS 1 of 2 Soil

Semivolatile Organics

Site/Project: _____ AR/COC #: 605783, -84 Batch #s: _____

Laboratory: _____ Laboratory Report #: _____ # of Samples: _____ Matrix: _____

IS	BNA	CAS #	NAME	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blanks	LCS	LCS D	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Field Blanks		
							>.05	<20%/ 0.99	20% 2 3 4												
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	✓	0.50		✓	✓	✓ ✓ ✓	✓		NA					✓	✓	NA		
2	BN	78-59-1	Isophorone		0.40																
2	BN	91-20-3	Naphthalene		0.70	✓	✓	✓													
2	BN	98-95-3	Nitrobenzene		0.20						✓			49	54	✓					
4	BN	86-30-6	N-Nitrosodiphenylamine (1)		0.01																
1	BN	621-64-7	N-Nitroso-di-propylamine	✓	0.50						✓			✓	✓	✓					
4	A	87-86-5	Pentachlorophenol		0.05	✓	✓	✓			✓			0	0	✓					
4	BN	85-01-8	Phenanthrene		0.70																
1	A	108-95-2	Phenol		0.80						✓			✓	✓	✓					
5	BN	129-00-0	Pyrene		0.60				✓		✓			✓	✓	✓					
			Diphenylamine						✓												

1. MSD2 CCV 10.06 ✓ 11.16 ✓ LCS, MB 10.08

Surrogate Recovery Outliers

Sample	SMC 1 (BN)	SMC 2	SMC 3	SMC 4 (A)	SMC 5	SMC 6 (A)	SMC 7	SMC 8
68288-022	113	✓	✓	103	✓	113		
	(24-97)			(22-99)		(23-111)	%	
All acceptable	J, K1							

SMC 1: Nitrobenzene-d5 (BN)
SMC 2: 2-Fluorobiphenyl (BN)
SMC 3: p-Terphenyl-d14 (BN)
SMC 4: Phenol-d6 (A)
SMC 5: 2-Fluorophenol (A)
SMC 6: 2,4,6-Tribromophenol (A)
SMC 7: 2-2-Chlorophenol-d4 (A)
SMC 8: 1,2-Dichlorobenzene-d4 (BN)

0 for pyrene CCV -27 11 J 11

Comments:

2. 68288 12, 13, (14) 17, 18 19, (20), 21 10.09
MSD2 CCV 13.17 ✓ 13.44

3. 68288 16, 22 10.10
MS/MSD
MSD2 CCV 11.38 ✓ 12.01 ✓

4 68288 15 10.14
MSD2 CCV 15.01 15.23 ✓

Internal Standard Outliers

Sample	IS 1-area	IS 1-RT	IS 2-area	IS 2-RT	IS 3-area	IS 3-RT	IS 4-area	IS 4-RT	IS 5-area	IS 5-RT	Is 6-area	IS 6-RT
IN CRITERIA												

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

MS/MSD XT clear & viscous 015, 016, 022 Run at 10X

WS 2 of 2 EB

Semivolatile Organics (SW 846 Method 8270)

Site/Project: DSS Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68295 -005 (EB)

Laboratory: GEL Laboratory Report #: 68288

Methods: SW-846 8270C

# of Samples: 1 Matrix: Aqueous Batch #s: 206445

IS	BNA	CAS #	NAME	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blanks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Field Blanks		
							>.05	<20% / 0.99	20%												
2	BN	120-82-1	1,2,4-Trichlorobenzene	✓	0.20	same	✓	✓	✓	✓	✓	NA									
1	BN	95-50-1	1,2-Dichlorobenzene		0.40	as	soils														
1	BN	541-73-1	1,3-Dichlorobenzene		0.60																
1	BN	106-46-7	1,4-Dichlorobenzene		0.50						✓										
3	A	95-95-4	2,4,5-Trichlorophenol		0.20						✓										
3	A	88-06-2	2,4,6-Trichlorophenol		0.20						✓										
2	A	120-83-2	2,4-Dichlorophenol		0.20																
2	A	105-67-9	2,4-Dimethylphenol		0.20																
3	A	51-28-5	2,4-dinitrophenol		0.01	✓	✓	✓	+36												
3	BN	121-14-2	2,4-Dinitrotoluene		0.20				✓		✓										
3	BN	606-20-2	2,6-Dinitrotoluene		0.20																
3	BN	91-58-7	2-Chloronaphthalene		0.80																
1	A	95-57-8	2-Chlorophenol		0.80						✓										
2	BN	91-57-6	2-Methylnaphthalene		0.40																
1	A	95-48-7	2-Methylphenol (o-cresol)		0.70						✓										
3	BN	88-74-4	2-Nitroaniline		0.01																
2	A	88-75-5	2-Nitrophenol		0.10																
5	BN	91-94-1	3,3'-Dichlorobenzidine		0.01																
3	BN	99-09-2	3-Nitroaniline		0.01	✓	✓	✓													
4	A	534-52-1	4,6-Dinitro-2-methylphenol		0.01	✓	✓	✓													
4	BN	101-55-3	4-Bromophenyl-phenylether		0.10																
3	BN	7005-72-3	4-Chlorophenyl-phenylether		0.40																
2	A	59-50-7	4-Chloro-3-methylphenol		0.20						✓										
2	BN	106-47-8	4-Chloroaniline		0.01																
1	A	106-44-5	4-Methylphenol (p-cresol)		0.60																

Comments: m,p-cresol ✓

Notes: Shaded rows are RCRA compounds.

Reviewed By: [signature] Date: 12.05.02

WS 2 2 EB

Semivolatile Organics

Site/Project: _____ AR/COC #: 605783, -84 Batch #s: _____

Laboratory: _____ Laboratory Report #: _____ # of Samples: _____ Matrix: _____

IS	BNA	CAS #	NAME	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blanks	LCS	LCSD	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Field Blanks		
							>.05	<20% / 0.99	20%												
3	BN	100-01-6	4-Nitroaniline	✓	0.01		✓	✓	✓	✓		NA									
3	A	100-02-7	4-Nitrophenol		0.01						✓										
3	BN	83-32-9	Acenaphthene		0.90						✓										
3	BN	208-96-8	Acenaphthylene		0.90																
4	BN	120-12-7	Anthracene		0.70																
5	BN	56-55-3	Benzo(a)anthracene		0.80																
6	BN	50-32-8	Benzo(a)pyrene		0.70																
6	BN	205-99-2	Benzo(b)fluoranthene		0.70																
6	BN	191-24-2	Benzo(g,h,i)perylene		0.50																
6	BN	207-08-9	Benzo(k)fluoranthene		0.70																
2	BN	111-91-1	bis(2-Chloroethoxy)methane		0.30																
1	BN	111-44-4	bis(2-Chloroethyl)ether		0.70				-25												
1	BN	108-60-1	bis(2-chloroisopropyl)ether		0.01				-23												
5	BN	117-81-7	bis(2-Ethylhexyl)phthalate		0.01				✓												
5	BN	85-68-7	Butylbenzylphthalate		0.01																
4	BN	86-74-8	Carbazole		0.01																
5	BN	218-01-9	Chrysene		0.70																
6	BN	53-70-3	Dibenz(a,h)anthracene		0.40																
3	BN	132-64-9	Dibenzofuran		0.80																
3	BN	84-66-2	Diethylphthalate		0.01																
3	BN	131-11-3	Dimethylphthalate		0.01																
4	BN	84-74-2	Di-n-butylphthalate		0.01																
6	BN	117-84-0	Di-n-octylphthalate		0.01																
4	BN	206-44-0	Fluoranthene		0.60																
3	BN	86-73-7	Fluorene		0.90																
4	BN	118-74-1	Hexachlorobenzene		0.10						✓										
2	BN	87-68-3	Hexachlorobutadiene		0.01						✓										
3	BN	77-47-4	Hexachlorocyclopentadiene		0.01																
1	BN	67-72-1	Hexachloroethane		0.30						✓										

Comments:

WS 2 of 2 EB

Semivolatile Organics

Site/Project: _____ AR/COC #: 605783, -84 Batch #s: _____

Laboratory: _____ Laboratory Report #: _____ # of Samples: _____ Matrix: _____

IS	BNA	CAS #	NAME	TCL	Min. RF	Intercept	Calib. RF	Calib. RSD/ R^2	CCV %D	Method Blanks	LCS	LCS D	LCS RPD	MS	MSD	MS RPD	Field Dup. RPD	Equip. Blanks	Field Blanks		
							>.05	<20%/ 0.99	20%												
6	BN	193-39-5	Indeno(1,2,3-cd)pyrene	✓	0.50		✓	✓	✓	✓		NA									
2	BN	78-59-1	Isophorone		0.40																
2	BN	91-20-3	Naphthalene		0.70	✓	✓	✓													
2	BN	98-95-3	Nitrobenzene		0.20						✓										
4	BN	86-30-6	N-Nitrosodiphenylamine (1)		0.01																
1	BN	621-64-7	N-Nitroso-di-propylamine	✓	0.50						✓										
4	A	87-86-5	Pentachlorophenol		0.05	✓	✓	✓			✓										
4	BN	85-01-8	Phenanthrene		0.70																
1	A	108-95-2	Phenol		0.80						✓										
5	BN	129-00-0	Pyrene		0.60						✓										
			Diphenylamine																		

Surrogate Recovery Outliers

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

SMC 1: Nitrobenzene-d5 (BN)
SMC 2: 2-Fluorobiphenyl (BN)
SMC 3: p-Terphenyl-d14 (BN)
SMC 4: Phenol-d6 (A)
SMC 5: 2-Fluorophenol (A)
SMC 6: 2,4,6-Tribromophenol (A)
SMC 7: 2-2-Chlorophenol-d4 (A)
SMC 8: 1,2-Dichlorobenzene-d4 (BN)

Comments:

MSD2 CCV. 10.06 ✓ 11.16 ✓
MB 5A 10.08

~~MSD 10.09~~ LT
MSD2 CCV LT 11.38 ✓ 12.01 ✓
2CV ~~LT~~ 10.10

Internal Standard Outliers

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

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

MS/MSD 68305 different client (BSK?) failed almost everything

P2"

High Explosives (SW 846 Method 8330)

Site/Project: DSS Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68288-012 thru -022
68295-007 (EB)

Laboratory: CEL Laboratory Report #: 68288

Methods: SW-846 8330 ① ②

# of Samples: 11 8 1 Matrix: Soils & Water Batch #s: 206552 206481 (EB)

CAS #	NAME	T/L	Intercept	Curve R^2 1.992	CCV %D 1 20%2	Method Blanks 1 U 2	LCS ①	LCSD ②	LCS RPD 20%	MS ①	MSD ①	MS RPD 20%	Field. Dup. RPD	Equip. Blanks U	Field Blanks U		
2691-41-0	HMX		NA	✓✓	✓✓	✓✓	✓	✓	NA	✓	✓	✓	✓	✓	NA		
121-82-4	RDX																
99-35-4	1,3,5-Trinitrobenzene																
99-65-0	1,3-dinitrobenzene																
98-95-3	Nitrobenzene																
479-45-8	Tetryl													.0453 JP			
118-96-7	2,4,6-trinitrotoluene													✓			
35572-78-2	2-amino-4,6-dinitrotoluene																
1946-51-0	4-amino-2,6-dinitrotoluene																
121-14-2	2,4-dinitrotoluene																
606-20-2	2,6-dinitrotoluene																
88-72-2	2-nitrotoluene																
99-99-0	4-nitrotoluene																
99-08-1	3-nitrotoluene																
78-11-5	PETN																

Sample	SMC %REC	~~SMC RT~~	Sample	SMC %REC	SMC RT
68288-016	330 %	(71-118 %)	Reextracted	DW at LT of surr	
			low surr	- MS/MSD	X interference

Comments:

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
68288-015	2-Amino-4,6	176 %	68288-016	4-Amino-2,6-	114 %
↓	2,6 Dinitrotoluene	158 %	"	2,4-Dinitrotol	144 %
	2-Nitrotoluene	54 %			

② 206481 - MS/MSD performed on sample 68152 shows ↑ %R % professional judgement not using MS data - P2

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

HMX 106 (RPD = 9.9 %) Nitrobenzene (RPD 6 %)

Reviewed By: (2/10) Date: 11.26.02

68295-007 Tetryl 84 %

PCBs (SW 846 - Method 8082)

Site/Project: DSI Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68288-012, thru -022

Laboratory: GEL Laboratory Report #: 68288 68295-006 (EB)

Methods: SW-846 8082 ① ②

# of Samples: 11 Matrix: Soils Batch #s: 206286 206677

CAS #	Name	TCL	Intercept	Calib RSD / R^2 (≤20% / 0.99)	CCV %D (1 20% 7)	Method Blanks (① ②)	LCS (①)	LCSD (②*)	LCS RPD (20%)	MS (1)	MSD (1)	MS RPD (20%)	12/8/14 Field Dup. RPD	Equip. Blanks	Field Blanks	② * LCS	LCSD	RPD
12674-11-2	Aroclor-1016	✓	NA	✓ ✓	✓ ✓	✓ ✓			NA				✓	✓	NA			
11104-28-2	Aroclor-1221												✓					
11141-16-5	Aroclor-1232												✓					
53469-21-9	Aroclor-1242			✓ ✓									✓					
12672-29-6	Aroclor-1248			✓ ✓									✓					
11097-69-1	Aroclor-1254			✓ ✓	✓								?					
11096-82-5	Aroclor-1260	✓		✓ ✓	✓ ✓		✓			✓	✓	✓	✓			✓	✓	✓

31-120 34-115

Sample	SMC 40mx % REC DCB	SMC RT	Sample	SMC % REC	SMC RT
68288-015	6% 6%	? confirmed by re-extraction & reanalysis			
-016	20% 4%		matrix interference		

Comments: SA-021,-22 (DX) due to viscosity

② 206677 NO MS/MSD. LCS/LCSD in criteria

Confirmation

Sample	CAS #	RPD > 25%	Sample	CAS #	RPD > 25%
IN CRITERIA					

Reviewed By: [signature] Date: 11.27.02

N 1 of 2 Soils

Inorganic Metals

Site/Project: OSS Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68288 - 012 thru 022

Laboratory: GEL Laboratory Report #: 68288

Methods: SW-846 7471A (Hg) 6010B (Metals)

# of Samples: 11 Matrix: Soils Batch #s: 207430 (Hg) 206907 (Metals)

CAS #/ Analyte	QC Element																				
	ug/l									75-125			<35%			12814	68295-				
	TAL	ICV	CCV	ICB	CCB	Method Blanks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	Rep. RPD	ICS AB	Serial Dilu-tion	Field Dup. RPD	9/0 Equip. Blanks ug/l	Field Blanks			
7429-90-5 Al	✓	✓	✓	✓	✓													NA			
7440-39-3 Ba	✓					✓	✓			131			65	✓	✓	✓	.507				
7440-41-7 Be																					
7440-43-9 Cd	✓					✓	✓			✓			NA	✓	NA	✓					
7440-70-2 Ca																					
7440-47-3 Cr	✓					✓	✓			✓			✓	✓	✓	✓	.802				
7440-48-4 Co																					
7440-50-8 Cu																					
7439-89-6 Fe																					
7439-95-4 Mg																					
7439-96-5 Mn																					
7440-02-0 Ni																					
7440-09-7 K																					
7440-22-4 Ag	✓					✓	✓			✓			NA	✓	NA	✓	✓				
7440-23-5 Na																					
7440-62-2 V																					
7440-66-6 Zn																					
7439-92-1 Pb	✓					✓	✓			✓			✓	✓	NA	✓	✓				
7782-49-2 Se	✓			[-1.7]	2.44	✓	✓			✓			NA	✓	NA	✓	4.19				
7440-38-2 As	✓			✓	✓	✓	✓			✓			✓	✓	✓	✓	✓				
7440-36-0 Sb																					
7440-28-0 Tl																					
7439-97-6 Hg	✓			✓	✓	✓	✓			✓			NA			✓	.2				
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: All soils ICP 2X

6 17 5X

18 10X

ICP mg/kg → ug/l x10 Hg x 20 → 21.66 · 23.3

Reviewed By: KMal Date: 11.27.02

WS 2 of 2 EB

Inorganic Metals

Site/Project: DSS Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68295-010 (EB)

Laboratory: GEL Laboratory Report #: 68288

Methods: SW-846 7470 (Hg) 6010B (Metals)

# of Samples: 1 Matrix: Aqueous Batch #s: 207410 (Hg) 206624 (Metals)

CAS # / Analyte	QC Element																			
				ug/L	ug/L															
	TAL	ICV	CCV	ICB	CCB	Method Blanks	LCS	LCSD	LCSD RPD	MS	MSD	MSD RPD	~~Field Dup~~ Rep RPD	ICS AB	Serial Dilution	~~Field Dup.~~ Rep Dup. RPD LF	Equip. Blanks	Field Blanks	Blanks x 5	
7429-90-5 Al													NA							
7440-39-3 Ba	✓	✓	✓	.611	.269	✓	✓			✓				✓	✓	✓			3.055	J, B3
7440-41-7 Be																				
7440-43-9 Cd	✓	✓	✓	.715	.334	✓	✓			✓				✓	NA	NA			3.575	ND
7440-70-2 Ca																				
7440-47-3 Cr	✓	✓	✓	.587	.518	✓	✓			✓				✓	NA	NA			2.93	J, B3
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																NA				
7440-22-4 Ag	✓	✓	✓	✓	✓	✓	✓			✓				✓						
7440-23-5 Na																				
7440-62-2 V																				
7440-66-6 Zn																				
7439-92-1 Pb	✓	✓	✓	✓	✓	✓	✓			✓				✓	✓	✓				
7782-49-2 Se	✓	✓	✓	3.64	✓	✓	✓			✓				✓	NA	NA			18.2	J, B3
7440-38-2 As	✓	✓	✓	✓	2.73	✓	✓			✓				✓	NA	NA			13.65	ND
7440-36-0 Sb																				
7440-28-0 Tl																				
7439-97-6 Hg	✓	✓	✓	✓	.116	.163	✓			✓						NA			0.58	0.765 J, B, B3
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: 206624 — Dup MS SD 68152 SW46 SOP
207410 Dup MS 68152

Reviewed By: [signature] Date: 11.27.02

General Chemistry

Site/Project: OSS Soil Sampling AR/COC #: 605783, -84 Laboratory Sample IDs: 68288-012 thru -022

Laboratory: GEL Laboratory Report #: 68288 68295-008 (TCN EB) 68295-009 (Cr_6 EB)

Methods: SW-846 9012A (TCN) 7196A (Cr^6)

# of Samples: 11 & 2 Matrix: Soil & H2O Batch #s: 206731 (TCN) 207514 (Cr^6)
207325 EB 206338-EB

	CAS #	Analyte	QC Element: TAL	ICV	CCV	ICB	CCB	Method Blanks	LCS	LCSD	LCSD RPD	75-125 % MS	MSD	MSD RPD	Rep. RPD	ICS AB	Serial Dilution	Field Dup. RPD	Equip. Blanks	Field Blanks	
																					5X ICB MB
206731	5955-70-0	Total Cyanide		✓	✓	0.115 ug/L	✓	0.074J mg/kg	✓			✓			NA			✓	✓		10.55 ug/L 0.37 mg/kg
207325 (EB)		|		✓	✓	✓	✓	✓	✓	✓	✓	69			NA			NA	NA		
207514		Hexavalent Chromium		✓	✓	✓	✓	✓	✓			72 ✓	No q. 49-130 % see email		NA NA			✓	✓		
206338 (EB)	~	|		✓	✓	✓	✓	✓	✓			✓			NA			NA	NA		

Comments: 68295-009 LT >MT but <2XMT UJ, MT

206731 – MBlank. 15,16 > 21,22 U, B

207325 (TCN LT – EB) 68295-008 MS ↓ >30% <75% UJ, A_2

207514 Cr^6 SA -015 & -016 dil 5X due to turbidity Reviewed By: Athael Date: 12.02.02

Package missing pages 142, 43, 44 & 45. – Found between pages 195 & 196 TCN lg ⇒ some

Radiochemistry

Site/Project: OSO Soil Sampling AR/COC #: 605783 - 84 Laboratory Sample IDs: 68288 - 012 thru - 022

Laboratory: GEL Laboratory Report #: 68288 68295 - 011 (EB)

Methods: EPA 900.0

# of Samples: 12 Matrix: Soils Batch #s: 206591 208471 (EB)

Analyte	QC Element													
	Method Blanks	LCS	MS/MSD	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	NA		50-105			50-105
H3													
U-238													
U-234													
U-235/-236													
Th-232													
Th-228													
Th-230													
Pu-239/-240													
206591 Gross Alpha	✓	✓	✓ ✓	✓	✓	✓	NA						
Nonvolatile Beta	✓	✓	✓ ✓	✓	✓	✓	NA						
Ra-226													
Ra-28													
Ni-63													
Gamma Spec. Am-241													
Gamma Spec. Cs-137													
Gamma Spec. Co-60													
208471 Gross α	✓	✓	✓✓	✓	NA	→	→						
Nonvolatile β	✓	✓	✓✓	✓	NA	→	→						

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: A. Hall Date: 12.02.02

Contract Verification Review (CVR)

Project Leader COLLINS Project Name DSS SOIL SAMPLING Case No. 7223_02.03.02

AR/COC No. 605783 & 605784 Analytical Lab GEL SDG No. 68288A & 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		VOC TRIP BLANK #060054-001 ANALYZED PAST HOLDING TIME HEXAVALENT CHROMIUM SAMPLE #060078-002 RECEIVED PAST HOLDING TIME	X	
2.13	Contractual qualifiers provided		X	"H" QUALIFIER NOT REPORTED ON VOC SAMPLE #060054-001		
2.14	All requested result and TIC (if requested) data provided	X		PAGES MISSING FOR COA FOR PCB SAMPLES #060052-002 & 060053-002		

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	SURROGATES FAILED RECOVERY LIMITS FOR VOC SAMPLES #060050-001, 060051-001, 060059-001, 060060-001 & SVOC SAMPLE #060060-002 & HE SAMPLE #060051-002 & PCB SAMPLES #060050-002, 060051-002
c) Matrix spike recovery data reported and met		X	SEVERAL ANALYTES FAILED RECOVERY LIMITS FOR SVOC MS/MSD BARIUM FAILED RECOVERY LIMITS FOR MATRIX SPIKE CYANIDE MATRIX SPIKE FAILED RECOVERY LIMITS
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	RPD FOR SVOC MS/MSD ABOVE ACCEPTANCE LIMITS
3.5 Blank data a) Method or reagent blank data reported and met for all samples		X	MERCURY DETECTED IN AQUEOUS BLANK CYANIDE DETECTED IN BLANK
b) Sampling blank (e.g., field, trip, and equipment) data reported and met		X	BARIUM, CHROMIUM, SELENIUM & MERCURY 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	"H" QUALIFIER MISSING FOR VOC TRIP BLANK
3.7 Narrative addresses planchet flaming for gross alpha/beta	X		
3.8 Narrative included, correct, and complete	X		
3.9 Second column confirmation data provided for methods 8330 (high explosives) and 8082 (pesticides/PCBs)	X		

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	X		
b) Continuing calibration provided	X		
c) Instrument run logs provided	X		
4.3 Inorganics (metals)			
a) Initial calibration provided	X		
b) Continuing calibration provided	X		
c) ICP interference check sample data provided	X		
d) ICP serial dilution provided	X		
e) Instrument run logs provided	X		
4.4 Radiochemistry			
a) Instrument run logs provided	X		

Contract Verification Review (Concluded)

5.0 Problem Resolution

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

Sample/Fraction No.	Analysis	Problems/Comments/Resolutions
060054-001	VOCs	"H" QUALIFIER MISSING
060052-002	PCBs	PAGE 2 OF COA MISSING
060053-002	PCBs	PAGE 1 OF COA MISSING
060053-002	GROSS ALPHA/BETA	PAGE 1 OF COA MISSING
060060-002	GROSS ALPHA/BETA	PAGE 2 OF COA MISSING

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 5226 and date correction request was submitted: 11-8-2002

Reviewed by: W. Palencia Date: 11-7-2002 Closed by: W. Palencia Date: 11/18/02

ANNEX B
DSS Site 1113
Risk Assessment

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DSS SITE 1113: RISK ASSESSMENT REPORT

I. Site Description and History

Drain and Septic Systems (DSS) Site 1113, the Building 6597 Drywell, at Sandia National Laboratories/New Mexico (SNL/NM), is located in Technical Area (TA)-V on federally owned land controlled by Kirtland Air Force Base (KAFB) and permitted to the U.S. Department of Energy (DOE). The abandoned drywell consisted of a 4-foot-square, 4-foot-deep unlined hole with a 2-foot-thick gravel layer from 2 to 4 feet below ground surface (bgs). This unit is located approximately 28 feet east of Building 6597. Available information indicates that Building 6597 was constructed in 1971 (SNL/NM March 2003), and it is assumed that the drywell was also constructed at that time. Discharges to the drywell were discontinued at some point prior to April 2002, when a backhoe excavation of the unit determined that the drainline to the drywell had been disconnected.

Environmental concern about DSS Site 1113 is based upon the potential for the release of constituents of concern (COCs) in effluent discharged to the environment via the drywell at this site. Because operational records were not available, the investigation was planned to be consistent with other DSS site investigations and to sample for possible COCs that may have been released during facility operations.

The ground surface in the vicinity of the site is flat or slopes slightly to the west. The closest major drainage is the Arroyo del Coyote, located approximately 0.75 miles northeast of the site. No springs or perennial surface-water bodies are located within 2 miles of the site. Average annual rainfall in the SNL/NM and KAFB area, as measured at Albuquerque International Sunport, is 8.1 inches (NOAA 1990). Surface-water runoff in the vicinity of the site is minor because the surface is flat or slopes slightly to the west. Infiltration of precipitation is almost nonexistent as virtually all of the moisture subsequently undergoes evapotranspiration. The estimates of evapotranspiration for the KAFB area range from 95 to 99 percent of the annual rainfall (SNL/NM March 1996). Part of the area immediately surrounding DSS Site 1113 is paved, and a portion is covered with landscaping gravel. No storm sewers are used to direct surface water away from the site.

DSS Site 1113 lies at an average elevation of approximately 5,439 feet above mean sea level. The groundwater beneath the site occurs in unconfined conditions in essentially unconsolidated silts, sands, and gravels. The depth to groundwater is approximately 515 feet bgs. Groundwater flow is thought to be west in this area (SNL/NM March 2002). The nearest groundwater monitoring wells are approximately 500 feet northwest of the site in the northern part of TA-V. The nearest production wells are north of the site and include KAFB-4 and KAFB-11, which are approximately 2.9 and 3.0 miles away, respectively.

II. Data Quality Objectives

The Data Quality Objectives (DQOs) presented in the "Sampling and Analysis Plan [SAP] for Characterizing and Assessing Potential Releases to the Environment From Septic and Other Miscellaneous Drain Systems at Sandia National Laboratories/New Mexico" (SNL/NM October 1999) and "Field Implementation Plan [FIP], Characterization of Non-Environmental Restoration

Drain and Septic Systems" (SNL/NM November 2001) identified the site-specific sample locations, sample depths, sampling procedures, and analytical requirements for this and many other DSS sites. The DQOs outlined the quality assurance (QA)/quality control (QC) requirements necessary for producing defensible analytical data suitable for risk assessment purposes. The sampling conducted at this site was designed to:

- Determine whether hazardous waste or hazardous constituents were released at the site.
- Characterize the nature and extent of any releases.
- Provide analytical data of sufficient quality to support risk assessments.

Table 1 summarizes the rationale for determining the sampling locations at this site. The source of potential COCs at DSS Site 1113 was effluent discharged to the environment from the drywell at this site.

Table 1
Summary of Sampling Performed to Meet DQOs

DSS Site 1113 Sampling Area	Potential COC Source	Number of Sampling Locations	Sample Density (samples/acre)	Sampling Location Rationale
Soil beneath the drywell	Effluent discharged to the environment from the drywell	1	NA	Evaluate potential COC releases to the environment from effluent discharged from the drainfield

COC = Constituents of concern.
DQO = Data Quality Objective.
DSS = Drain and Septic Systems.
NA = Not applicable.

Using a Geoprobe™, the soil samples were collected from two 3- or 4-foot long sampling intervals at a single borehole location at DSS Site 1113. Drainfield sampling intervals started at 5 and 10 feet bgs in the boring. The soil samples were collected in accordance with the procedures described in the SAP (SNL/NM October 1999) and FIP (SNL/NM November 2001). Table 2 summarizes the types of confirmatory and QA/QC samples collected at the site and the laboratories that performed the analyses.

The soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), high explosive (HE) compounds, polychlorinated biphenyls (PCBs), Resource Conservation and Recovery Act (RCRA) metals, hexavalent chromium, cyanide, radionuclides, and gross alpha/beta activity. The samples were analyzed by an off-site laboratory (General Engineering Laboratories, Inc.) and the on-site SNL/NM Radiation

Table 2
Number of Confirmatory Soil and QA/QC Samples Collected from DSS Site 1113

Sample Type	VOCs	SVOCs	PCBs	HE	RCRA Metals	Hexavalent Chromium	Cyanide	Gamma Spectroscopy Radionuclides	Gross Alpha/Beta
Confirmatory	2	2	2	2	2	2	2	2	2
Duplicates	0	0	0	0	0	0	0	0	0
EBs and TBs[a]	1	0	0	0	0	0	0	0	0
Total Samples	3	2	2	2	2	2	2	2	2
Analytical Laboratory	GEL	GEL	GEL	GEL	GEL	GEL	GEL	RPSD	GEL

[a]TBs for VOCs only.
DSS = Drain and Septic Systems.
EB = Equipment blank.
GEL = General Engineering Laboratories, Inc.
HE = High explosive(s).
PCB = Polychlorinated biphenyl.
QA/QC = Quality assurance/quality control.
RCRA = Resource Conservation and Recovery Act.
RPSD = Radiation Protection Sample Diagnostics Laboratory.
SVOC = Semivolatile organic compound.
TB = Trip blank.
VOC = Volatile organic compound.

Protection Sample Diagnostics (RPSD) Laboratory. Table 3 summarizes the analytical methods and the data quality requirements from the SAP (SNL/NM October 1999) and FIP (SNL/NM November 2001).

Table 3
Summary of Data Quality Requirements for DSS Site 1113

Analytical Method[a]	Data Quality Level	GEL	RPSD
VOCs EPA Method 8260	Defensible	2	None
SVOCs EPA Method 8270	Defensible	2	None
PCBs EPA Method 8082	Defensible	2	None
HE Compounds EPA Method 8330	Defensible	2	None
RCRA Metals EPA Method 6000/7000	Defensible	2	None
Hexavalent Chromium EPA Method 7196A	Defensible	2	None
Total Cyanide EPA Method 9012A	Defensible	2	None
Gamma Spectroscopy Radionuclides EPA Method 901.1	Defensible	None	2
Gross Alpha/Beta Activity EPA Method 900.0	Defensible	2	None

Note: The number of samples does not include QA/QC samples such as duplicates, trip blanks, and equipment blanks.
[a]EPA November 1986.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
GEL = General Engineering Laboratories, Inc.
HE = High explosive(s).
PCB = Polychlorinated biphenyl.
QA/QC = Quality assurance/quality control.
RCRA = Resource Conservation and Recovery Act.
RPSD = Radiation Protection Sample Diagnostics Laboratory.
SVOC = Semivolatile organic compound.
VOC = Volatile organic compound.

One QA/QC sample was collected during the sampling effort according to the Environmental Restoration (ER) Project Quality Assurance Project Plan. The QA/QC sample consisted of one trip blank (for VOCs only). No field duplicate or equipment blank samples were collected at this site. No significant QA/QC problems were identified in the QA/QC sample.

All of the soil sample results were verified/validated by SNL/NM according to "Verification and Validation of Chemical and Radiochemical Data," Technical Operating Procedure (TOP 94-03, Rev. 0 (SNL/NM July 1994) or SNL/NM ER Project "Data Validation Procedure for Chemical and Radiochemical Data," Administrative Operating Procedure (AOP) 00-03" (SNL/NM

December 1999). The data validation reports are presented in the associated DSS Site 1113 request for a determination of Corrective Action Complete (CAC) without controls. The gamma spectroscopy data from the RPSD Laboratory were reviewed according to "Laboratory Data Review Guidelines," Procedure No. RPSD-02-11, Issue No. 2 (SNL/NM July 1996). The gamma spectroscopy results are presented in the CAC proposal. The reviews confirmed that the analytical data are defensible and therefore acceptable for use in the request for a determination of CAC without controls. Therefore, the DQOs have been fulfilled.

III. Determination of Nature, Rate, and Extent of Contamination

III.1 Introduction

The determination of the nature, migration rate, and extent of contamination at DSS Site 1113 is based upon an initial conceptual model validated with confirmatory sampling at the site. The initial conceptual model was developed from archival site research, site inspections, and soil sampling. The DQOs contained in the SAP (SNL/NM October 1999) and FIP (SNL/NM November 2001) identified the sample locations, sample density, sample depth, and analytical requirements. The sample data were subsequently used to develop the final conceptual model for DSS Site 1113, which is presented in Section 4.0 of the associated request for a determination of CAC without controls. The quality of the data specifically used to determine the nature, migration rate, and extent of contamination is described in the following sections.

III.2 Nature of Contamination

Both the nature of contamination and the potential for the degradation of COCs at DSS Site 1113 were evaluated using laboratory analyses of the soil samples. The analytical requirements included analyses for VOCs, SVOCs, HE compounds, PCBs, RCRA metals, hexavalent chromium, cyanide, radionuclides by gamma spectroscopy, and gross alpha/beta activity. The analytes and methods listed in Tables 2 and 3 are appropriate to characterize the COCs and potential degradation products at DSS Site 1113.

III.3 Rate of Contaminant Migration

The drywell at DSS Site 1113 was deactivated at some point prior to the April 2002 backhoe excavation of the unit. The migration rate of COCs that may have been introduced into the subsurface via the drywell at this site was therefore dependent upon the volume of aqueous effluent discharged to the environment from this system when it was operational. Any migration of COCs from this site after use of the drywell was discontinued has been predominantly dependent upon precipitation. However, it is highly unlikely that sufficient precipitation has fallen on the site to reach the depth at which COCs may have been discharged to the subsurface from this system, partly because a portion of the site is covered by pavement. Analytical data generated from the soil sampling conducted at the site are adequate to characterize the rate of COC migration at DSS Site 1113.

III.4 Extent of Contamination

Subsurface soil samples were collected from a borehole drilled at one location beneath the effluent release point (the drywell) at the site to assess whether releases of effluent from the septic system caused any environmental contamination.

The soil samples were collected at sampling depths starting at 5 and 10 feet beneath the drywell. Sampling intervals started at the depths at which effluent discharged from the drywell would have entered the subsurface environment at the site. This sampling procedure was required by New Mexico Environment Department (NMED) regulators and has been used at numerous DSS-type sites at SNL/NM. The soil samples are considered to be representative of the soil potentially contaminated with the COCs at this site and are sufficient to determine the vertical extent, if any, of COCs.

IV. Comparison of COCs to Background Levels

Site history and characterization activities are used to identify potential COCs. The DSS Site 1113 request for a determination of CAC without controls describes the identification of COCs and the sampling that was conducted in order to determine the concentration levels of those COCs across the site. Generally, COCs evaluated in this risk assessment include all detected organic and all inorganic and radiological COCs for which samples were analyzed. When the detection limit of an organic compound is too high (i.e., could possibly cause an adverse effect to human health or the environment), the compound is retained. Nondetected organic compounds not included in this assessment were determined to have detection limits low enough to ensure protection of human health and the environment. In order to provide conservatism in this risk assessment, the calculation uses only the maximum concentration value of each COC found for the entire site. The SNL/NM maximum background concentration (Dinwiddie September 1997) was selected to provide the background screen listed in Tables 4 and 5.

Nonradiological inorganic constituents that are essential nutrients, such as iron, magnesium, calcium, potassium, and sodium, are not included in this risk assessment (EPA 1989). Both radiological and nonradiological COCs are evaluated. The nonradiological COCs included in this risk assessment consist of both inorganic and organic compounds.

Table 4 lists the nonradiological COCs and Table 5 lists the radiological COCs for the human health risk assessment at DSS Site 1113. All samples were collected from depths greater than 5 feet bgs; therefore, evaluation of ecological risk was not performed. Both tables show the associated SNL/NM maximum background concentration values (Dinwiddie September 1997). Section VI.4 discusses the results presented in Tables 4 and 5.

V. Fate and Transport

The primary releases of COCs at DSS Site 1113 were to the subsurface soil resulting from the discharge of effluents from the Building 6597 drywell. Wind, water, and biota are natural mechanisms of COC transport from the primary release point; however, because the discharge was to subsurface soil, none of these are considered to be of potential significance as transport mechanisms at this site. Because the drywell is no longer active, additional

Table 4
Nonradiological COCs for Human Health Risk Assessment at DSS Site 1113 with Comparison to the Associated SNL/NM Background Screening Value, BCF, and Log K_{ow}

COC	Maximum Concentration (All Samples) (mg/kg)	SNL/NM Background Concentration (mg/kg)[a]	Is Maximum COC Concentration Less Than or Equal to the Applicable SNL/NM Background Screening Value?	BCF (maximum aquatic)	Log K_{ow} (for organic COCs)	Bioaccumulator?[b] (BCF>40, Log K_{ow}>4)
Inorganic						
Arsenic	3.8	4.4	Yes	44[c]	–	**Yes**
Barium	303 J	214	**No**	170[d]	–	**Yes**
Cadmium	0.209 J	0.9	Yes	64[c]	–	**Yes**
Chromium, total	10.2	15.9	Yes	16[c]	–	No
Chromium VI	0.348 J	1	Yes	16[c]	–	No
Cyanide	0.573	NC	**Unknown**	NC	–	**Unknown**
Lead	6.08	11.8	Yes	49[c]	–	**Yes**
Mercury	0.002 J	<0.1	Yes	5,500[c]	–	**Yes**
Selenium	0.544 J	<1	Yes	800[e]	–	**Yes**
Silver	0.0438[f]	<1	Yes	0.5[c]	–	No
Organic						
Acetone	0.256	NA	**NA**	0.69[g]	-0.24[g]	No
2-Butanone	0.106 J	NA	**NA**	1[g]	0.29[g]	No
Ethylbenzene	0.00248 J	NA	**NA**	15.5[h]	3.15[h]	No
bis(2-Ethylhexyl) phthalate	3.92	NA	**NA**	851[h]	7.6[h]	**Yes**
2-Hexanone	0.142 J	NA	**NA**	6[i]	1.38[i]	No
HMX	0.106 J	NA	**NA**	0.49[j]	0.26[k]	No
4-Methyl-2-pentanone	0.0217 J	NA	**NA**	5[i]	1.19[l]	No
Nitrobenzene	1.41 J	NA	**NA**	24[l]	1.85[i]	No
2-Nitrotoluene	0.0921 J	NA	**NA**	<100[l]	2.37[l]	**Yes**
Tetrachloroethene	0.0161 J	NA	**NA**	49[g]	2.67[l]	**Yes**
Toluene	0.0256	NA	**NA**	10.7[c]	2.69[c]	No
Xylene	0.0119 J	NA	**NA**	23.4[g]	1.5[l]	No

Refer to footnotes at end of table.

Table 4 (Concluded)
Nonradiological COCs for Human Health Risk Assessment at DSS Site 1113 with Comparison to the Associated SNL/NM Background Screening Value, BCF, and Log K_{ow}

Note: **Bold** indicates the COCs that exceed the background screening values and/or are bioaccumulators.
[a]Dinwiddie September 1997, Southwest Area Supergroup.
[b]NMED March 1998.
[c]Yanicak March 1997.
[d]Neumann 1976.
[e]Callahan et al. 1979.
[f]Parameter was not detected. Concentration is one-half the detection limit.
[g]Howard 1990.
[h]Howard 1989.
[i]Howard 1993.
[j]Rosenblatt et al. 1991.
[k]Maxwell and Opresko 1996.
[l]Micromedex, Inc. 1998.
BCF = Bioconcentration factor.
COC = Constituent of concern.
DSS = Drain and Septic Systems.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
J = Estimated concentration.
K_{ow} = Octanol-water partition coefficient.
Log = Logarithm (base 10).
mg/kg = Milligram(s) per kilogram.
NA = Not applicable.
NC = Not calculated.
NMED = New Mexico Environment Department.
SNL/NM = Sandia National Laboratories/New Mexico.
– = Information not available.

Table 5
Radiological COCs for Human Health Risk Assessment at DSS Site 1113 with Comparison to the Associated SNL/NM Background Screening Value and BCF

COC	Maximum Activity (All Samples) (pCi/g)[a]	SNL/NM Background Activity (pCi/g)[b]	Is Maximum COC Activity Less Than or Equal to the Applicable SNL/NM Background Screening Value?	BCF (maximum aquatic)	Is COC a Bioaccumulator?[c] (BCF >40)
Cs-137	ND (0.0262)	0.079	Yes	3,000[d]	**Yes**
Th-232	0.773	1.01	Yes	3,000[e]	**Yes**
U-235	**ND (0.206)**	0.16	**No**	900[e]	**Yes**
U-238	ND (0.659)	1.4	Yes	900[e]	**Yes**

Note: **Bold** indicates COCs that exceed the background screening values and/or are bioaccumulators.
[a]Value listed is the greater of either the maximum detection or the highest MDA.
[b]Dinwiddie September 1997, Southwest Area Supergroup.
[c]NMED March 1998.
[d]Whicker and Schultz 1982.
[e]Baker and Soldat 1992.
BCF = Bioconcentration factor.
COC = Constituent of concern.
DSS = Drain and Septic Systems.
MDA = Minimum detectable activity.
ND ( ) = Not detected above the MDA, shown in parentheses.
ND ( ) = Not detected, but the MDA (shown in parentheses) exceeds background activity.
NMED = New Mexico Environment Department.
pCi/g = Picocurie(s) per gram.
SNL/NM = Sandia National Laboratories/New Mexico.

infiltration of water is not expected. Infiltration of precipitation is essentially nonexistent at DSS Site 1113, as virtually all of the moisture either drains away from the site or evaporates. Because groundwater at this site is approximately 515 feet bgs, the potential for COCs to reach groundwater through the unsaturated zone above the water table is extremely low.

The COCs at DSS Site 1113 include both inorganic and organic constituents. The inorganic COCs include both radiological and nonradiological analytes. With the exception of cyanide, the inorganic COCs are elemental in form and are not considered to be degradable. Transformations of these inorganic constituents could include changes in valence (oxidation/reduction reactions) or incorporation into organic forms (e.g., the conversion of selenite or selenate from soil to seleno-amino acids in plants). Cyanide can be metabolized by soil biota. Radiological COCs will undergo decay to stable isotopes or radioactive daughter elements. However, because of the long half-life of the radiological COC (U-235), the aridity of the environment at this site, and the lack of potential contact with biota, none of these mechanisms are expected to result in significant losses or transformations of the inorganic COCs.

The organic COCs at DSS Site 1113 include VOCs, SVOCs, and HE compounds. Organic COCs may be degraded through photolysis, hydrolysis, and biotransformation. Photolysis requires light and therefore takes place in the air, at the ground surface, or in surface water. Hydrolysis includes chemical transformations in water and may occur in the soil solution. Biotransformation (i.e., transformation caused by plants, animals, and microorganisms) may occur; however, biological activity may be limited by the arid environment at this site. Because of the depth of the COCs in the soil, the loss of VOCs through volatilization is expected to be minimal.

Table 6 summarizes the fate and transport processes that can occur at DSS Site 1113. The COCs at this site include both radiological and nonradiological inorganic analytes as well as organic analytes. Wind, surface water, and biota are considered to be of low significance as potential transport mechanisms at this site. Significant leaching into the subsurface soil is unlikely, and leaching into the groundwater at this site is highly unlikely. The potential for transformation of COCs is low, and loss through decay of the radiological COC is insignificant because of its long half-life.

Table 6
Summary of Fate and Transport at DSS Site 1113

Transport and Fate Mechanism	Existence at Site	Significance
Wind	Yes	Low
Surface runoff	Yes	Low
Migration to groundwater	No	None
Food chain uptake	Yes	Low
Transformation/degradation	Yes	Low to moderate

DSS = Drain and Septic Systems.

VI. Human Health Risk Assessment

VI.1 Introduction

The human health risk assessment of this site includes a number of steps that culminate in a quantitative evaluation of the potential adverse human health effects caused by constituents located at the site. The steps to be discussed include the following:

Step 1.	Site data are described that provide information on the potential COCs, as well as the relevant physical characteristics and properties of the site.
Step 2.	Potential pathways are identified by which a representative population might be exposed to the COCs.
Step 3.	The potential intake of these COCs by the representative population is calculated using a tiered approach. The first component of the tiered approach is a screening procedure that compares the maximum concentration of the COC to an SNL/NM maximum background screening value. COCs that are not eliminated during the first screening procedure are carried forward in the risk assessment process.
Step 4.	Toxicological parameters are identified and referenced for COCs that were not eliminated during the screening procedure.
Step 5.	Potential toxicity effects (specified as a hazard index [HI]) and estimated excess cancer risks are calculated for nonradiological COCs and background. For radiological COCs, the incremental total effective dose equivalent (TEDE) and incremental estimated cancer risk are calculated by subtracting applicable background concentrations directly from maximum on-site contaminant values. This background subtraction applies only when a radiological COC occurs as contamination and exists as a natural background radionuclide.
Step 6.	These values are compared with guidelines established by the U.S. Environmental Protection Agency (EPA), NMED, and the DOE to determine whether further evaluation and potential site cleanup are required. Nonradiological COC risk values also are compared to background risk so that an incremental risk can be calculated.
Step 7.	Uncertainties of the above steps are addressed.

VI.2 Step 1. Site Data

Section I of this risk assessment provides the site description and history for DSS Site 1113. Section II presents a comparison of results to DQOs. Section III discusses the nature, rate, and extent of contamination.

VI.3 Step 2. Pathway Identification

DSS Site 1113 has been designated with a future land-use scenario of industrial (DOE et al. September 1995) (see Appendix 1 for default exposure pathways and parameters). However, the residential land-use scenario is also considered in the pathway analysis. Because of the location and characteristics of the potential contaminants, the primary pathway for human exposure is considered to be soil ingestion for the nonradiological COCs and direct gamma exposure for the radiological COCs. The inhalation pathway for both nonradiological and radiological COCs is included because the potential exists to inhale dust and volatiles. Soil ingestion is included for the radiological COCs as well. The dermal pathway is included for the nonradiological COCs because of the potential for the receptor to be exposed to contaminated soil. No water pathways to the groundwater are considered. Depth to groundwater at DSS

Site 1113 is approximately 515 feet bgs. No intake routes through plant, meat, or milk ingestion are considered appropriate for either the industrial or residential land-use scenarios. Figure 1 shows the conceptual site model flow diagram for DSS Site 1113.

Pathway Identification

Nonradiological Constituents	Radiological Constituents
Soil ingestion	Soil ingestion
Inhalation (dust and volatiles)	Inhalation (dust)
Dermal contact	Direct gamma

VI.4 Step 3. Background Screening Procedure

This section discusses Step 3, the background screening procedure, which compares the maximum COC concentration to the background screening level. The methodology and results are described in the following sections.

VI.4.1 Methodology

Maximum concentrations of nonradiological COCs are compared to the approved SNL/NM maximum screening levels for this area. The SNL/NM maximum background concentration was selected to provide the background screen in Table 4 and used to calculate risk attributable to background in Section VI.6.2. Only the COCs that were detected above the corresponding SNL/NM maximum background screening levels or that do not have either a quantifiable or calculated background screening level are considered in further risk assessment analyses.

For radiological COCs that exceed the SNL/NM background screening levels, background values are subtracted from the individual maximum radionuclide concentrations. Those that do not exceed these background levels are not carried any further in the risk assessment. This approach is consistent with DOE Order 5400.5, "Radiation Protection of the Public and the Environment" (DOE 1993). Radiological COCs that do not have a background value and are detected above the analytical minimum detectable activity (MDA) are carried through the risk assessment at the maximum levels. The resultant radiological COCs remaining after this step are referred to as background-adjusted radiological COCs.

VI.4.2 Results

Tables 4 and 5 show the DSS Site 1113 maximum COC concentrations that were compared to the SNL/NM maximum background values (Dinwiddie September 1997) for the human health risk assessment. For the nonradiological COCs, one constituent was measured at a concentration greater than the background screening value. One constituent does not have a quantified background screening concentration; therefore it is unknown whether this COC exceeds background. Twelve constituents are organic compounds that do not have corresponding background screening values.

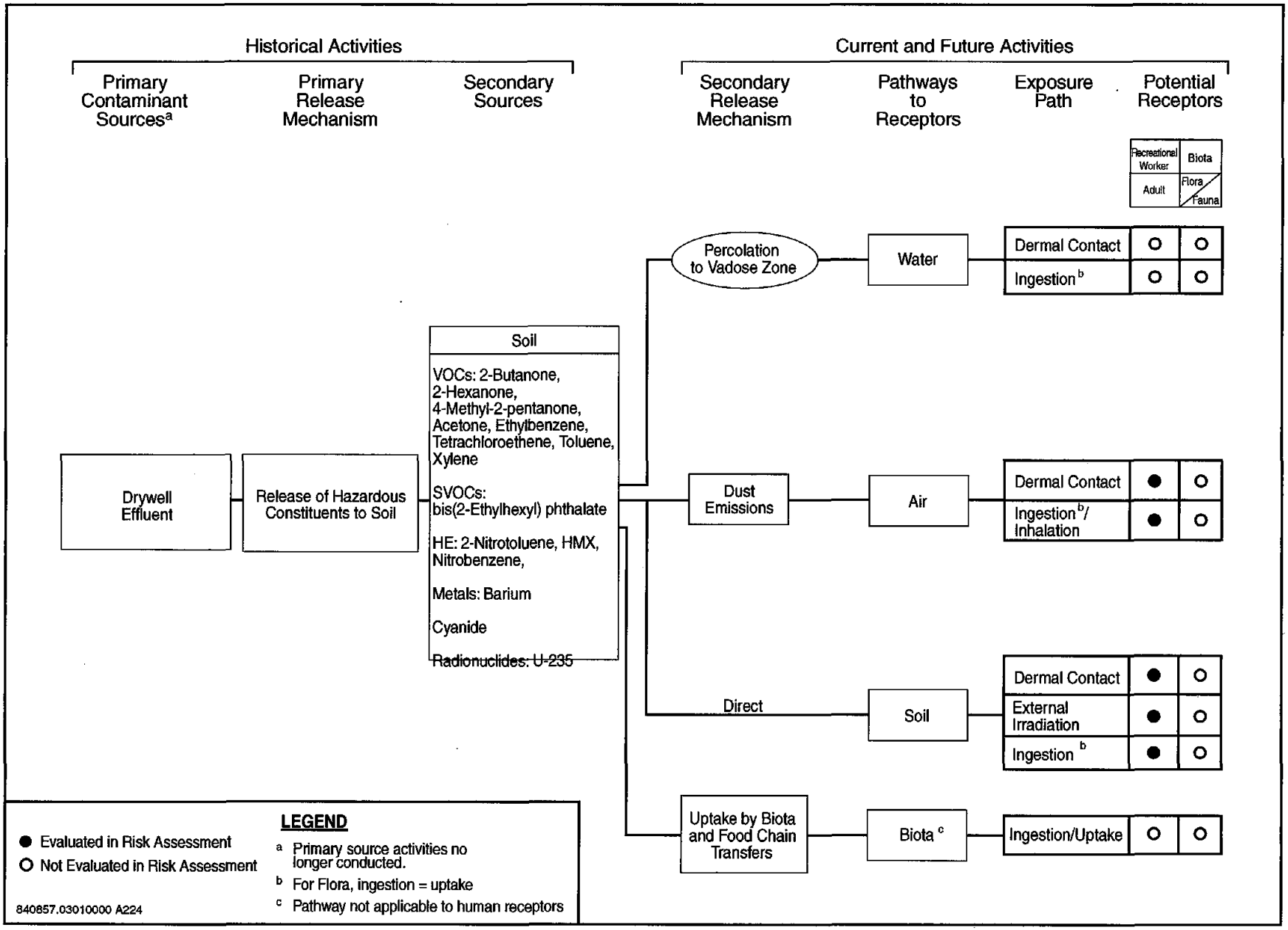

Figure 1

Conceptual Site Model Flow Diagram for DSS Site 1113, Building 6597 Drywell

For the radiological COCs, one constituent (U-235) exhibited an MDA greater than its background screening level.

VI.5 Step 4. Identification of Toxicological Parameters

Tables 7 (nonradiological) and 8 (radiological) list the COCs retained in the risk assessment and the values for the available toxicological information. The toxicological values for the nonradiological COCs presented in Table 7 were obtained from the Integrated Risk Information System (IRIS) (EPA 2004a), the Health Effects Assessment Summary Tables (HEAST) (EPA 1997a), EPA Regions 6, 9, and 3 (EPA 2004b, EPA 2002a, EPA 2002b), Risk Assessment Information System (ORNL 2003), and Technical Background Document for Development of Soil Screening Levels (NMED February 2004). Dose conversion factors (DCFs) used in determining the excess TEDE values for radiological COCs for the individual pathways were the default values provided in the RESRAD computer code (Yu et al. 1993a) as developed in the following documents:

- DCFs for ingestion and inhalation were taken from "Federal Guidance Report No. 11, Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion" (EPA 1988).
- DCFs for surface contamination (contamination on the surface of the site) were taken from DOE/EH-0070, "External Dose-Rate Conversion Factors for Calculation of Dose to the Public" (DOE 1988).
- DCFs for volume contamination (exposure to contamination deeper than the immediate surface of the site) were calculated using the methods discussed in "Dose-Rate Conversion Factors for External Exposure to Photon Emitters in Soil" (Kocher 1983) and in ANL/EAIS-8, "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil" (Yu et al. 1993b).

VI.6 Step 5. Exposure Assessment and Risk Characterization

Section VI.6.1 describes the exposure assessment for this risk assessment. Section VI.6.2 provides the risk characterization, including the HI and excess cancer risk for both the potential nonradiological COCs and associated background for the industrial and residential land-use scenarios. The incremental TEDE and incremental estimated cancer risk are provided for the background-adjusted radiological COC for both the industrial and residential land-use scenarios.

VI.6.1 Exposure Assessment

Appendix 1 provides the equations and parameter input values used in calculating intake values and subsequent HI and excess cancer risk values for the individual exposure pathways. The appendix shows parameters for both industrial and residential land-use scenarios. The equations for nonradiological COCs are based upon the Risk Assessment Guidance for Superfund (RAGS) (EPA 1989). Parameters are based upon information from the RAGS (EPA 1989), the Technical Background Document for Development of Soil Screening Levels (NMED February 2004), as well as other EPA and NMED guidance documents, and reflect the

Table 7
Toxicological Parameter Values for DSS Site 1113 Nonradiological COCs

COC	RfD_o (mg/kg-d)	Confidence[a]	RfD_{inh} (mg/kg-d)	Confidence[a]	SF_o $(mg/kg\text{-}d)^{-1}$	SF_{inh} $(mg/kg\text{-}d)^{-1}$	Cancer Class[b]	ABS
Inorganic								
Barium	7E-2[c]	M	1.4E-4[d]	–	–	–	D	0.01[e]
Cyanide	2E-2[c]	M	–	–	–	–	D	0.1[e]
Organic								
Acetone	1E-1[c]	L	1E-1[f]	–	–	–	D	0.01[e]
2-Butanone	6E-1[c]	L	2.9E-1[c]	L	–	–	D	0.1[e]
Ethylbenzene	1E-1[c]	L	2.9E-1[c]	L	3.85E-3[g]	3.85E-3[g]	–	0.1[e]
bis(2-Ethylhexyl) phthalate	2E-2[f]	–	2E-2[f]	–	1.4E-2[f]	1.4E-2[f]	–	0.01[h]
2-Hexanone	4E-2[i]	–	1.4E-3[i]	–	–	–	–	0.01[h]
HMX	5E-2[c]	L	5E-2[f]	–	–	–	D	0.1[e]
4-Methyl-2-pentanone	8E-2[d]	–	2.3E-2[d]	–	–	–	–	0.01[h]
Nitrobenzene	5E-4[c]	L	5.7E-4[d]	–	–	–	D	0.1[e]
2-Nitrotoluene	1E-2[e]	–	1E-2[f]	–	–	–	–	0.01[h]
Tetrachloroethene	1E-2[c]	M	1.1E-1[f]	–	5.2E-2[f]	1.2E-2[f]	–	0.1[e]
Toluene	2E-1[c]	M	1.1E-1[c]	M	–	–	D	0.1[e]
Xylene	2E+0[c]	M	2E-1[f]	–	–	–	D	0.1[e]

[a]Confidence associated with IRIS (EPA 2004a) database values. Confidence: L = low, M = medium.
[b]EPA weight-of-evidence classification system for carcinogenicity (EPA 1989) taken from IRIS (EPA 2004a):
D = Not classifiable as to human carcinogenicity.
[c]Toxicological parameter values from IRIS electronic database (EPA 2004a).
[d]Toxicological parameter values from HEAST (EPA 1997a).
[e]Toxicological parameter values from NMED (February 2004).
[f]Toxicological parameter values from EPA Region 6 (EPA 2004b).
[g]Toxicological parameter values from EPA Region 9 (EPA 2002a).
[h]Toxicological parameter values from Risk Assessment Information System (ORNL 2003).
[i]Toxicological parameter values from EPA Region 3 (EPA 2002b).
ABS = Gastrointestinal absorption coefficient.
COC = Constituent of concern.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
HEAST = Health Effects Assessment Summary Tables.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.

Table 7 (Concluded)
Toxicological Parameter Values for DSS Site 1113 Nonradiological COCs

IRIS	= Integrated Risk Information System.
mg/kg-d	= Milligram(s) per kilogram-day.
$(mg/kg-d)^{-1}$	= Per milligram per kilogram-day.
NMED	= New Mexico Environment Department.
RfD_{inh}	= Inhalation chronic reference dose.
RfD_o	= Oral chronic reference dose.
SF_{inh}	= Inhalation slope factor.
SF_o	= Oral slope factor.
–	= Information not available.

Table 8
Radiological Toxicological Parameter Values for DSS Site 1113 COCs Obtained from RESRAD Risk Coefficients[a]

COC	SF_o (1/pCi)	SF_{inh} (1/pCi)	SF_{ev} (g/pCi-yr)	Cancer Class[b]
U-235	4.70E-11	1.30E-08	2.70E-07	A

[a]Yu et al. 1993a.
[b]EPA weight-of-evidence classification system for carcinogenicity (EPA 1989): A = Human carcinogen for high dose and high dose rate (i.e., greater than 50 rem per year). For low-level environmental exposures, the carcinogenic effect has not been observed and documented.
1/pCi = One per picocurie.
COC = Constituent of concern.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
g/pCi-yr = Gram(s) per picocurie year.
SF_{ev} = External volume exposure slope factor.
SF_{inh} = Inhalation slope factor.
SF_o = Oral (ingestion) slope factor.

reasonable maximum exposure (RME) approach advocated by the RAGS (EPA 1989). For the radiological COC, the coded equation provided in RESRAD computer code is used to estimate the incremental TEDE and cancer risk for individual exposure pathways. Further discussion of this process is provided in the "Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD" (Yu et al. 1993a).

Although the designated land-use scenario for this site is industrial, risk and TEDE values for a residential land-use scenario are also presented.

VI.6.2 Risk Characterization

Table 9 shows an HI of 0.02 for the DSS Site 1113 nonradiological COCs and an estimated excess cancer risk of 3E-8 for the designated industrial land-use scenario. The numbers presented include exposure from soil ingestion, dermal contact, and dust and volatile inhalation for nonradiological COCs. Table 10 shows an HI of 0.00 and no estimated excess cancer risk for the DSS Site 1113 associated background constituents under the designated industrial land-use scenario.

For the radiological COC, contribution from the direct gamma exposure pathway is included. For the industrial land-use scenario, a TEDE was calculated that resulted in an incremental TEDE of 6.6E-3 millirem (mrem)/year (yr). In accordance with EPA guidance found in Office of Solid Waste and Emergency Response (OSWER) Directive No. 9200.4-18 (EPA 1997b), an incremental TEDE of 15 mrem/yr is used for the probable land-use scenario (industrial in this case); the calculated dose value for DSS Site 1113 for the industrial land-use scenario is well below this guideline. The estimated excess cancer risk is 5.6E-8.

Table 9
Risk Assessment Values for DSS Site 1113 Nonradiological COCs

COC	Maximum Concentration (mg/kg)	Industrial Land-Use Scenario[a]		Residential Land-Use Scenario[a]	
		Hazard Index	Cancer Risk	Hazard Index	Cancer Risk
Inorganic					
Barium	303 J	0.00	–	0.06	–
Cyanide	0.573	0.00	–	0.00	–
Organic					
Acetone	0.256	0.00	–	0.00	–
2-Butanone	0.106 J	0.00	–	0.00	–
Ethylbenzene	0.00248 J	0.00	2E-10	0.00	4E-10
bis(2-Ethylhexyl) phthalate	3.92	0.00	2E-8	0.00	9E-8
2-Hexanone	0.142 J	0.00	–	0.00	–
HMX	0.106 J	0.00	–	0.00	–
4-Methyl-2-pentanone	0.0217 J	0.00	–	0.00	–
Nitrobenzene	1.41 J	0.02	–	0.08	–
2-Nitrotoluene	0.0921 J	0.00	–	0.00	–
Tetrachloroethene	0.0161 J	0.00	5E-9	0.00	1E-8
Toluene	0.0256	0.00	–	0.00	–
Xylene	0.0119 J	0.00	–	0.00	–
Total		**0.02**	**3E-8**	**0.14**	**1E-7**

[a]EPA 1989.
COC = Constituent of concern.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine.
J = Estimated concentration.
mg/kg = Milligram(s) per kilogram.
– = Information not available.

Table 10
Risk Assessment Values for DSS Site 1113 Nonradiological Background Constituents

COC	Background Concentration[a] (mg/kg)	Industrial Land-Use Scenario[b]		Residential Land-Use Scenario[b]	
		Hazard Index	Cancer Risk	Hazard Index	Cancer Risk
Barium	214	0.00	–	0.04	–
Cyanide	NC	–	–	–	–
Total		**0.00**	–	**0.04**	–

[a]Dinwiddie September 1997, Southwest Area Supergroup.
[b]EPA 1989.
COC = Constituent of concern.
DSS = Drain and Septic Systems.
EPA = U.S. Environmental Protection Agency.
mg/kg = Milligram(s) per kilogram.
NC = Not calculated.
– = Information not available.

For the nonradiological COCs under the residential land-use scenario, the HI is 0.14 with an estimated excess cancer risk of 1E-7 (Table 9). The numbers in the table include exposure from soil ingestion, dermal contact, and dust and volatile inhalation. Although the EPA (1991) generally recommends that inhalation not be included in a residential land-use scenario, this pathway is included because of the potential for soil in Albuquerque, New Mexico, to be eroded and for dust to be present in predominantly residential areas. Because of the nature of the local soil, other exposure pathways are not considered (see Appendix 1). Table 10 shows an HI of 0.04 and no estimated excess cancer risk for the DSS Site 1113 associated background constituents under the residential land-use scenario.

For the radiological COC, the incremental TEDE for the residential land-use scenario is 1.7E-2 mrem/yr. The guideline being used is an excess TEDE of 75 mrem/yr (SNL/NM February 1998) for a complete loss of institutional controls (residential land use in this case); the calculated dose value for DSS Site 1113 for the residential land-use scenario is well below this guideline. Consequently, DSS Site 1113 is eligible for unrestricted radiological release as the residential land-use scenario resulted in an incremental TEDE of less than 75 mrem/yr to the on-site receptor. The estimated excess cancer risk is 1.6E-7. The excess cancer risk from the nonradiological and radiological COCs should be summed to provide risk estimates for persons exposed to both types of carcinogenic contaminants, as noted in OSWER Directive No. 9200.4-18 "Establishment of Cleanup Levels for CERCLA [Comprehensive Environmental Response, Compensation, and Liability Act] Sites with Radioactive Contamination," (EPA 1997b). This summation is tabulated in Section VI.9, Summary.

VI.7 Step 6. Comparison of Risk Values to Numerical Guidelines

The human health risk assessment analysis evaluates the potential for adverse health effects for both the industrial (the designated land-use scenario for this site) and residential land-use scenarios.

For the nonradiological COCs under the industrial land-use scenario, the HI is 0.02 (less than the numerical guideline of 1 suggested in the RAGS [EPA 1989]). The estimated excess cancer risk is 3E-8. NMED guidance states that cumulative excess lifetime cancer risk must be less than 1E-5 (Bearzi January 2001); thus the excess cancer risk for this site is below the suggested acceptable risk value. This assessment also determined risks considering background concentrations of the potential nonradiological COCs for both the industrial and residential land-use scenarios. Assuming the industrial land-use scenario, there is neither a quantifiable HI nor an excess cancer risk for nonradiological COCs. The incremental risk is determined by subtracting risk associated with background from potential COC risk. These numbers are not rounded before the difference is determined and therefore may appear to be inconsistent with numbers presented in tables and within the text. For conservatism, the background constituents that do not have quantified background screening concentrations are assumed to have a hazard quotient of 0.00. The incremental HI is 0.02 and the incremental estimated excess cancer risk is 2.53E-8 for the industrial land-use scenario. These incremental risk calculations indicate insignificant risk to human health from nonradiological COCs under an industrial land-use scenario.

For the radiological COC under the industrial land-use scenario, the incremental TEDE is 6.6E-3 mrem/yr, which is significantly less than EPA's numerical guideline of 15 mrem/yr. The incremental estimated excess cancer risk is 5.6E-8.

The calculated HI for the nonradiological COCs under the residential land-use scenario is 0.14, which is below numerical guidance. The estimated excess cancer risk is 1E-7. NMED guidance states that cumulative excess lifetime cancer risk must be less than 1E-5 (Bearzi January 2001); thus the excess cancer risk for this site is below the suggested acceptable risk value. The incremental HI is 0.10 and the estimated incremental cancer risk is 9.97E-8 for the residential land-use scenario. These incremental risk calculations indicate insignificant risk to human health from nonradiological COCs under the residential land-use scenario.

The incremental TEDE for a residential land-use scenario from the radiological component is 1.7E-2 mrem/yr, which is significantly less than the numerical guideline of 75 mrem/yr suggested in the SNL/NM "RESRAD Input Parameter Assumptions and Justification" (SNL/NM February 1998). The estimated excess cancer risk is 1.6E-7.

VI.8 Step 7. Uncertainty Discussion

The determination of the nature, rate, and extent of contamination at DSS Site 1113 is based upon an initial conceptual model that was validated with sampling conducted at the site. The sampling was implemented in accordance with the SAP (SNL/NM October 1999) and FIP (SNL/NM November 2001). The DQOs contained in these two documents are appropriate for use in risk assessments. The data from soil samples collected at effluent release points are representative of potential COC releases to the site. The analytical requirements and results satisfy the DQOs, and data quality was verified/validated in accordance with SNL/NM procedures. Therefore, there is no uncertainty associated with the data quality used to perform the risk assessment at DSS Site 1113.

Because of the location, history of the site, and future land use (DOE et al. September 1995), there is low uncertainty in the land-use scenario and the potentially affected populations that were considered in performing the risk assessment analysis. Based upon the COCs found in the near-surface soil and the location and physical characteristics of the site, there is little uncertainty in the exposure pathways relevant to the analysis.

An RME approach is used to calculate the risk assessment values. Specifically, the parameter values in the calculations are conservative and calculated intakes are probably overestimated. Maximum measured values of COC concentrations are used to provide conservative results.

Table 7 shows the uncertainties (confidence levels) in nonradiological toxicological parameter values. There is a combination of estimated values and values from the IRIS (EPA 2004a), HEAST (EPA 1997a), EPA Regions 6, 9, and 3 (EPA 2004b, EPA 2002a, EPA 2002b), and Technical Background Document for Development of Soil Screening Levels (NMED February 2004). Where values are not provided, information is not available from the HEAST (EPA 1997a), IRIS (EPA 2004a), Technical Background Document for Development of Soil Screening Levels (NMED February 2004), Risk Assessment Information System (ORNL 2003), or EPA regions (EPA 2004b, EPA 2002a, EPA 2002b). Because of the conservative nature of the RME approach, uncertainties in toxicological values are not expected to change the conclusion from the risk assessment analysis. Risk assessment values for the nonradiological COCs are within the acceptable range for human health under the industrial land-use scenario compared to established numerical guidance.

For the radiological COC, the conclusion of the risk assessment is that potential effects on human health for both the industrial and residential land-use scenarios are below background and represent only a small fraction of the estimated 360 mrem/yr received by the average U.S. population (NCRP 1987).

The overall uncertainty in all of the steps in the risk assessment process is not considered to be significant with respect to the conclusion reached.

VI.9 Summary

DSS Site 1113 contains identified COCs consisting of some inorganic, organic, and radiological compounds. Because of the location of the site, the designated industrial land-use scenario, and the nature of contamination, potential exposure pathways identified for this site include soil ingestion, dermal contact, and dust and volatile inhalation for chemical COCs, and soil ingestion, dust inhalation, and direct gamma exposure for radionuclides. The same exposure pathways are applied to the residential land-use scenario.

Using conservative assumptions and an RME approach to risk assessment, calculations for the nonradiological COCs show that for the industrial land-use scenario the HI (0.02) is significantly lower than the accepted numerical guidance from the EPA. The estimated excess cancer risk is 3E-8; thus, excess cancer risk is also below the acceptable risk value provided by the NMED for an industrial land-use scenario (Bearzi January 2001). The incremental HI is 0.02 and the incremental estimated excess cancer risk is 2.53E-8 for the industrial land-use scenario. The incremental risk calculations indicate insignificant risk to human health for the industrial land-use scenario.

Using conservative assumptions and an RME approach to risk assessment, calculations for nonradiological COCs show that for the residential land-use scenario the HI (0.14) is below the accepted numerical guidance from the EPA. The estimated excess cancer risk is 1E-7. Thus, excess cancer risk is below the acceptable risk value provided by the NMED for a residential land-use scenario (Bearzi January 2001). The incremental HI is 0.10 and the incremental estimated excess cancer risk is 9.97E-8 for the residential land-use scenario. The incremental risk calculations indicate insignificant risk to human health for the residential land-use scenario.

The incremental TEDE and corresponding estimated cancer risk from radiological COCs are much less than EPA guidance values. The estimated TEDE is 6.6E-3 mrem/yr for the industrial land-use scenario, which is much less than the EPA's numerical guidance of 15 mrem/yr (EPA 1997b). The corresponding incremental estimated cancer risk value is 5.6E-8 for the industrial land-use scenario. Furthermore, the incremental TEDE for the residential land-use scenario that results from a complete loss of institutional control is 1.7E-2 mrem/yr with an associated risk of 1.6E-7. The guideline for this scenario is 75 mrem/yr (SNL/NM February 1998). Therefore, DSS Site 1113 is eligible for unrestricted radiological release.

The excess cancer risk from the nonradiological and radiological COCs should be summed to provide risk estimates for persons exposed to both types of carcinogenic contaminants, as noted in OSWER Directive No. 9200.4-18 (EPA 1997b). The summation of the nonradiological and radiological carcinogenic risks is tabulated in Table 11.

Table 11
Summation of Incremental Nonradiological and Radiological Risks from DSS Site 1113, Building 6597 Drywell Carcinogens

Scenario	Nonradiological Risk	Radiological Risk	Total Risk
Industrial	2.53E-8	5.6E-8	8.1E-8
Residential	9.97E-8	1.6E-7	2.6E-7

DSS = Drain and Septic Systems.

Uncertainties associated with the calculations are considered small relative to the conservatism of the risk assessment analysis. Therefore, it is concluded that this site poses insignificant risk to human health under both the industrial and residential land-use scenarios.

VII. Ecological Risk Assessment

VII.1 Introduction

This section addresses the ecological risks associated with exposure to constituents of potential ecological concern (COPECs) in the soil at DSS Site 1113. A component of the NMED Risk-Based Decision Tree (NMED March 1998) is to conduct an ecological risk assessment that corresponds with that presented in EPA's Ecological RAGS (EPA 1997c). The current methodology is tiered and contains an initial scoping assessment followed by a more detailed risk assessment if warranted by the results of the scoping assessment. Initial components of NMED's decision tree (a discussion of DQOs, data assessment, and evaluations of bioaccumulation as well as fate and transport potential) are addressed in previous sections of this report. At the end of the scoping assessment, a determination is made as to whether a more detailed examination of potential ecological risk is necessary.

VII.2 Scoping Assessment

The scoping assessment focuses primarily on the likelihood of exposure of biota at, or adjacent to, the site to constituents associated with site activities. Included in this section are an evaluation of existing data with respect to the existence of complete ecological exposure pathways, an evaluation of bioaccumulation potential, and a summary of fate and transport potential. A scoping risk management decision (Section VII.2.4) summarizes the scoping results and assesses the need for further examination of potential ecological impacts.

VII.2.1 Data Assessment

As indicated in Section IV, all COCs at DSS Site 1113 are at depths of 5 feet bgs or greater. Therefore, no complete ecological exposure pathways exist at this site, and no COCs are considered to be COPECs.

VII.2.2 Bioaccumulation

Because no COPECs are associated with this site, bioaccumulation potential was not evaluated.

VII.2.3 Fate and Transport Potential

The potential for the COCs to migrate from the source of contamination to other media or biota is discussed in Section V. As noted in Table 6 (Section V), wind, surface water, and biota (food chain uptake) are expected to be of low significance as transport mechanisms for COCs at this site. Degradation, transformation, and radiological decay of the COC also are expected to be of low significance.

VII.2.4 Scoping Risk-Management Decision

Based upon information gathered through the scoping assessment, it is concluded that complete ecological pathways are not associated with COCs at this site. Therefore, no COPECs exist at the site, and a more detailed risk assessment was not deemed necessary to predict the potential level of ecological risk associated with the site.

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APPENDIX 1
EXPOSURE PATHWAY DISCUSSION FOR CHEMICAL AND RADIONUCLIDE CONTAMINATION

Introduction

Sandia National Laboratories/New Mexico (SNL/NM) uses a default set of exposure routes and associated default parameter values developed for each future land-use designation being considered for SNL/NM Environmental Restoration (ER) Project sites. This default set of exposure scenarios and parameter values are invoked for risk assessments unless site-specific information suggests other parameter values. Because many SNL/NM solid waste management units (SWMUs) have similar types of contamination and physical settings, SNL/NM believes that the risk assessment analyses at these sites can be similar. A default set of exposure scenarios and parameter values facilitates the risk assessments and subsequent review.

The default exposure routes and parameter values used are those that SNL/NM views as resulting in a Reasonable Maximum Exposure (RME) value. Subject to comments and recommendations by the U.S. Environmental Protection Agency (EPA) Region VI and New Mexico Environment Department (NMED), SNL/NM will use these default exposure routes and parameter values in future risk assessments.

At SNL/NM, all SWMUs exist within the boundaries of the Kirtland Air Force Base. Approximately 240 potential waste and release sites have been identified where hazardous, radiological, or mixed materials may have been released to the environment. Evaluation and characterization activities have occurred at all of these sites to varying degrees. Among other documents, the SNL/NM ER draft Environmental Assessment (DOE 1996) presents a summary of the hydrogeology of the sites and the biological resources present. When evaluating potential human health risk the current or reasonably foreseeable land use negotiated and approved for the specific SWMU/AOC, aggregate, or watershed will be used. The following references generally document these land uses: *Workbook: Future Use Management Area 2 (DOE et al. September 1995); Workbook: Future Use Management Area 1 (DOE et al. October 1995); Workbook: Future Use Management Areas 3, 4, 5, and 6 (DOE and USAF January 1996); Workbook: Future Use Management Area 7 (DOE and USAF March 1996)*. At this time, all SNL/NM SWMUs have been tentatively designated for either industrial or recreational future land use. The NMED has also requested that risk calculations be performed based upon a residential land-use scenario. Therefore, all three land-use scenarios will be addressed in this document.

The SNL/NM ER Project has screened the potential exposure routes and identified default parameter values to be used for calculating potential intake and subsequent hazard index (HI), excess cancer risk and dose values. The EPA (EPA 1989) provides a summary of exposure routes that could potentially be of significance at a specific waste site. These potential exposure routes consist of:

- Ingestion of contaminated drinking water
- Ingestion of contaminated soil

- Ingestion of contaminated fish and shellfish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water
- Dermal contact with chemicals in soil
- Inhalation of airborne compounds (vapor phase or particulate)
- External exposure to penetrating radiation (immersion in contaminated air; immersion in contaminated water; and exposure from ground surfaces with photon-emitting radionuclides)

Based upon the location of the SNL/NM SWMUs and the characteristics of the surface and subsurface at the sites, we have evaluated these potential exposure routes for different land-use scenarios to determine which should be considered in risk assessment analyses (the last exposure route is pertinent to radionuclides only). At SNL/NM SWMUs, there is currently no consumption of fish, shellfish, fruits, vegetables, meat, eggs, or dairy products that originate on site. Additionally, no potential for swimming in surface water is present due to the high-desert environmental conditions. As documented in the RESRAD computer code manual (ANL 1993), risks resulting from immersion in contaminated air or water are not significant compared to risks from other radiation exposure routes.

For the industrial and recreational land-use scenarios, SNL/NM ER has, therefore, excluded the following five potential exposure routes from further risk assessment evaluations at any SNL/NM SWMU:

- Ingestion of contaminated fish and shellfish
- Ingestion of contaminated fruits and vegetables
- Ingestion of contaminated meat, eggs, and dairy products
- Ingestion of contaminated surface water while swimming
- Dermal contact with chemicals in water

That part of the exposure pathway for radionuclides related to immersion in contaminated air or water is also eliminated.

Based upon this evaluation, for future risk assessments the exposure routes that will be considered are shown in Table 1.

Table 1
Exposure Pathways Considered for Various Land-Use Scenarios

Industrial	Recreational	Residential
Ingestion of contaminated drinking water	Ingestion of contaminated drinking water	Ingestion of contaminated drinking water
Ingestion of contaminated soil	Ingestion of contaminated soil	Ingestion of contaminated soil
Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)	Inhalation of airborne compounds (vapor phase or particulate)
Dermal contact (nonradiological constituents only) soil only	Dermal contact (nonradiological constituents only) soil only	Dermal contact (nonradiological constituents only) soil only
External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces	External exposure to penetrating radiation from ground surfaces

Equations and Default Parameter Values for Identified Exposure Routes

In general, SNL/NM expects that ingestion of compounds in drinking water and soil will be the more significant exposure routes for chemicals; external exposure to radiation may also be significant for radionuclides. All of the above routes will, however, be considered for their appropriate land-use scenarios. The general equation for calculating potential intakes via these routes is shown below. The equations are taken from "Assessing Human Health Risks Posed by Chemicals: Screening-Level Risk Assessment" (NMED March 2000) and "Technical Background Document for Development of Soil Screening Levels" (NMED December 2000). Equations from both documents are based upon the "Risk Assessment Guidance for Superfund" (RAGS): Volume 1 (EPA 1989, 1991). These general equations also apply to calculating potential intakes for radionuclides. A more in-depth discussion of the equations used in performing radiological pathway analyses with the RESRAD code may be found in the RESRAD Manual (ANL 1993). RESRAD is the only code designated by the U.S. Department of Energy (DOE) in DOE Order 5400.5 for the evaluation of radioactively contaminated sites (DOE 1993). The Nuclear Regulatory Commission (NRC) has approved the use of RESRAD for dose evaluation by licensees involved in decommissioning, NRC staff evaluation of waste disposal requests, and dose evaluation of sites being reviewed by NRC staff. EPA Science Advisory Board reviewed the RESRAD model. EPA used RESRAD in their rulemaking on radiation site cleanup regulations. RESRAD code has been verified, undergone several benchmarking analyses, and been included in the International Atomic Energy Agency's VAMP and BIOMOVS II projects to compare environmental transport models.

Also shown are the default values SNL/NM ER will use in RME risk assessment calculations for industrial, recreational, and residential land-use scenarios, based upon EPA and other governmental agency guidance. The pathways and values for chemical contaminants are discussed first, followed by those for radionuclide contaminants. RESRAD input parameters that are left as the default values provided with the code are not discussed. Further information relating to these parameters may be found in the RESRAD Manual (ANL 1993) or by directly accessing the RESRAD websites at: http://web.ead.anl.gov/resrad/home2/ or http://web.ead.anl.gov/resrad/documents/.

Generic Equation for Calculation of Risk Parameter Values

The equation used to calculate the risk parameter values (i.e., hazard quotients/HI, excess cancer risk, or radiation total effective dose equivalent [TEDE] [dose]) is similar for all exposure pathways and is given by:

Risk (or Dose) = Intake x Toxicity Effect (either carcinogenic, noncarcinogenic, or radiological)

$$= C \times (CR \times EFD/BW/AT) \times \text{Toxicity Effect} \quad (1)$$

where;

C = contaminant concentration (site specific)
CR = contact rate for the exposure pathway
EFD= exposure frequency and duration
BW = body weight of average exposure individual
AT = time over which exposure is averaged.

For nonradiological constituents of concern (COCs), the total risk/dose (either cancer risk or HI) is the sum of the risks/doses for all of the site-specific exposure pathways and contaminants. For radionuclides, the calculated radiation exposure, expressed as TEDE is compared directly to the exposure guidelines of 15 millirem per year (mrem/year) for industrial and recreational future use and 75 mrem/year for the unlikely event that institutional control of the site is lost and the site is used for residential purposes (EPA 1997).

The evaluation of the carcinogenic health hazard produces a quantitative estimate for excess cancer risk resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of the quantitative estimate with the potentially acceptable risk of 1E-5 for nonradiological carcinogens. The evaluation of the noncarcinogenic health hazard produces a quantitative estimate (i.e., the HI) for the toxicity resulting from the COCs present at the site. This estimate is evaluated for determination of further action by comparison of this quantitative estimate with the EPA standard HI of unity (1). The evaluation of the health hazard from radioactive compounds produces a quantitative estimate of doses resulting from the COCs present at the site. This estimated dose is used to calculate an assumed risk. However, this calculated risk is presented for illustration purposes only, not to determine compliance with regulations.

The specific equations used for the individual exposure pathways can be found in RAGS (EPA 1989) and are outlined below. The RESRAD Manual (ANL 1993) describes similar equations for the calculation of radiological exposures.

Soil Ingestion

A receptor can ingest soil or dust directly by working in the contaminated soil. Indirect ingestion can occur from sources such as unwashed hands introducing contaminated soil to food that is then eaten. An estimate of intake from ingesting soil will be calculated as follows:

$$I_s = \frac{C_s * IR * CF * EF * ED}{BW * AT}$$

where:

I_s = Intake of contaminant from soil ingestion (milligrams [mg]/kilogram [kg]-day)
C_s = Chemical concentration in soil (mg/kg)
IR = Ingestion rate (mg soil/day)
CF = Conversion factor (1E-6 kg/mg)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

It should be noted that it is conservatively assumed that the receptor only ingests soil from the contaminated source.

Soil Inhalation

A receptor can inhale soil or dust directly by working in the contaminated soil. An estimate of intake from inhaling soil will be calculated as follows (EPA August 1997):

$$I_s = \frac{C_s * IR * EF * ED * \left(1/VF \text{ or } 1/PEF\right)}{BW * AT}$$

where:

I_s = Intake of contaminant from soil inhalation (mg/kg-day)
C_s = Chemical concentration in soil (mg/kg)
IR = Inhalation rate (cubic meters [m^3]/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
VF = soil-to-air volatilization factor (m^3/kg)
PEF = particulate emission factor (m^3/kg)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

Soil Dermal Contact

$$D_a = \frac{C_s * CF * SA * AF * ABS * EF * ED}{BW * AT}$$

where:

D_a = Absorbed dose (mg/kg-day)
C_s = Chemical concentration in soil (mg/kg)
CF = Conversion factor (1E-6 kg/mg)
SA = Skin surface area available for contact (cm^2/event)
AF = Soil to skin adherence factor (mg/cm^2)
ABS = Absorption factor (unitless)
EF = Exposure frequency (events/year)

ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

Groundwater Ingestion

A receptor can ingest water by drinking it or through using household water for cooking. An estimate of intake from ingesting water will be calculated as follows (EPA August 1997):

$$I_w = \frac{C_w * IR * EF * ED}{BW * AT}$$

where:

I_w = Intake of contaminant from water ingestion (mg/kg/day)
C_w = Chemical concentration in water (mg/liter [L])
IR = Ingestion rate (L/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged) (days)

Groundwater Inhalation

The amount of a constituent taken into the body via exposure to volatilization from showering or other household water uses will be evaluated using the concentration of the constituent in the water source (EPA 1991 and 1992). An estimate of intake from volatile inhalation from groundwater will be calculated as follows (EPA 1991):

$$I_w = \frac{C_w * K * IR_i * EF * ED}{BW * AT}$$

where:

I_w = Intake of volatile in water from inhalation (mg/kg/day)
C_w = Chemical concentration in water (mg/L)
K = volatilization factor (0.5 L/m^3)
IR_i = Inhalation rate (m^3/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged—days)

For volatile compounds, volatilization from groundwater can be an important exposure pathway from showering and other household uses of groundwater. This exposure pathway will only be evaluated for organic chemicals with a Henry's Law constant greater than $1x10^{-5}$ and with a molecular weight of 200 grams/mole or less (EPA 1991).

Tables 2 and 3 show the default parameter values suggested for use by SNL/NM at SWMUs, based upon the selected land-use scenarios for nonradiological and radiological COCs,

respectively. References are given at the end of the table indicating the source for the chosen parameter values. SNL/NM uses default values that are consistent with both regulatory guidance and the RME approach. Therefore, the values chosen will, in general, provide a conservative estimate of the actual risk parameter. These parameter values are suggested for use for the various exposure pathways, based upon the assumption that a particular site has no unusual characteristics that contradict the default assumptions. For sites for which the assumptions are not valid, the parameter values will be modified and documented.

Summary

SNL/NM will use the described default exposure routes and parameter values in risk assessments at sites that have an industrial, recreational, or residential future land-use scenario. There are no current residential land-use designations at SNL/NM ER sites, but NMED has requested this scenario to be considered to provide perspective of the risk under the more restrictive land-use scenario. For sites designated as industrial or recreational land use, SNL/NM will provide risk parameter values based upon a residential land-use scenario to indicate the effects of data uncertainty on risk value calculations or in order to potentially mitigate the need for institutional controls or restrictions on SNL/NM ER sites. The parameter values are based upon EPA guidance and supplemented by information from other government sources. If these exposure routes and parameters are acceptable, SNL/NM will use them in risk assessments for all sites where the assumptions are consistent with site-specific conditions. All deviations will be documented.

Table 2
Default Nonradiological Exposure Parameter Values for Various Land-Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure Frequency (day/yr)	250[a,b]	8.7 (4 hr/wk for 52 wk/yr)[a,b]	350[a,b]
Exposure Duration (yr)	25[a,b,c]	30[a,b,c]	30[a,b,c]
Body Weight (kg)	70[a,b,c]	70 Adult[a,b,c] 15 Child[a,b,c]	70 Adult[a,b,c] 15 Child[a,b,c]
Averaging Time (days) for Carcinogenic Compounds (= 70 yr x 365 day/yr) for Noncarcinogenic Compounds (= ED x 365 day/yr)	25,550[a,b] 9,125[a,b]	25,550[a,b] 10,950[a,b]	25,550[a,b] 10,950[a,b]
Soil Ingestion Pathway			
Ingestion Rate (mg/day)	100[a,b]	200 Child[a,b] 100 Adult[a,b]	200 Child[a,b] 100 Adult[a,b]
Inhalation Pathway			
Inhalation Rate (m^3/day)	20[a,b]	15 Child[a] 30 Adult[a]	10 Child[a] 20 Adult[a]
Volatilization Factor (m^3/kg)	Chemical Specific	Chemical Specific	Chemical Specific
Particulate Emission Factor (m^3/kg)	1.36E9[a]	1.36E9[a]	1.36E9[a]
Water Ingestion Pathway			
Ingestion Rate (liter/day)	2.4[a]	2.4[a]	2.4[a]
Dermal Pathway			
Skin Adherence Factor (mg/cm^2)	0.2[a]	0.2 Child[a] 0.07 Adult[a]	0.2 Child[a] 0.07 Adult[a]
Exposed Surface Area for Soil/Dust (cm^2/day)	3,300[a]	2,800 Child[a] 5,700 Adult[a]	2,800 Child[a] 5,700 Adult[a]
Skin Adsorption Factor	Chemical Specific	Chemical Specific	Chemical Specific

[a]Technical Background Document for Development of Soil Screening Levels (NMED December 2000).
[b]Risk Assessment Guidance for Superfund, Vol. 1, Part B (EPA 1991).
[c]Exposure Factors Handbook (EPA August 1997).
ED = Exposure duration.
EPA = U.S. Environmental Protection Agency.
hr = Hour(s).
kg = Kilogram(s).
m = Meter(s).
mg = Milligram(s).
NA = Not available.
wk = Week(s).
yr = Year(s).

Table 3
Default Radiological Exposure Parameter Values for Various Land-Use Scenarios

Parameter	Industrial	Recreational	Residential
General Exposure Parameters			
Exposure Frequency	8 hr/day for 250 day/yr	4 hr/wk for 52 wk/yr	365 day/yr
Exposure Duration (yr)	25[a,b]	30[a,b]	30[a,b]
Body Weight (kg)	70 Adult[a,b]	70 Adult[a,b]	70 Adult[a,b]
Soil Ingestion Pathway			
Ingestion Rate	100 mg/day[c]	100 mg/day[c]	100 mg/day[c]
Averaging Time (days) (= 30 yr x 365 day/yr)	10,950[d]	10,950[d]	10,950[d]
Inhalation Pathway			
Inhalation Rate (m^3/yr)	7,300[d,e]	10,950[e]	7,300[d,e]
Mass Loading for Inhalation g/m^3	1.36 E-5[d]	1.36 E-5[d]	1.36 E-5[d]
Food Ingestion Pathway			
Ingestion Rate, Leafy Vegetables (kg/yr)	NA	NA	16.5[c]
Ingestion Rate, Fruits, Non-Leafy Vegetables & Grain (kg/yr)	NA	NA	101.8[b]
Fraction Ingested	NA	NA	0.25[b,d]

[a]Risk Assessment Guidance for Superfund, Vol. 1, Part B (EPA 1991).
[b]Exposure Factors Handbook (EPA August 1997).
[c]EPA Region VI guidance (EPA 1996).
[d]For radionuclides, RESRAD (ANL 1993).
[e]SNL/NM (February 1998).
EPA = U.S. Environmental Protection Agency.
g = Gram(s)
hr = Hour(s).
kg = Kilogram(s).
m = Meter(s).
mg = Milligram(s).
NA = Not applicable.
wk = Week(s).
yr = Year(s).

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Brenda

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MAR 2 2 2005

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Road East, Building 1
Santa Fe, NM 87505

Dear Mr. Bearzi,

On behalf of the Department of Energy (DOE) and Sandia Corporation, DOE is submitting the enclosed responses to the New Mexico Environment Department Request for Supplemental Information, SWMU Assessment Reports and Proposals for Corrective Action Complete, Drain and Septic Systems (DSS) Sites 276, 1004, 1031, 1052, 1080, 1087, 1090, 1102, and 1113, DSS Round 7, Environmental Restoration Project at Sandia National Laboratories, New Mexico, EPA ID No. NM589011518, dated January 26, 2005.

If you have any questions, please contact John Gould at (505) 845-6089.

Sincerely,

Patty Wagner
Manager

Enclosure

cc w/enclosure:
W. Moats, NMED-HWB (via Certified Mail)
L. King, EPA, Region 6 (Via Certified Mail)
M. Gardipe, NNSA/SC/ERD
D. Pepe, NMED-OB
J. Volkerding, DOE-NMED-OB

cc w/o enclosure:
F. Nimick, SNL, MS 1089
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M. J. Davis, SNL, MS 1089
D. Stockham, SNL, MS 1087
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Sandia National Laboratories
Albuquerque, New Mexico
March 2005

Environmental Restoration Project
Responses to NMED Request for Supplemental Information
SWMU Assessment Reports and Proposals for Corrective Action Complete: Drain and Septic Systems (DSS) Sites 276, 1004, 1031, 1052, 1080, 1087, 1090, 1102, AND 1113, DSS ROUND 7
Dated December 2004

INTRODUCTION

This document responds to a January 26, 2005 Request for Supplemental Information (RSI) letter from William P. Moats of the State of New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) to the U.S Department of Energy and Sandia National Laboratories/New Mexico (SNL/NM). A response to this RSI is due within sixty (60) days of receipt of the letter by SNL/NM, or by March 26, 2005.

In this document, the NMED comments (in bold font) are restated in the same order in which they were provided in the RSI. Following each comment, the word "Response" introduces the U.S. Department of Energy/SNL/NM reply (in normal font style).

GENERAL COMMENTS

1. **Shallow ground water is present beneath several of the sites that are included in the subject document (SWMUs 276, 1102, and 1052). This fact is stated in the description of each of these sites. Clarify why this information is neither mentioned when describing the conceptual site model nor taken into account when identifying and evaluating the potential contaminant pathways in the risk assessment reports.**

Response: As noted in each of the three reports, the shallow groundwater aquifer is approximately 265, 267, and 310 feet below ground surface (bgs) at Sites 276 (Building 829X silver recovery sump), 1052 (Building 803 seepage pit), and 1102 (Building 889 septic system) respectively. The shallow groundwater aquifer is limited in extent beneath SNL/NM and Kirtland Air Force Base (KAFB) and is not used as a water supply source. The regional groundwater aquifer is approximately 555, 552, and 535 feet bgs beneath Sites 276, 1052, and 1102, respectively. In addition, infiltration of precipitation is almost nonexistent at these sites as virtually all moisture that falls or flows onto the site subsequently undergoes evapotranspiration.

No significant contaminant of concern (COC) concentrations were detected in soil samples collected in 2002 from beneath these three units. As described in the DSS Site 1052 SWMU Assessment Report (SAR), Site 1052 was one of seven DSS project sites selected by NMED for the installation of a deep soil-vapor monitoring well, to test for the presence of significant volatile organic compound (VOC) soil-vapor concentrations in the deep subsurface at selected DSS sites. Soil vapor samples were collected at depths of 5, 20, 70, 100, and 150 feet bgs in well 1052-VW-01, and total VOC vapor concentrations in all of the samples were much lower than the 10 parts per million by volume (ppmv) action level specified in the "Sampling and Analysis Plan (SAP) for Characterizing and Assessing Potential Releases to the Environment From Septic and Other Miscellaneous Drain Systems at Sandia National Laboratories/New Mexico". Therefore, based on the sampling conducted at these three locations, it was considered unlikely that COCs have or will reach either the shallow or regional aquifers as a result of discharges from these sites. For these reasons, the groundwater pathway for these three sites was not evaluated as part of the risk assessments for these three sites.

2. **The NMED is aware of the typical background levels for gross alpha/beta for the Sandia National Laboratories area. However, the term "New Mexico-established background levels" for gross alpha and gross beta is potentially misleading in that it implies that these levels have been officially approved by the New Mexico Environment Department (NMED), which is not true. In future reports, this phrase should be eliminated from similar discussions of gross alpha/beta activities.**

Response: SNL/NM acknowledges that there are no NMED-approved maximum background levels for gross alpha/beta activities in soil, and did not intend to imply that this was the case. The upper 95th percentile (mean plus 2 standard deviations above the mean) background activities for gross alpha/beta activities of 17.4 and 25.4 picocuries per gram (pCi/g), respectively, are based upon values derived from a gross alpha/beta soil sampling study conducted in November 1990 by the NMED in which soil samples were collected from 40 locations throughout the state. This is the most comprehensive study known to attempt to determine maximum background gross alpha and beta values in soil throughout the state. These background values were used in the DSS SARs to give the detected gross alpha/beta values meaning relative to background activities, instead of presenting the values without comparison. The language in future reports will be modified to remove the implication of official approval of the background values by the NMED.

3. **Each drain and septic system report must include the date that the septic system was abandoned or otherwise inactivated and the date that the septic tank was pumped out and backfilled. If a tank has not been emptied and backfilled, state the date that these activities will occur.**

Response: The dates by which most of the septic systems in SNL/NM Technical Area (TA)-III and the Coyote Test Field (CTF) areas were "removed from service" are based upon two memos written by Mr. Joe Jones (SNL/NM), dated June 21, 1991, and July 26, 1993. In future SARs and RSI responses, for non-TA-III and CTF sites not listed in the Jones memos, additional research will be conducted as needed to determine the year in which a system was abandoned. Also, see the response to Specific Comment #7 below for additional historical information on the Building 803 seepage pit (DSS Site 1052), one of the sites included in DSS Round 7.

All known SNL/NM abandoned septic tanks were inspected in 2004 to determine if they were empty and ready to backfill, or if they contained effluent. Six tanks were found to still contain effluent. As a result, waste characterization samples were collected from these tanks in July 2004 and January 2005. SNL/NM plans to remove the waste in these six tanks and dispose of it according to SNL/NM policy in the spring of 2005. Once the waste has been removed, all of the remaining abandoned SNL/NM septic tanks and seepage pits will be backfilled in place with clean soil by mid-2005. It is anticipated that this backfilling work will commence in approximately mid-May 2005, and will be completed in approximately two months.

As of March 2005, there remain five SNL/NM-owned septic systems that are still in use. These include:

- Building 6020 septic system, 6000 Igloo area
- Building 6030 septic system, 6000 Igloo area
- Building 8895/MO-100 septic system, TA-I
- MO-14/MO-15 septic system, TA-I
- Robotic Vehicle Range septic system, east of TA-II

There are no current plans to close out these active septic systems, and the tanks will be periodically pumped out as required.

4. **Final decisions on the subject reports can not be made until the Quality Control and Gamma Spectrometry Reports addressed in NMED's January 14, 2005, Request for Supplemental Information have been received and approved by the NMED.**

Response: SNL/NM recognizes that final decisions for the proposals for Corrective Action Complete (CAC) for the DSS project sites cannot be made until the above-referenced report is completed. Work on this report is ongoing, and it is anticipated that it will be completed and delivered to the NMED by April 14, 2005, within the required 90-day time frame specified in the applicable Request for Supplemental Information letter.

SPECIFIC COMMENTS

5. **Site 1087: Building 6743 Seepage Pit:**
The report states that the seepage pit at Site 1087 will be backfilled in late 2004 or early 2005, when all inflow plumbing will be disconnected. State whether the seepage pit has been backfilled and the date of this activity.

Response: The seepage pit at this site has not yet been backfilled. SNL/NM plans to backfill this seepage pit, and disconnect the piping from the Building 6743 floor drains to the seepage pit, in mid-2005.

6. **Site 1090: Building 6721 Septic System:**
The NMED does not believe that this site meets residential risk goals, as there are no data supporting an assertion that various semi-volatile organic compounds driving the risk assessment originate from drain field piping. Industrial land use controls will be required for Site 1090. Also, state the detection limits for all samples analyzed for Pyrene that have J-coded values in Table 3.4.2-3.

Response: SNL/NM believes that the most likely source of semivolatile organic compounds (SVOCs) detected in the shallow interval soil samples collected at this site are fragments of the disintegrated bituminous drainfield pipe. If this is the case, the source of the SVOC contamination (piping) still remains at the site, and SNL/NM accepts that the site will be designated Corrective Action Complete with Controls.

As shown on Table 3.4.2-4 of the DSS Site 1090 SAR (the SVOC analytical method detection limit [MDL] table), the MDL for pyrene is 16.7 micrograms per kilogram (µg/kg). The detections of pyrene on Table 3.4.2-3 (the SVOC data summary table) are estimated values that were J-coded during the data validation review process.

7. **Site 1052: Building 803 Seepage Pit:**
Provide the dates when the drainline was disconnected, the seepage pit was abandoned in place, and the discharges were routed to the City of Albuquerque sanitary sewer system.

It is not credible that SNL could not find *any* operational history for Site 1052. NMED currently has offices in Building 803 and at least some of the past uses of this building are known. Provide a description of the known historical operations at this site.

Response: The exact date that the Building 803 seepage pit was abandoned was unknown when the Site 1052 SAR was written in December 2004. However, a report titled "Storm Drain System Cross Connect Project" report produced by an SNL/NM Facilities Engineering group in August 1995 has since been located. This project was performed to investigate the storm and sanitary sewer line drain piping at SNL/NM, and to identify and correct any unauthorized cross connections (from the sanitary sewer system to the storm drain). Most of this work was done at TA-I facilities, and details, including test results for Building 803, are presented in the report. Specifically, the report states that an inspection of the Building 803 sanitary and storm drain systems was conducted on September 16, 1992, and included dye testing and inspections of interior drains. Part of the evaluation process included the introduction of fluorescent dye into various inspection ports (sinks, toilets, floor drains, etc.) in the building and observation for the presence of the dye at various downstream discharge points, to determine if there was a connection.

SNL/NM Facilities Engineering drawings show that a floor drain in the northwest part of Building 803 was connected to the seepage pit on the west side of the building. As part of the September 1992 inspection, it was determined that seepage pit floor drain was filled with concrete. The seepage pit was inspected after completion of the building dye testing, and no dye was observed to have entered the seepage pit. It was therefore concluded that the Building 803 seepage pit had been abandoned at sometime prior to September 16, 1992.

What is meant by the statement "because operational records were not available" (which appears in Section 2.2.2 of the DSS Site 1052 SAR) is that SNL/NM has, for the most part, not determined specifics on activities at this or any other DSS AOC site. It was recognized early in the DSS site investigation process that it would be very difficult, if not impossible to determine with a high degree of certainty complete site histories, and the types and quantities of COCs that may or may not have been discharged to the environment. Therefore, during the negotiation process being conducted with the NMED to determine a technical and decision-making approach to complete environmental investigations at the DSS sites, it was concluded that the most definitive way to determine if COCs are present at the sites would be to collect the same comprehensive set of characterization samples at each site. The "standard suite" of analyses was specified in the SAP, and included VOCs, SVOCs, polychlorinated biphenyls (PCBs), total cyanide, high explosive (HE) compounds, the eight Resource Conservation and Recovery Act (RCRA) metals, hexavalent chromium, radionuclides by gamma spectroscopy, and gross alpha/beta activity.

8. **Site 276: Former Building 829 X Silver Recovery Sump:**
The relationship between the silver sump and the sewer line on the east side of Building 829X is unclear. State whether there is any relationship between these two systems and whether the sewer line is part of SWMU 276.

Low levels of VOCs, SVOCs, and radionuclides were detected in the soil samples collected in 1994 along the sewer line. Describe any remedial activities that were conducted after the collection of these soil samples and whether the sewer line was removed. Data from the samples collected along the sewer line may need to be included in a revised risk assessment for the site.

Response: There is no known direct relationship or connection between the silver recovery sump (on the southwest side of the former Building 829X), and the sewer line on the east side of the building. SWMU 276 includes only the silver recovery sump, and does not include the sewer line. Portions of the August 1995 "Contamination Assessment Report for Soil Sampling at Building 829X" were included as Annex A of the SMWU 276 SAR for completeness, because it presents analytical results for samples collected from beneath the silver recovery sump, as well as other areas around Building 829X. Because the sewer line is not part of SWMU 276, the data from the samples collected along the sewer line is not relevant to the risk assessment for the site.

Available information (SNL/NM Facilities Engineering drawings and computer-aided design (CAD) system maps of sewer lines in TA-I) indicates that the portion of the sewer line in question was removed as part of the demolition activities for this and other nearby buildings. The area of the former Building 829X, and the sewer line and silver recovery sump are now covered by an asphalt parking lot.

9. **Site 1004: Building 6969 Septic System:**
This is an active site. The report does not state whether current operations comply with the applicable laws and regulations nor whether there are any institutional or other controls that will prevent the discharge of possible contaminants into the system in the future. Clarify how the current operations at Site 1004 are protective of the environment.

The risk assessment report for Site 1004 states that the analytical data adequately characterize the rate of contaminant migration up to the date of sampling in September 2002. State if there are any changes in the volumes or types of discharges to this system that may affect the rate of contaminant migration. Industrial land use controls may be required for Site 1004.

Response:
In the "Summary" Section 2.1 of the DSS Site 1004 SAR, the final sentence in the first paragraph states that "Current operations at the site are conducted in accordance with applicable laws and regulations that are protective of the environment."

SNL/NM has a septic system monitoring program that was established to sample all active septic tank systems at SNL/NM. The purpose of the program was to show that no contaminated material will be sent to the City of Albuquerque publically-owned treatment works (POTW) when tanks are pumped, and that no effluent contained within the tanks will contaminate the soil column. SNL/NM maintains five active septic tank systems in remote areas on KAFB that are not connected to the sanitary sewer system. These systems are used only for domestic sanitary sewage collection. Since these systems receive only domestic sewage and no industrial discharges, they do not require sampling prior to pumping and discharge to the public sewer system. However, since 1992 as a Best Management Practice (BMP), SNL/NM periodically samples these active systems prior to pumping and discharge by a certified pumping service. Environmental monitoring samples are also periodically collected from the KAFB sanitary sewer system at monitoring stations to verify and demonstrate that contaminants in waste streams exiting the facility do not exceed applicable wastewater discharge standards.

The SNL/NM Environment, Safety, and Health (ES&H) Manual describes numerous policies and procedures that are in place to ensure that operations at the site are conducted in a manner that are protective of the environment. SNL/NM department managers are directly responsible for ensuring that department activities are conducted in an environmentally responsible manner, and that department personnel are properly trained and educated about hazardous waste management practices. Also, annual audits and inspections are conducted at SNL/NM by NMED regulators to determine if the facility is in compliance with all pertinent environmental regulations.

Mr. Dan Puetz, the Robotics Vehicle Range facility representative, was contacted on March 4, 2005, and he stated that 16 to 18 permanent staff have typically worked at the facility, but that number has recently increased to approximately 35 personnel, and it could increase again to as many as 50 people approximately one year from now. The septic system at this remote facility currently receives only effluent from restrooms, and while the volume of effluent discharged to the system will increase in the future due to staff increases at the facility, the nature of the discharges will not change.

RSI

National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

APR 7 2005

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Road East, Building 1
Santa Fe, NM 87505

Dear Mr. Bearzi,

On behalf of the Department of Energy (DOE) and Sandia Corporation, DOE is submitting the enclosed Quality Control (QC) Report, and copies of gamma spectroscopy analytical results for the entire Drain and Septic Systems (DSS) project, in response to the New Mexico Environment Department Request for Supplemental Information: Environmental Restoration Project SWMU Assessment Reports and Proposals for Corrective Action Complete: Drain and Septic Systems Sites 1034, 1035, 1036, 1078, 1079, 1084, 1098, 1104, and 1120, (DSS Round 6); September 2004, Environmental Restoration Project at Sandia National Laboratories, New Mexico, EPA ID No. NM589011518, dated January 14, 2005.

One hardcopy (consisting of seven volumes) will be delivered to Will Moats (NMED), and an electronic CD will be sent by certified mail to you and Laurie King (EPA).

If you have any questions, please contact John Gould at (505) 845-6089.

Sincerely,

Patty Wagner
Manager

Enclosure

cc w/ enclosure:
W. Moats, NMED-HWB (via Certified Mail)
L. King, EPA, Region 6 (Via Certified Mail)
M. Gardipe, NNSA/SC/ERD
J. Volkerding, DOE-NMED-OB

cc w/o enclosure:
D. Pepe, NMED-OB
J. Estrada, NNSA/SSO, MS 0184
F. Nimick, SNL, MS 1089
R. E. Fate, SNL, MS 1089
M. J. Davis, SNL, MS 1089
D. Stockham, SNL, MS 1087
B. Langkopf, SNL, MS 1087
P. Puissant, SNL, MS 1087
M. Sanders, SNL, MS 1087
A. Blumberg, SNL, MS 0141

Sandia National Laboratories

Drain and Septic Systems Project Quality Control (QC) Report

April 2005

Volume 1 of 7
Master Index
and
Field Duplicate Relative Percent Difference Tables

Environmental
Restoration
Project

United States Department of Energy
Sandia Site Office

Sandia National Laboratories/New Mexico
Drain and Septic Systems Project Quality Control Report
April 2005

In response to the New Mexico Environmental Department (NMED) request for supplemental information dated January 14, 2005, the Sandia National Laboratories/New Mexico (SNL/NM) Environmental Restoration (ER) project is providing a complete set of laboratory analytical quality control (QC) documentation for approximately 1,200 soil and associated field blank and duplicate samples collected at the SNL/NM Drain and Septic System (DSS) sites from 1998 to 2002.

The documentation set is comprised of seven report binders. The first binder contains a master index sorted by DSS Site number, and then by analytical parameter. The master index also includes the site names, binder number in which the pertinent QC information can be found for any individual sample, Analytical Request/Chain of Custody (AR/COC) numbers, ER sample IDs, ER sample numbers, sample collection dates, sample matrix, analytical laboratory, and the laboratory analytical batch number for these DSS samples. The first binder also contains tables of calculated relative percent differences (RPDs) for primary and field duplicate sample pairs collected at the DSS sites from 1998 to 2002.

Binders 2 through 5 include the detailed QC information for General Engineering Laboratories (GEL). Binder 6 includes the same type of information for the ER Chemistry Laboratory (ERCL). Binders 2 through 6 include general narratives which address condition on receipt at the laboratory, and sample integrity issues (proper preservation, shipping, AR/COC, etc.). Technical narratives are also provided for each analytical method used. These narratives address holding time and any other specific QC method conformance issues. QC summaries are included for each QC batch. These include the result data and applicable calculations (percent recovery, RPD) for analytical blanks, spikes, and replicates. Finally, Binder 7 includes both complete gamma spectroscopy data documentation, and the associated batch QC from the SNL Radiation Protection Sample Diagnostic (RPSD) Laboratory. For each data set indicated by the AR/COC number, an individual cross reference summary sheet is provided.

DRAIN AND SEPTIC SYSTEMS PROJECT QC MASTER INDEX

Site #	Site Name	Binder #	COC#	ER Sample ID	Sample #	SAMPLE DATE	MATRIX	LAB TEST	Lab	BATCH #
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-10-S	059850-002	13-SEP-02	SOIL	BNA-8270	GEL	203051
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-15-S	059851-002	13-SEP-02	SOIL	BNA-8270	GEL	203051
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-10-S	059850-002	13-SEP-02	SOIL	GROSS-A/B	GEL	203332
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-15-S	059851-002	13-SEP-02	SOIL	GROSS-A/B	GEL	203332
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-10-S	059850-002	13-SEP-02	SOIL	Cr+6	GEL	203665
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-15-S	059851-002	13-SEP-02	SOIL	Cr+6	GEL	203665
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-10-S	059850-001	13-SEP-02	SOIL	VOA-8260	GEL	203934
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-15-S	059851-001	13-SEP-02	SOIL	VOA-8260	GEL	203934
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-10-S	059850-002	13-SEP-02	SOIL	TOTAL-CN	GEL	204134
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-15-S	059851-002	13-SEP-02	SOIL	TOTAL-CN	GEL	204134
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-10-S	059850-002	13-SEP-02	SOIL	HE-8330	GEL	204142
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-15-S	059851-002	13-SEP-02	SOIL	HE-8330	GEL	204142
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-10-S	059850-002	13-SEP-02	SOIL	RCRA METALS	GEL	203818, 203489
1111	Bldg. 6720 SP	Volume 4	605674	6720/1111-SP1-BH1-15-S	059851-002	13-SEP-02	SOIL	RCRA METALS	GEL	203818, 203489
1112	Bldg. 6590 Sump DW	Volume 7	605790	6590/1112-SP1-BH1-15-S	060057-003	11-OCT-02	SOIL	GAMMA SPEC	RPSD	201445
1112	Bldg. 6590 Sump DW	Volume 7	605790	6590/1112-SP1-BH1-20-S	060058-003	11-OCT-02	SOIL	GAMMA SPEC	RPSD	201445
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-002	11-OCT-02	SOIL	HE-8330	GEL	208682
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-002	11-OCT-02	SOIL	HE-8330	GEL	208682
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-002	11-OCT-02	SOIL	BNA-8270	GEL	208790
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-002	11-OCT-02	SOIL	BNA-8270	GEL	208790
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-002	11-OCT-02	SOIL	PCB-8082	GEL	209080
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-002	11-OCT-02	SOIL	PCB-8082	GEL	209080
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-002	11-OCT-02	SOIL	TOTAL-CN	GEL	209203
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-002	11-OCT-02	SOIL	TOTAL-CN	GEL	209203
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-002	11-OCT-02	SOIL	GROSS-A/B	GEL	210166
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-002	11-OCT-02	SOIL	GROSS-A/B	GEL	210166
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-TB	060077-001	11-OCT-02	AQUEOUS	VOA-8260	GEL	210994
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-001	11-OCT-02	SOIL	VOA-8260	GEL	211014
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-001	11-OCT-02	SOIL	VOA-8260	GEL	211014
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-002	11-OCT-02	SOIL	Cr+6	GEL	213487
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-002	11-OCT-02	SOIL	Cr+6	GEL	213487
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-15-S	060057-002	11-OCT-02	SOIL	RCRA METALS	GEL	209840, 211021
1112	Bldg. 6590 Sump DW	Volume 5	605805	6590/1112-SP1-BH1-20-S	060058-002	11-OCT-02	SOIL	RCRA METALS	GEL	209840, 211021
1113	Bldg. 6597 DW	Volume 7	605790	6597/1113-DW1-BH1-10-S	060051-003	26-SEP-02	SOIL	GAMMA SPEC	RPSD	201445
1113	Bldg. 6597 DW	Volume 7	605790	6597/1113-DW1-BH1-5-S	060050-003	26-SEP-02	SOIL	GAMMA SPEC	RPSD	201445
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-002	26-SEP-02	SOIL	PCB-8082	GEL	206282
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-002	26-SEP-02	SOIL	PCB-8082	GEL	206282
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-002	26-SEP-02	SOIL	BNA-8270	GEL	206457
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-002	26-SEP-02	SOIL	BNA-8270	GEL	206457
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-002	26-SEP-02	SOIL	HE-8330	GEL	206554
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-002	26-SEP-02	SOIL	HE-8330	GEL	206554
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-002	26-SEP-02	SOIL	GROSS-A/B	GEL	206591

NOTE: Multiple batch numbers are listed for reanalysis and RCRA metals for the ICP run and the mercury CVAA run.

DRAIN AND SEPTIC SYSTEMS PROJECT QC MASTER INDEX

Site #	Site Name	Binder #	COC#	ER Sample ID	Sample #	SAMPLE DATE	MATRIX	LAB TEST	Lab	BATCH #
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-002	26-SEP-02	SOIL	GROSS-A/B	GEL	206591
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-002	26-SEP-02	SOIL	TOTAL-CN	GEL	206731
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-002	26-SEP-02	SOIL	TOTAL-CN	GEL	206731
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-001	26-SEP-02	SOIL	VOA-8260	GEL	207083
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-001	26-SEP-02	SOIL	VOA-8260	GEL	207083
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-002	26-SEP-02	SOIL	Cr+6	GEL	207514
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-002	26-SEP-02	SOIL	Cr+6	GEL	207514
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-10-S	060051-002	26-SEP-02	SOIL	RCRA METALS	GEL	206907, 207430
1113	Bldg. 6597 DW	Volume 5	605783	6597/1113-DW1-BH1-5-S	060050-002	26-SEP-02	SOIL	RCRA METALS	GEL	206907, 207430
1114	Bldg. 9978 DW	Volume 7	605731	9978/1114-DW1-BH1-11-S	059924-003	23-SEP-02	SOIL	GAMMA SPEC	RPSD	201342
1114	Bldg. 9978 DW	Volume 7	605731	9978/1114-DW1-BH1-6-S	059923-003	23-SEP-02	SOIL	GAMMA SPEC	RPSD	201342
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-002	23-SEP-02	SOIL	PCB-8082	GEL	203728
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-002	23-SEP-02	SOIL	PCB-8082	GEL	203728
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-002	23-SEP-02	SOIL	BNA-8270	GEL	203764
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-002	23-SEP-02	SOIL	BNA-8270	GEL	203764
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-001	23-SEP-02	SOIL	VOA-8260	GEL	203934
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-001	23-SEP-02	SOIL	VOA-8260	GEL	203934
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-002	23-SEP-02	SOIL	HE-8330	GEL	204142
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-002	23-SEP-02	SOIL	HE-8330	GEL	204142
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-TB	059925-001	23-SEP-02	AQUEOUS	VOA-8260	GEL	204910
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-002	23-SEP-02	SOIL	GROSS-A/B	GEL	205009
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-002	23-SEP-02	SOIL	GROSS-A/B	GEL	205009
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-002	23-SEP-02	SOIL	TOTAL-CN	GEL	205123
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-002	23-SEP-02	SOIL	TOTAL-CN	GEL	205123
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-002	23-SEP-02	SOIL	Cr+6	GEL	205618
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-002	23-SEP-02	SOIL	Cr+6	GEL	205618
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-11-S	059924-002	23-SEP-02	SOIL	RCRA METALS	GEL	203818, 204433
1114	Bldg. 9978 DW	Volume 5	605730	9978/1114-DW1-BH1-6-S	059923-002	23-SEP-02	SOIL	RCRA METALS	GEL	203818, 204433
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH1-10-S	050056-003	27-AUG-99	SOIL	HE-8330	GEL	158012
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH1-5-S	050055-003	27-AUG-99	SOIL	HE-8330	GEL	158012
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH2-10-S	050053-003	27-AUG-99	SOIL	HE-8330	GEL	158012
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH2-5-S	050052-003	27-AUG-99	SOIL	HE-8330	GEL	158012
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH3-10-S	050050-003	27-AUG-99	SOIL	HE-8330	GEL	158012
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH3-5-S	050049-003	27-AUG-99	SOIL	HE-8330	GEL	158012
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH1-10-S	050056-003	27-AUG-99	SOIL	BNA-8270	GEL	158016
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH1-5-S	050055-003	27-AUG-99	SOIL	BNA-8270	GEL	158016
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH2-10-S	050053-003	27-AUG-99	SOIL	BNA-8270	GEL	158016
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH2-5-S	050052-003	27-AUG-99	SOIL	BNA-8270	GEL	158016
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH3-10-S	050050-003	27-AUG-99	SOIL	BNA-8270	GEL	158016
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH3-5-S	050049-003	27-AUG-99	SOIL	BNA-8270	GEL	158016
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH1-10-S	050056-001	27-AUG-99	SOIL	VOA-8260	GEL	158044
1115	F. Solar Offices SS	Volume 3	602817	SOLARDETOX-DF1-BH1-5-S	050055-001	27-AUG-99	SOIL	VOA-8260	GEL	158044

NOTE: Multiple batch numbers are listed for reanalysis and RCRA metals for the ICP run and the mercury CVAA run.

Sandia National Laboratories

Drain and Septic Systems Project Quality Control (QC) Report

April 2005

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General Engineering Laboratories, Inc. (GEL) QC Data

Environmental
Restoration
Project

United States Department of Energy
Sandia Site Office

GEL QC CROSS REFERENCE

COC 605783

Site #	Site Name	SAMPLE#	F#	DISP_ER_SAMP_LOC	SAMPLE DATE	MATRIX	LAB TEST	BATCH #
1105	Bldg. 6596 DW	060046	001	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	VOA-8260	207083
1105	Bldg. 6596 DW	060046	002	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	BNA-8270	206457
1105	Bldg. 6596 DW	060046	002	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	Cr+6	207514
1105	Bldg. 6596 DW	060046	002	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	GROSS-A/B	206591
1105	Bldg. 6596 DW	060046	002	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	HE-8330	206554
1105	Bldg. 6596 DW	060046	002	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	PCB-8082	206282
1105	Bldg. 6596 DW	060046	002	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	RCRA METALS	206907, 207430
1105	Bldg. 6596 DW	060046	002	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	TOTAL-CN	206731
1105	Bldg. 6596 DW	060047	001	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	VOA-8260	207083
1105	Bldg. 6596 DW	060047	002	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	BNA-8270	206457
1105	Bldg. 6596 DW	060047	002	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	Cr+6	207514
1105	Bldg. 6596 DW	060047	002	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	GROSS-A/B	206591
1105	Bldg. 6596 DW	060047	002	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	HE-8330	206554
1105	Bldg. 6596 DW	060047	002	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	PCB-8082	206282
1105	Bldg. 6596 DW	060047	002	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	RCRA METALS	206907, 207430
1105	Bldg. 6596 DW	060047	002	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	TOTAL-CN	206731
1105	Bldg. 6596 DW	060048	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	VOA-8260	207083
1105	Bldg. 6596 DW	060049	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	BNA-8270	206457
1105	Bldg. 6596 DW	060049	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	Cr+6	207514
1105	Bldg. 6596 DW	060049	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	GROSS-A/B	206591
1105	Bldg. 6596 DW	060049	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	HE-8330	206554
1105	Bldg. 6596 DW	060049	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	PCB-8082	206282
1105	Bldg. 6596 DW	060049	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	RCRA METALS	206907, 207430
1105	Bldg. 6596 DW	060049	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	TOTAL-CN	206731
1113	Bldg. 6597 DW	060050	001	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	VOA-8260	207083
1113	Bldg. 6597 DW	060050	002	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	BNA-8270	206457
1113	Bldg. 6597 DW	060050	002	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	Cr+6	207514
1113	Bldg. 6597 DW	060050	002	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	GROSS-A/B	206591
1113	Bldg. 6597 DW	060050	002	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	HE-8330	206554

GEL QC CROSS REFERENCE

COC 605783

Site #	Site Name	SAMPLE#	F#	DISP_ER_SAMP_LOC	SAMPLE DATE	MATRIX	LAB TEST	BATCH #
1113	Bldg. 6597 DW	060050	002	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	PCB-8082	206282
1113	Bldg. 6597 DW	060050	002	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	RCRA METALS	206907, 207430
1113	Bldg. 6597 DW	060050	002	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	TOTAL-CN	206731
1113	Bldg. 6597 DW	060051	001	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	VOA-8260	207083
1113	Bldg. 6597 DW	060051	002	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	BNA-8270	206457
1113	Bldg. 6597 DW	060051	002	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	Cr+6	207514
1113	Bldg. 6597 DW	060051	002	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	GROSS-A/B	206591
1113	Bldg. 6597 DW	060051	002	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	HE-8330	206554
1113	Bldg. 6597 DW	060051	002	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	PCB-8082	206282
1113	Bldg. 6597 DW	060051	002	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	RCRA METALS	206907, 207430
1113	Bldg. 6597 DW	060051	002	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	TOTAL-CN	206731
1073	Bldg. 6580 SP	060052	001	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	VOA-8260	207083
1073	Bldg. 6580 SP	060052	002	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	BNA-8270	206457
1073	Bldg. 6580 SP	060052	002	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	Cr+6	207514
1073	Bldg. 6580 SP	060052	002	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	GROSS-A/B	206591
1073	Bldg. 6580 SP	060052	002	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	HE-8330	206554
1073	Bldg. 6580 SP	060052	002	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	PCB-8082	206282
1073	Bldg. 6580 SP	060052	002	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	RCRA METALS	206907, 207430
1073	Bldg. 6580 SP	060052	002	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	TOTAL-CN	206731
1073	Bldg. 6580 SP	060053	001	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	VOA-8260	207083
1073	Bldg. 6580 SP	060053	002	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	BNA-8270	206457
1073	Bldg. 6580 SP	060053	002	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	Cr+6	207514
1073	Bldg. 6580 SP	060053	002	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	GROSS-A/B	206591
1073	Bldg. 6580 SP	060053	002	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	HE-8330	206554
1073	Bldg. 6580 SP	060053	002	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	PCB-8082	206282
1073	Bldg. 6580 SP	060053	002	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	RCRA METALS	206907, 207430
1073	Bldg. 6580 SP	060053	002	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	TOTAL-CN	206731
1073	Bldg. 6580 SP	060054	001	6580/1037-SP1-TB	26-SEP-02	AQUEOUS	VOA-8260	207726

Sandia National Laboratories

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April 2005

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Radiation Protection & Sample Diagnostics (RPSD)
Laboratory Data

Environmental
Restoration
Project

United States Department of Energy
Sandia Site Office

RPSD QC CROSS REFERENCE

COC 605790
BATCH NO. 201445

Site #	Site Name	SAMPLE#	F#	ER SAMPLE ID	SAMPLE DATE	MATRIX	LAB TEST
1105	Bldg. 6596 DW	060046	003	6596/1105-DW1-BH1-10-S	26-SEP-02	SOIL	GAMMA SPEC
1105	Bldg. 6596 DW	060047	003	6596/1105-DW1-BH1-15-S	26-SEP-02	SOIL	GAMMA SPEC
1113	Bldg. 6597 DW	060050	003	6597/1113-DW1-BH1-5-S	26-SEP-02	SOIL	GAMMA SPEC
1113	Bldg. 6597 DW	060051	003	6597/1113-DW1-BH1-10-S	26-SEP-02	SOIL	GAMMA SPEC
1073	Bldg. 6580 SP	060052	003	6580/1037-SP1-BH1-5-S	26-SEP-02	SOIL	GAMMA SPEC
1073	Bldg. 6580 SP	060053	003	6580/1037-SP1-BH1-10-S	26-SEP-02	SOIL	GAMMA SPEC
1098	TAV Plenum Rm. SPs	060055	003	STACK S. PIT/1098-SP1-BH1-10-S	02-OCT-02	SOIL	GAMMA SPEC
1098	TAV Plenum Rm. SPs	060056	003	STACK S. PIT/1098-SP1-BH1-15-S	02-OCT-02	SOIL	GAMMA SPEC
1112	Bldg. 6590 Sump DW	060057	003	6590/1112-SP1-BH1-15-S	11-OCT-02	SOIL	GAMMA SPEC
1112	Bldg. 6590 Sump DW	060058	003	6590/1112-SP1-BH1-20-S	11-OCT-02	SOIL	GAMMA SPEC
1104	Bldg. 6595 SP	060059	003	6595/1104-SP1-BH1-11-S	01-OCT-02	SOIL	GAMMA SPEC
1104	Bldg. 6595 SP	060060	003	6595/1104-SP1-BH1-16-S	01-OCT-02	SOIL	GAMMA SPEC
1105	Bldg. 6596 DW	060062	001	6596/1105-DW1-BH1-10-DU	26-SEP-02	SOIL	GAMMA SPEC

COC 605783

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CASE NARRATIVE
for
Sandia National Laboratories
ARCOC-605783
SDG#68288A
ARCOC-605784
SDG#68288B
Case No. 7223.02.03.02

October 31, 2002

Laboratory Identification:

General Engineering Laboratories, Inc.

Mailing Address:

P.O. Box 30712
Charleston, South Carolina 29417

Express Mail Delivery and Shipping Address:

2040 Savage Road
Charleston, South Carolina 29407

Telephone Number:

(843) 556-8171

Summary:

Sample receipt

Sandia collected twenty-two soil samples and eleven aqueous samples on September 26, October 1, 2, and 3, 2002. The samples arrived at General Engineering Laboratories, Inc., (GEL) Charleston, South Carolina on October 4, 2002, for environmental analyses. Cooler clearance (screening, temperature check, etc.) was done upon login. The coolers arrived without any visible signs of tampering and with custody seals intact. The samples were delivered with chain of custody documentation and signatures. The temperature of the samples was 2.0°C, as measured from the temperature control bottles.

The trip blank with sample ID 060054-001 was analyzed one day out of holding for Volatiles. Details will be discussed further in the technical case narrative and client was notified. The cyanide batch for sample ID 060078-005 had a matrix spike that failed GEL's SPC limits as well as contract limits at 68.6% (our low end is 72.2%). The sample

and duplicate were non-detect and the LCS passed at 99.4%. The sample was out of holding. Client was notified and instructed GEL to qualify, narrate, and report the data.

The samples were screened according to GEL Standard Operating Procedures (SOP) EPI SOP S-007 rev. 2 "The Receiving of Radioactive Samples." The samples were stored properly according to SW-846 procedures and GEL SOP.

The samples were received and collected as listed in the table below:

ARCOC	SDG#	#of samples	Collection Date	Date Rec'd by Lab
605783	68288A	15	09/26/02	10/04/02
605784	68288B	18	10/01/02,10/02/02, 10/03/02	10/04/02

The laboratory received the following samples:

Laboratory ID	Description
ARCOC-605783:	
68288001	060046-001
68288002	060047-001
68288003	060048-001
68288004	060050-001
68288005	060051-001
68288006	060052-001
68288007	060053-001
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68295001	060054-001
ARCOC-605784:	
68288008	060055-001
68288009	050056-001
68288010	060059-001
68288011	060060-001
68288019	060055-002
68288020	060056-002
68288021	060059-002
68288022	060060-002
68295002	060061-001
68295003	060078-001
68295004	060079-001
68295005	060078-002

68295006	060078-003
68295007	060078-004
68295008	060078-005
68295009	060078-006
68295010	060078-007
68295011	060078-008

Case Narrative

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Internal Chain of Custody:

Custody was maintained for the samples.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Qualifier Flag and Data Package Definitions, Laboratory Certifications, Volatiles Data, Volatiles QC Summary, Semivolatiles Data, Semivolatiles QC Summary, PCB Data, PCB QC Summary, Explosives Data, Explosives QC Summary, Metals Data, Metals QC Summary, General Chemistry Data, General Chemistry QC Summary, Radiochemistry Data, Radiochemistry QC Summary, and Level C Data Package.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.

Edith M. Kent

Edith M. Kent

Project Manager

GENERAL ENGINEERING LABORATORIES
P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

GC/MS Volatile Organics
Sandia National Labs (SNLS)
SDG# 68288

Method/Analysis Information

Procedure:	Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer
Analytical Method:	SW846 8260A
Prep Method:	SW846 5030A
Analytical Batch Number:	207083
Prep Batch Number:	207082

Sample Analysis

The following client and quality control samples were analyzed to complete this sample delivery group/work order using the methods referenced in the Analysis Information section:

Sample ID	Client ID
68288001	060046-001
68288002	060047-001
68288003	060048-001
68288004	060050-001
68288005	060051-001
68288006	060052-001
68288007	060053-001
68288008	060055-001
68288009	050056-001
68288010	060059-001
68288011	060060-001
1200314571	VBLK01 (Blank)

1200314572	VBLK01LCS (Laboratory Control Sample)
1200313718	060046-001MS (Matrix Spike)
1200313719	060046-001MSD (Matrix Spike Duplicate)

Preparation/Analytical Method Verification

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-026 REV.8.

Calibration Information
Due to software limitations, all the data files comprising the initial calibration curve may not be listed on the initial calibration summary form. All calibration files are listed in the calibration history report in the "Standard Data" section.

Initial Calibration
All the initial calibration requirements were met.

CCV Requirements
All the continuing calibration verification (CCV) requirements were met.

Quality Control (QC) Information

Surrogate Recoveries
The surrogate recoveries, in the following samples, were above the acceptance limits:

68288004	*060050-001*	*Bromofluorobenzene*
68288005	*060051-001*	*Bromofluorobenzene and Toluene-d8*
68288010	*060059-001*	*Bromofluorobenzene*
68288011	*060060-001*	*Bromofluorobenzene and Toluene-d8*

Low response of the associated internal standard, 1,4-dichlorobenzene, resulted in the biased high recoveries of the surrogate standards, bromofluorobenzene. The high recovery of toluene-d8, was due to the low response of the internal standard, chlorobenzene-d5. The samples were reanalyzed and high recoveries were confirmed indicating matrix effect.

Blank Acceptance
Target analytes were not detected above the reporting limit in the blank.

LCS Recovery Statement
All the required analyte recoveries in the laboratory control sample were within the acceptance limits.

QC Sample Designation
The following sample was designated for matrix spike analysis:
68288001 *060046-001*

MS Recovery Statement
All the required matrix spike recoveries were within the acceptance limits.

MSD Recovery Statement
All the required matrix spike duplicate recoveries were within the acceptance limits.

MS/MSD RPD Statement
The relative percent differences (RPD) between the matrix spike and matrix spike duplicate recoveries were within the acceptance limits.

Internal Standard (I STD) Acceptance
In the following samples, internal standard responses were outside the required acceptance criteria.

68288004	*060050-001*	*1,4-Dichlorobenzene-d4*
68288005	*060051-001*	*1,4-Dichlorobenzene-d4 and Chlorobenzene-d5*
68288010	*060059-001*	*1,4-Dichlorobenzene-d4*
68288011	*060046-001*	*1,4-Dichlorobenzene-d4*

The low response of the internal standards resulted in biased high recoveries of the associated target analytes and surrogate standards. Sample reanalysis confirmed the low response of the internal standards indicating matrix effect.

Technical Information

Holding Time Specifications
All the samples were prepared and/or analyzed within the required holding time period.

Sample Preservation and Integrity
All samples met the sample preservation and integrity requirements.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The samples in this sample delivery group/work order did not require dilutions.

Sample Re-prep/Re-analysis
Re-analyses were not required for samples in this sample group/work order.

Miscellaneous Information

Nonconformance (NCR) Documentation
A nonconformance report was not required for this sample delivery group/work order.

Manual Integrations
Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

Additional Comments
The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are on the original raw data. These hard copies are temporary stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data package. The data validator will always sign and date the case

narrative. Data that are not generated electronically, and such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration
The laboratory utilizes the following GC/MS configurations:

Chromatographic Columns
Chromatographic separation of volatile components is accomplished through analysis on one of the following columns:

Column ID	Column Description
J&W1	DB-624, 60m x 0.25mm, 1.4um
J&W2	DB-624, 75m x 0.53mm, 3.0um

Instrument Configuration
Instrument systems are reference in the raw data and individual form headers by the Instrument ID designations below:

Instrument ID	System Configuration	Chromatographic Column	P & T Trap
VOA1	HP6890/HP5973	J&W1	Trap C
VOA2	HP6890/HP5973	J&W1	Trap C
VOA4	HP5890/HP5972	J&W1	Trap K
VOA5	HP5890/HP5972	J&W1	Trap C
VOA7	HP5890/HP5972	J&W2	Trap K
VOA8	HP6890/HP5973	J&W1	Trap K
VOA9	HP6890/HP5973	J&W1	Trap C

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: Chuck Wilson Date: 10-31-02

QC Summary

Report Date: October 30, 2002

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS Federal										
Batch 207083										
QC1200313717 LCS										
1,1-Dichloroethylene	50.0			50.1	ug/kg		100	(75%-134%)	MAP	10/09/02 07:02
Benzene	50.0			48.8	ug/kg		98	(80%-120%)		
Chlorobenzene	50.0			52.4	ug/kg		105	(82%-118%)		
Toluene	50.0			53.1	ug/kg		106	(74%-115%)		
Trichloroethylene	50.0			52.3	ug/kg		105	(80%-119%)		
**Bromofluorobenzene	50.0			63.6	ug/kg		127	(69%-138%)		
**Dibromofluoromethane	50.0			61.6	ug/kg		123	(67%-137%)		
**Toluene-d8	50.0			58.2	ug/kg		116	(67%-139%)		
QC1200314572 LCS										
1,1-Dichloroethylene	50.0			45.4	ug/kg		91	(75%-134%)		10/09/02 16:45
Benzene	50.0			45.8	ug/kg		92	(80%-120%)		
Chlorobenzene	50.0			48.2	ug/kg		96	(82%-118%)		
Toluene	50.0			48.8	ug/kg		98	(74%-115%)		
Trichloroethylene	50.0			47.3	ug/kg		95	(80%-119%)		
**Bromofluorobenzene	50.0			62.7	ug/kg		125	(69%-138%)		
**Dibromofluoromethane	50.0			63.2	ug/kg		126	(67%-137%)		
**Toluene-d8	50.0			57.8	ug/kg		116	(67%-139%)		
QC1200313714 MB										
1,1,1-Trichloroethane			U	ND	ug/kg					10/09/02 08:21
1,1,2,2-Tetrachloroethane			U	ND	ug/kg					
1,1,2-Trichloroethane			U	ND	ug/kg					
1,1-Dichloroethane			U	ND	ug/kg					
1,1-Dichloroethylene			U	ND	ug/kg					
1,2-Dichloroethane			U	ND	ug/kg					
1,2-Dichloropropane			U	ND	ug/kg					
2-Butanone			U	ND	ug/kg					
2-Hexanone			U	ND	ug/kg					
4-Methyl-2-pentanone			U	ND	ug/kg					
Acetone			U	ND	ug/kg					
Benzene			U	ND	ug/kg					
Bromodichloromethane			U	ND	ug/kg					
Bromoform			U	ND	ug/kg					
Bromomethane			U	ND	ug/kg					
Carbon disulfide			U	ND	ug/kg					
Carbon tetrachloride			U	ND	ug/kg					
Chlorobenzene			U	ND	ug/kg					
Chloroethane			U	ND	ug/kg					
Chloroform			U	ND	ug/kg					
Chloromethane			U	ND	ug/kg					
Dibromochloromethane			U	ND	ug/kg					
Ethylbenzene			U	ND	ug/kg					
Methylene chloride			U	ND	ug/kg					

QC Summary

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS Federal											
Batch 207083											
Styrene			U	ND	ug/kg						
Tetrachloroethylene			U	ND	ug/kg						
Toluene			U	ND	ug/kg						
Trichloroethylene			U	ND	ug/kg						
Vinyl acetate			U	ND	ug/kg						
Vinyl chloride			U	ND	ug/kg						
Xylenes (total)			U	ND	ug/kg						
cis-1,2-Dichloroethylene			U	ND	ug/kg						
cis-1,3-Dichloropropylene			U	ND	ug/kg						
trans-1,2-Dichloroethylene			U	ND	ug/kg						
trans-1,3-Dichloropropylene			U	ND	ug/kg						
**Bromofluorobenzene	50.0			63.6	ug/kg		127	(69%-138%)			
**Dibromofluoromethane	50.0			64.4	ug/kg		129	(67%-137%)			
**Toluene-d8	50.0			57.1	ug/kg		114	(67%-139%)			
QC1200314571 MB											
1,1,1-Trichloroethane			U	ND	ug/kg					10/09/02	18:04
1,1,2,2-Tetrachloroethane			U	ND	ug/kg						
1,1,2-Trichloroethane			U	ND	ug/kg						
1,1-Dichloroethane			U	ND	ug/kg						
1,1-Dichloroethylene			U	ND	ug/kg						
1,2-Dichloroethane			U	ND	ug/kg						
1,2-Dichloropropane			U	ND	ug/kg						
2-Butanone			U	ND	ug/kg						
2-Hexanone			U	ND	ug/kg						
4-Methyl-2-pentanone			U	ND	ug/kg						
Acetone			U	ND	ug/kg						
Benzene			U	ND	ug/kg						
Bromodichloromethane			U	ND	ug/kg						
Bromoform			U	ND	ug/kg						
Bromomethane			U	ND	ug/kg						
Carbon disulfide			U	ND	ug/kg						
Carbon tetrachloride			U	ND	ug/kg						
Chlorobenzene			U	ND	ug/kg						
Chloroethane			U	ND	ug/kg						
Chloroform			U	ND	ug/kg						
Chloromethane			U	ND	ug/kg						
Dibromochloromethane			U	ND	ug/kg						
Ethylbenzene			U	ND	ug/kg						
Methylene chloride			U	ND	ug/kg						
Styrene			U	ND	ug/kg						
Tetrachloroethylene			U	ND	ug/kg						
Toluene			U	ND	ug/kg						
Trichloroethylene			U	ND	ug/kg						
Vinyl acetate			U	ND	ug/kg						
Vinyl chloride			U	ND	ug/kg						
Xylenes (total)			U	ND	ug/kg						
cis-1,2-Dichloroethylene			U	ND	ug/kg						
cis-1,3-Dichloropropylene			U	ND	ug/kg						

QC Summary

Workorder: 68288

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS Federal											
Batch 207083											
trans-1,2-Dichloroethylene				U	ND	ug/kg					
trans-1,3-Dichloropropylene				U	ND	ug/kg					
**Bromofluorobenzene	50.0				61.2	ug/kg		122	(69%-138%)		
**Dibromofluoromethane	50.0				63.5	ug/kg		127	(67%-137%)		
**Toluene-d8	50.0				57.7	ug/kg		115	(67%-139%)		
QC1200313718 68288001 PS											
1,1-Dichloroethylene	50.0	U	ND		40.2	ug/L		80	(55%-128%)		10/09/02 23:20
Benzene	50.0	U	ND		40.4	ug/L		81	(53%-118%)		
Chlorobenzene	50.0	U	ND		41.8	ug/L		84	(53%-116%)		
Toluene	50.0	U	ND		42.3	ug/L		85	(56%-113%)		
Trichloroethylene	50.0	U	ND		43.5	ug/L		87	(54%-119%)		
**Bromofluorobenzene	50.0		60.8		62.7	ug/L		125	(69%-138%)		
**Dibromofluoromethane	50.0		62.1		62.7	ug/L		125	(67%-137%)		
**Toluene-d8	50.0		55.9		57.2	ug/L		114	(67%-139%)		
QC1200313719 68288001 PSD											
1,1-Dichloroethylene	50.0	U	ND		40.6	ug/L	1	81	(0%-21%)		10/09/02 23:47
Benzene	50.0	U	ND		40.2	ug/L	0	80	(0%-17%)		
Chlorobenzene	50.0	U	ND		41.9	ug/L	0	84	(0%-21%)		
Toluene	50.0	U	ND		41.9	ug/L	1	84	(0%-25%)		
Trichloroethylene	50.0	U	ND		42.3	ug/L	3	85	(0%-25%)		
**Bromofluorobenzene	50.0		60.8		64.0	ug/L		128	(69%-138%)		
**Dibromofluoromethane	50.0		62.1		63.6	ug/L		127	(67%-137%)		
**Toluene-d8	50.0		55.9		56.9	ug/L		114	(67%-139%)		

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where th
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL.]
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

QC Summary

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GC/MS Volatile Organics
Sandia National Labs (SNLS)
SDG# 68288-1

Method/Analysis Information

Procedure:	Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer
Analytical Method:	SW846 8260B
Prep Method:	SW846 5030B
Analytical Batch Number:	207726

Sample Analysis

The following client and quality control samples were analyzed to complete this sample delivery group/work order using the methods referenced in the Analysis Information section:

Sample ID	Client ID
68295001	060054-001
68295002	060061-001
68295003	060078-001
68295004	060079-001
1200315357	VBLK01 (Blank)
1200315360	VBLK01LCS (Laboratory Control Sample)

Preparation/Analytical Method Verification

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-038 REV.6.

Calibration Information
Due to software limitations, all the data files comprising the initial calibration curve may not be listed on the initial calibration summary form. All calibration files are listed in the calibration history report in the "Standard Data" section.

Initial Calibration
All the initial calibration requirements were met.

CCV Requirements
All the continuing calibration verification (CCV) requirements were met.

Quality Control (QC) Information

Surrogate Recoveries
Surrogate recoveries, in all samples and quality control samples, were within the acceptance limits.

Blank Acceptance
Target analytes were not detected above the reporting limit in the blank.

LCS Recovery Statement
All the required analyte recoveries in the laboratory control sample were within the acceptance limits.

QC Sample Designation
Matrix spikes were analyzed on a sample of similar matrix in SNLS sample delivery group, # 68152.

MS Recovery Statement
All the required matrix spike recoveries were within the acceptance limits.

MSD Recovery Statement
All the required matrix spike duplicate recoveries were within the acceptance limits.

MS/MSD RPD Statement
The relative percent differences (RPD) between the matrix spike and matrix spike duplicate recoveries were within the acceptance limits.

Internal Standard (I STD) Acceptance
The internal standard responses, in all samples and quality control samples, met the required acceptance criteria.

Technical Information

Holding Time Specifications
All the samples were prepared and/or analyzed within the required holding time period, except for the following sample:
68295001 060054-001

The sample, a trip blank for soils collected on 09/26/02, was analyzed one day past the hold time of 10/10/02. See the nonconformance report, NCR # 7719, found in the Miscellaneous Data section of this package.

Sample Preservation and Integrity
All samples met the sample preservation and integrity requirements.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The samples in this sample delivery group/work order did not require dilutions.

Sample Re-prep/Re-analysis
Re-analyses were not required for samples in this sample group/work order.

Miscellaneous Information

Nonconformance (NCR) Documentation
The following nonconformance report was required for this sample delivery group/work order:
NCR # 7719

Manual Integrations
Data files associated with the initial calibration, continuing calibration check, and samples did not require manual integrations.

Additional Comments
The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are on the original raw data. These hard copies are temporary stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data package. The data validator will always sign and date the case narrative. Data that are not generated electronically, and such as hand written pages, will be scanned and inserted into the electronic package.

The MS/MSD set form the other SNLS sample delivery group was analyzed in the same 12-hour as the samples in this sample delivery group.

TIC Comment
Tentatively identified compounds (TIC) were not required for this sample delivery group/work order.

System Configuration
The laboratory utilizes the following GC/MS configurations:

Chromatographic Columns
Chromatographic separation of volatile components is accomplished through analysis on one of the following columns:

Column ID	Column Description
J&W1	DB-624, 60m x 0.25mm, 1.4um
J&W2	DB-624, 75m x 0.53mm, 3.0um

Instrument Configuration
Instrument systems are reference in the raw data and individual form headers by the Instrument ID designations below:

Instrument ID	System Configuration	Chromatographic Column	P & T Trap
VOA1	HP6890/HP5973	J&W1	Trap C
VOA2	HP6890/HP5973	J&W1	Trap C

VOA4	HP5890/HP5972	J&W1	Trap K
VOA5	HP5890/HP5972	J&W1	Trap C
VOA7	HP5890/HP5972	J&W2	Trap K
VOA8	HP6890/HP5973	J&W1	Trap K
VOA9	HP6890/HP5973	J&W1	Trap C

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the infomation presented in this case narrative:

Reviewer: Charles W Sim Date: 10-31-02

QC Summary

Report Date: October 29, 2002

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlyt	Date	Time
Volatile-GC/MS Federal											
Batch 207726											
QC1200315360 LCS											
1,1-Dichloroethylene	50.0			40.9	ug/L		82	(78%-140%)	RMB	10/11/02	09:15
Benzene	50.0			47.6	ug/L		95	(78%-119%)			
Chlorobenzene	50.0			51.5	ug/L		103	(82%-120%)			
Toluene	50.0			50.2	ug/L		100	(68%-133%)			
Trichloroethylene	50.0			47.8	ug/L		96	(80%-123%)			
**Bromofluorobenzene	50.0			48.0	ug/L		96	(67%-136%)			
**Dibromofluoromethane	50.0			49.6	ug/L		99	(62%-148%)			
**Toluene-d8	50.0			46.9	ug/L		94	(58%-139%)			
QC1200315357 MB											
1,1,1-Trichloroethane			U	ND	ug/L					10/11/02	10:46
1,1,2,2-Tetrachloroethane			U	ND	ug/L						
1,1,2-Trichloroethane			U	ND	ug/L						
1,1-Dichloroethane			U	ND	ug/L						
1,1-Dichloroethylene			U	ND	ug/L						
1,2-Dichloroethane			U	ND	ug/L						
1,2-Dichloropropane			U	ND	ug/L						
2-Butanone			U	ND	ug/L						
2-Hexanone			U	ND	ug/L						
4-Methyl-2-pentanone			U	ND	ug/L						
Acetone			U	ND	ug/L						
Benzene			U	ND	ug/L						
Bromodichloromethane			U	ND	ug/L						
Bromoform			U	ND	ug/L						
Bromomethane			U	ND	ug/L						
Carbon disulfide			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						
Chlorobenzene			U	ND	ug/L						
Chloroethane			U	ND	ug/L						
Chloroform			U	ND	ug/L						
Chloromethane			U	ND	ug/L						
Dibromochloromethane			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						
Methylene chloride			U	ND	ug/L						
Styrene			U	ND	ug/L						
Tetrachloroethylene			U	ND	ug/L						
Toluene			U	ND	ug/L						
Trichloroethylene			U	ND	ug/L						
Vinyl chloride			U	ND	ug/L						
Xylenes (total)			U	ND	ug/L						
cis-1,2-Dichloroethylene			U	ND	ug/L						
cis-1,3-Dichloropropylene			U	ND	ug/L						
trans-1,2-Dichloroethylene			U	ND	ug/L						

QC Summary

Workorder: 68295

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS Federal											
Batch 207726											
trans-1,3-Dichloropropylene				U	ND	ug/L					
**Bromofluorobenzene	50.0				58.8	ug/L		118	(67%-136%)		
**Dibromofluoromethane	50.0				48.3	ug/L		97	(62%-148%)		
**Toluene-d8	50.0				47.6	ug/L		95	(58%-139%)		
QC1200315358 68152004 PS											
1,1-Dichloroethylene	50.0	U	ND		35.2	ug/L		70	(67%-129%)		10/11/02 17:02
Benzene	50.0	U	ND		41.3	ug/L		83	(74%-112%)		
Chlorobenzene	50.0	U	ND		44.3	ug/L		89	(77%-113%)		
Toluene	50.0	J	0.395		43.1	ug/L		85	(74%-109%)		
Trichloroethylene	50.0	U	ND		40.8	ug/L		82	(71%-118%)		
**Bromofluorobenzene	50.0		52.5		47.1	ug/L		94	(67%-136%)		
**Dibromofluoromethane	50.0		49.7		49.8	ug/L		100	(62%-148%)		
**Toluene-d8	50.0		47.3		46.7	ug/L		94	(58%-139%)		
QC1200315359 68152004 PSD											
1,1-Dichloroethylene	50.0	U	ND		35.5	ug/L	1	71	(0%-11%)		10/11/02 17:30
Benzene	50.0	U	ND		41.4	ug/L	0	83	(0%-8%)		
Chlorobenzene	50.0	U	ND		44.0	ug/L	1	88	(0%-11%)		
Toluene	50.0	J	0.395		43.2	ug/L	0	86	(0%-12%)		
Trichloroethylene	50.0	U	ND		40.9	ug/L	0	82	(0%-9%)		
**Bromofluorobenzene	50.0		52.5		48.7	ug/L		97	(67%-136%)		
**Dibromofluoromethane	50.0		49.7		48.7	ug/L		97	(62%-148%)		
**Toluene-d8	50.0		47.3		46.0	ug/L		92	(58%-139%)		

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where th
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. T
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Uncertain identification for gamma spectroscopy.

QC Summary

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Semi-Volatile Case Narrative
Sandia National Labs (SNLS)
SDG 68288

Method/Analysis Information

Procedure:	**Semivolatile Analysis by Gas Chromatograph/Mass Spectrometer**
Analytical Method:	SW846 8270C
Prep Method:	SW846 3550B
Analytical Batch Number:	206457
Prep Batch Number:	206456

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8270C:

Sample ID	Client ID
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68288019	060055-002
68288020	060056-002
68288021	060059-002
68288022	060060-002
1200312135	SBLK01 (Blank)
1200312136	SBLK01LCS (Laboratory Control Sample)

1200312137	060060-002MS (Matrix Spike)
1200312138	060060-002MSD (Matrix Spike Duplicate)

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Due to the limited capacity of software we do not display all of the current initial calibration files here. If necessary, a calibration history will be inserted in the package prior to the appropriate Form 6.

Diphenylamine has now superseded N-Nitroso-diphenylamine as a CCC on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Method 8270 (prior to 8270C) listed N-Nitroso-diphenylamine as a CCC. However, as stated in EPA Method 8270C, Revision 3, December, 1996, Section 1.4.5, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, show that they not only coelute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

When calibrations are performed for Appendix IX compounds some of the compounds may not be calibrated exactly according to the criteria in Method 8270C. If the %RSD is greater than 15% or the correlation coefficient is less that 0.99 then the analyte is quantitated using the response factor. If the analyte is detected then the sample is reanalyzed for that analyte on an instrument that is compliant with the criteria in the method.

Initial Calibration
All initial calibration requirements have been met for this SDG.

CCV Requirements
All calibration verification standard (CVS, ICV or CCV) requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries
The following sample was run at a dilution. As a result, the surrogates were diluted below recoverable levels.
68288022 *060060-002*

Blank Acceptance
The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement
The laboratory control sample (LCS) spike recoveries for this SDG were within the established acceptance limits.

QC Sample Designation
The following sample analyzed with this SDG was chosen for matrix spike analysis:
68288022 *060060-002*

MS Recovery Statement
The matrix spike recoveries for this SDG were not within the established acceptance limits.

MSD Recovery Statement
The matrix spike duplicate (MSD) recoveries for this SDG were not within the established acceptance limits.

MS/MSD RPD Statement
The relative percent differences (RPD) between each MS and MSD were not within the required acceptance limits.

Internal Standard (ISTD) Acceptance
The internal standard responses were within the required acceptance criteria for all samples and QC.

Technical Information:

Holding Time Specifications
All samples in this SDG met the specified holding time requirements. GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The following samples was/were diluted because the extract was very dark and viscous:

1200312137	
1200312138	
68288015	*060050-002*
68288016	*060051-002*
68288022	*060060-002*

Miscellaneous Information:

Nonconformance (NCR) Documentation
No nonconformance report (NCR) was generated for this SDG.

Manual Integrations
No manual integrations were required for any data file in this SDG.

System Configuration

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with the electronic pressure control. All MS interfaces are capillary direct.

Chromatographic Columns

Chromatographic separation of semivolatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x 0.25 millimeters ID and 0.25 micron film except J&W DB-5MS2 which is 25 meters x 0.20 mm ID and 0.33 micron film):

Column ID	Column Description
J&W	DB-5.625(5% Phenyl)-methylpolysiloxane (identified by a DB-5.625 designation on quantitation reports and reconstructed ion chromatograms)

J&W DB-5MS	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS designation)
Alltech	EC-5 (SE-54) 5% Phenyl, 95% Methylpolysiloxane (identified by a HP-5MS designation)
HP	HP-5MS 5% Phenylmethylsiloxane (identified by a HP-5MS designation)
Phenomenex	ZB-5 5% Phenyl Polysiloxane (identified by a ZB-5 designation)
J&W DB-5MS2	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS2 designation)

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below:

Instrument ID	System Configuration	Chromatographic Column
MSD2	HP6890/HP5973	DB-5MS2
MSD4	HP6890/HP5973	DB-5MS2
MSD5	HP6890/HP5973	DB-5MS2
MSD7	HP6890/HP5973	DB-5MS2
MSD8	HP6890/HP5973	DB-5MS2

Certification Statement

* Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

Reviewer: Robert K. Mauer Date: 10/31/02

QC Summary

Report Date: October 28, 2002

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-GC/MS Federal											
Batch 206457											
QC1200312136 LCS											
Pyridine	1670			536	ug/kg		32		JWF	10/08/02	17:56
1,2,4-Trichlorobenzene	1670			744	ug/kg		45	(27%-91%)			
1,4-Dichlorobenzene	1670			662	ug/kg		40	(25%-85%)			
2,4,5-Trichlorophenol	3330			1480	ug/kg		44	(42%-96%)			
2,4,6-Trichlorophenol	3330			1450	ug/kg		44	(32%-91%)			
2,4-Dinitrotoluene	1670			838	ug/kg		50	(50%-109%)			
2-Chlorophenol	3330			1420	ug/kg		43	(31%-85%)			
4-Chloro-3-methylphenol	3330			1610	ug/kg		48	(34%-97%)			
4-Nitrophenol	3330			1430	ug/kg		43	(22%-128%)			
Acenaphthene	1670			784	ug/kg		47	(39%-98%)			
Hexachlorobenzene	1670			778	ug/kg		47	(41%-105%)			
Hexachlorobutadiene	1670			643	ug/kg		39	(21%-94%)			
Hexachloroethane	1670			597	ug/kg		36	(25%-86%)			
N-Nitrosodipropylamine	1670			687	ug/kg		41	(34%-90%)			
Nitrobenzene	1670			794	ug/kg		48	(30%-84%)			
Pentachlorophenol	3330			1030	ug/kg		31	(27%-109%)			
Phenol	3330			1420	ug/kg		43	(31%-83%)			
Pyrene	1670			845	ug/kg		51	(37%-110%)			
m,p-Cresols	3330			1430	ug/kg		43	(40%-83%)			
o-Cresol	3330			1390	ug/kg		42	(34%-86%)			
**2,4,6-Tribromophenol	3330			1510	ug/kg		45	(23%-111%)			
**2-Fluorobiphenyl	1670			771	ug/kg		46	(21%-104%)			
**2-Fluorophenol	3330			1410	ug/kg		42	(22%-93%)			
**Nitrobenzene-d5	1670			776	ug/kg		47	(24%-97%)			
**Phenol-d5	3330			1480	ug/kg		44	(22%-99%)			
**p-Terphenyl-d14	1670			866	ug/kg		52	(30%-133%)			
QC1200312135 MB											
1,2,4-Trichlorobenzene			U	ND	ug/kg					10/08/02	17:34
1,2-Dichlorobenzene			U	ND	ug/kg						
1,3-Dichlorobenzene			U	ND	ug/kg						
1,4-Dichlorobenzene			U	ND	ug/kg						
2,4,5-Trichlorophenol			U	ND	ug/kg						
2,4,6-Trichlorophenol			U	ND	ug/kg						
2,4-Dichlorophenol			U	ND	ug/kg						
2,4-Dimethylphenol			U	ND	ug/kg						
2,4-Dinitrophenol			U	ND	ug/kg						
2,4-Dinitrotoluene			U	ND	ug/kg						
2,6-Dinitrotoluene			U	ND	ug/kg						
2-Chloronaphthalene			U	ND	ug/kg						
2-Chlorophenol			U	ND	ug/kg						
2-Methyl-4,6-dinitrophenol			U	ND	ug/kg						
2-Methylnaphthalene			U	ND	ug/kg						

QC Summary

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-GC/MS Federal											
Batch 206457											
2-Nitrophenol			U	ND	ug/kg						
3,3'-Dichlorobenzidine			U	ND	ug/kg						
4-Bromophenylphenylether			U	ND	ug/kg						
4-Chloro-3-methylphenol			U	ND	ug/kg						
4-Chloroaniline			U	ND	ug/kg						
4-Chlorophenylphenylether			U	ND	ug/kg						
4-Nitrophenol			U	ND	ug/kg						
Acenaphthene			U	ND	ug/kg						
Acenaphthylene			U	ND	ug/kg						
Anthracene			U	ND	ug/kg						
Benzo(a)anthracene			U	ND	ug/kg						
Benzo(a)pyrene			U	ND	ug/kg						
Benzo(b)fluoranthene			U	ND	ug/kg						
Benzo(ghi)perylene			U	ND	ug/kg						
Benzo(k)fluoranthene			U	ND	ug/kg						
Butylbenzylphthalate			U	ND	ug/kg						
Carbazole			U	ND	ug/kg						
Chrysene			U	ND	ug/kg						
Di-n-butylphthalate			U	ND	ug/kg						
Di-n-octylphthalate			U	ND	ug/kg						
Dibenzo(a,h)anthracene			U	ND	ug/kg						
Dibenzofuran			U	ND	ug/kg						
Diethylphthalate			U	ND	ug/kg						
Dimethylphthalate			U	ND	ug/kg						
Diphenylamine			U	ND	ug/kg						
Fluoranthene			U	ND	ug/kg						
Fluorene			U	ND	ug/kg						
Hexachlorobenzene			U	ND	ug/kg						
Hexachlorobutadiene			U	ND	ug/kg						
Hexachlorocyclopentadiene			U	ND	ug/kg						
Hexachloroethane			U	ND	ug/kg						
Indeno(1,2,3-cd)pyrene			U	ND	ug/kg						
Isophorone			U	ND	ug/kg						
N-Nitrosodipropylamine			U	ND	ug/kg						
Naphthalene			U	ND	ug/kg						
Nitrobenzene			U	ND	ug/kg						
Pentachlorophenol			U	ND	ug/kg						
Phenanthrene			U	ND	ug/kg						
Phenol			U	ND	ug/kg						
Pyrene			U	ND	ug/kg						
bis(2-Chloroethoxy)methane			U	ND	ug/kg						
bis(2-Chloroethyl) ether			U	ND	ug/kg						
bis(2-Chloroisopropyl)ether			U	ND	ug/kg						
bis(2-Ethylhexyl)phthalate			U	ND	ug/kg						
m,p-Cresols			U	ND	ug/kg						
m-Nitroaniline			U	ND	ug/kg						
o-Cresol			U	ND	ug/kg						
o-Nitroaniline			U	ND	ug/kg						

QC Summary

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-GC/MS Federal										
Batch 206457										
p-Nitroaniline			U	ND	ug/kg					
**2,4,6-Tribromophenol	3330			1670	ug/kg		50	(23%-111%)		
**2-Fluorobiphenyl	1670			863	ug/kg		52	(21%-104%)		
**2-Fluorophenol	3330			1580	ug/kg		48	(22%-93%)		
**Nitrobenzene-d5	1670			864	ug/kg		52	(24%-97%)		
**Phenol-d5	3330			1710	ug/kg		51	(22%-99%)		
**p-Terphenyl-d14	1670			1060	ug/kg		64	(30%-133%)		
QC1200312137 68288022 MS										
Pyridine	1670			0.00	ug/kg					10/10/02 16:10
1,2,4-Trichlorobenzene	1670	U	ND	J	1060	ug/kg		64	(15%-112%)	
1,4-Dichlorobenzene	1670	U	ND	J	761	ug/kg		46	(19%-89%)	
2,4,5-Trichlorophenol	3330	J	193	J	1860	ug/kg		50		
2,4,6-Trichlorophenol	3330	U	ND	J	1880	ug/kg		56		
2,4-Dinitrotoluene	1670	U	ND	J	1180	ug/kg		71	(32%-117%)	
2-Chlorophenol	3330	U	ND	J	1220	ug/kg		37	(13%-101%)	
4-Chloro-3-methylphenol	3330	U	ND	J	1700	ug/kg		51	(23%-114%)	
4-Nitrophenol	3330	U	ND	U	ND	ug/kg		0*	(20%-126%)	
Acenaphthene	1670	U	ND		1070	ug/kg		64	(15%-114%)	
Hexachlorobenzene	1670	U	ND	J	1150	ug/kg		69		
Hexachlorobutadiene	1670	U	ND	J	1040	ug/kg		63		
Hexachloroethane	1670	U	ND	J	820	ug/kg		49		
N-Nitrosodipropylamine	1670	U	ND	J	659	ug/kg		40	(18%-106%)	
Nitrobenzene	1670	U	ND	J	809	ug/kg		49		
Pentachlorophenol	3330	U	ND	U	ND	ug/kg		0*	(34%-110%)	
Phenol	3330	U	ND	J	1140	ug/kg		34	(17%-104%)	
Pyrene	1670	U	ND		1540	ug/kg		92	(26%-130%)	
m,p-Cresols	3330	U	ND	J	1380	ug/kg		41		
o-Cresol	3330	U	ND	J	1320	ug/kg		40		
**2,4,6-Tribromophenol	3330		3760		1640	ug/kg		49	(23%-111%)	
**2-Fluorobiphenyl	1670		1650		1040	ug/kg		63	(21%-104%)	
**2-Fluorophenol	3330		2890		882	ug/kg		26	(22%-93%)	
**Nitrobenzene-d5	1670		1890		919	ug/kg		55	(24%-97%)	
**Phenol-d5	3330		3420		1180	ug/kg		35	(22%-99%)	
**p-Terphenyl-d14	1670		1960		1380	ug/kg		83	(30%-133%)	
QC1200312138 68288022 MSD										
Pyridine	1670				0.00	ug/kg				10/10/02 16:33
1,2,4-Trichlorobenzene	1670	U	ND	J	1100	ug/kg	4	66	(0%-31%)	
1,4-Dichlorobenzene	1670	U	ND	J	819	ug/kg	7	49	(0%-36%)	
2,4,5-Trichlorophenol	3330	J	193	J	1740	ug/kg	7	46		
2,4,6-Trichlorophenol	3330	U	ND	J	1880	ug/kg	0	57		
2,4-Dinitrotoluene	1670	U	ND	U	ND	ug/kg	200*	0	(0%-37%)	
2-Chlorophenol	3330	U	ND	J	1130	ug/kg	7	34	(0%-34%)	
4-Chloro-3-methylphenol	3330	U	ND	J	1750	ug/kg	3	53	(0%-34%)	
4-Nitrophenol	3330	U	ND	U	ND	ug/kg	0	0	(0%-35%)	
Acenaphthene	1670	U	ND		1150	ug/kg	7	69	(0%-33%)	
Hexachlorobenzene	1670	U	ND	J	1300	ug/kg	13	78		
Hexachlorobutadiene	1670	U	ND	J	1150	ug/kg	9	69		
Hexachloroethane	1670	U	ND	J	878	ug/kg	7	53		

QC Summary

Workorder: 68288

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-GC/MS Federal												
Batch 206457												
N-Nitrosodipropylamine	1670	U	ND	J	675	ug/kg	2	41	(0%-29%)			
Nitrobenzene	1670	U	ND	J	898	ug/kg	11	54				
Pentachlorophenol	3330	U	ND	U	ND	ug/kg	0	0	(0%-40%)			
Phenol	3330	U	ND	J	1050	ug/kg	8	32	(0%-37%)			
Pyrene	1670	U	ND		1640	ug/kg	7	99	(0%-39%)			
m,p-Cresols	3330	U	ND	J	1300	ug/kg	6	39				
o-Cresol	3330	U	ND	J	1270	ug/kg	4	38				
**2,4,6-Tribromophenol	3330		3760		1540	ug/kg		46	(23%-111%)			
**2-Fluorobiphenyl	1670		1650		1110	ug/kg		67	(21%-104%)			
**2-Fluorophenol	3330		2890		739	ug/kg		22	(22%-93%)			
**Nitrobenzene-d5	1670		1890		884	ug/kg		53	(24%-97%)			
**Phenol-d5	3330		3420		1080	ug/kg		33	(22%-99%)			
**p-Terphenyl-d14	1670		1960		1270	ug/kg		76	(30%-133%)			

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL.]
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Semi-Volatile Case Narrative
Sandia National Labs (SNLS)
SDG 68288-1

Method/Analysis Information

Procedure:	**Semivolatile Analysis by Gas Chromatograph/Mass Spectrometer**
Analytical Method:	SW846 8270C
Prep Method:	SW846 3510C
Analytical Batch Number:	206445
Prep Batch Number:	206444

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8270C:

Sample ID	Client ID
68295005	060078-002
1200312114	SBLK01 (Blank)
1200312115	SBLK01LCS (Laboratory Control Sample)

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Due to the limited capacity of software we do not display all of the current initial calibration files here. If necessary, a calibration history will be inserted in the package prior to the appropriate Form 6.

Diphenylamine has now superseded N-Nitroso-diphenylamine as a CCC on Quantitation Reports, Initial Calibration Reports, Calibration Check Standard Reports, etc. Previous versions of EPA Method 8270 (prior to 8270C) listed N-Nitroso-diphenylamine as a CCC. However, as stated in EPA Method 8270C, Revision 3, December, 1996, Section 1.4.5, "N-Nitroso-diphenylamine decomposes in the gas chromatographic inlet and cannot be separated from Diphenylamine." Studies of these two compounds at GEL, both independent of each other and together, show that they not only coelute, but also have similar mass spectra. N-Nitroso-diphenylamine and Diphenylamine will be reported as Diphenylamine on all reports and forms.

When calibrations are performed for Appendix IX compounds some of the compounds may not be calibrated exactly according to the criteria in Method 8270C. If the %RSD is greater than 15% or the correlation coefficient is less that 0.99 then the analyte is quantitated using the response factor. If the analyte is detected then the sample is reanalyzed for that analyte on an instrument that is compliant with the criteria in the method.

Initial Calibration
All initial calibration requirements have been met for this SDG.

CCV Requirements
All calibration verification standard (CVS, ICV or CCV) requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries
All the surrogate recoveries were within the established acceptance criteria for this SDG.

Blank Acceptance
The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement
The laboratory control sample (LCS) spike recoveries for this SDG were within the established acceptance limits.

QC Sample Designation
The matrix spikes were analyzed on a sample of similar matrix not in this SDG. The client sample is a field blank and it is not used for method QC.

MS Recovery Statement
The matrix spike recoveries for this SDG were within the established acceptance limits.

MSD Recovery Statement
The matrix spike duplicate (MSD) recoveries for this SDG were within the established acceptance limits.

MS/MSD RPD Statement
The relative percent differences (RPD) between each MS and MSD were within the required acceptance limits.

Internal Standard (ISTD) Acceptance
The internal standard responses were within the required acceptance criteria for all samples and QC.

Technical Information:

Holding Time Specifications
All samples in this SDG met the specified holding time requirements. GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
None of the samples analyzed in this SDG required dilution.

Miscellaneous Information:

Nonconformance (NCR) Documentation
No nonconformance report (NCR) was generated for this SDG.

Manual Integrations
No manual integrations were required for any data file in this SDG.

System Configuration

The laboratory utilizes a HP 6890 Series gas chromatograph and a HP 5973 Mass Selective Detector. The configuration is equipped with the electronic pressure control. All MS interfaces are capillary direct.

Chromatographic Columns

Chromatographic separation of semivolatile components is accomplished through analysis on one or more of the following columns (all with dimensions of 30 meters x 0.25 millimeters ID and 0.25 micron film except J&W DB-5MS2 which is 25 meters x 0.20 mm ID and 0.33 micron film):

Column ID	Column Description
J&W	DB-5.625(5% Phenyl)-methylpolysiloxane (identified by a DB-5.625 designation on quantitation reports and reconstructed ion chromatograms)
J&W DB-5MS	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS designation)
Alltech	EC-5 (SE-54) 5% Phenyl, 95% Methylpolysiloxane (identified by a HP-5MS designation)
HP	HP-5MS 5% Phenylmethylsiloxane (identified by a HP-5MS designation)
Phenomenex	ZB-5 5% Phenyl Polysiloxane (identified by a ZB-5 designation)
J&W DB-5MS2	Similar to the J&W DB-5.625 with low bleed characteristics (identified by a DB-5MS2 designation)

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below:

Instrument ID	System Configuration	Chromatographic Column
MSD2	HP6890/HP5973	DB-5MS2
MSD4	HP6890/HP5973	DB-5MS2

MSD5	HP6890/HP5973	DB-5MS2
MSD7	HP6890/HP5973	DB-5MS2
MSD8	HP6890/HP5973	DB-5MS2

Certification Statement

* Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

Reviewer: Heebeen K. Mauer **Date:** 10/31/02

QC Summary

Report Date: October 31, 2002

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-GC/MS Federal										
Batch 206445										
QC1200312115 LCS										
1,2,4-Trichlorobenzene	50.0			26.9	ug/L		54	(53%-104%)	JWF	10/10/02 14:40
1,4-Dichlorobenzene	50.0			25.6	ug/L		51	(47%-102%)		
2,4,5-Trichlorophenol	100			73.1	ug/L		73	(67%-106%)		
2,4,6-Trichlorophenol	100			73.3	ug/L		73	(45%-111%)		
2,4-Dinitrotoluene	50.0			44.5	ug/L		89	(55%-121%)		
2-Chlorophenol	100			59.7	ug/L		60	(47%-87%)		
4-Chloro-3-methylphenol	100			66.4	ug/L		66	(51%-100%)		
4-Nitrophenol	100			25.1	ug/L		25	(10%-55%)		
Acenaphthene	50.0			37.5	ug/L		75	(63%-111%)		
Hexachlorobenzene	50.0			38.5	ug/L		77	(67%-114%)		
Hexachlorobutadiene	50.0			24.6	ug/L		49	(44%-106%)		
Hexachloroethane	50.0			25.3	ug/L		51	(47%-97%)		
N-Nitrosodipropylamine	50.0			27.9	ug/L		56	(52%-118%)		
Nitrobenzene	50.0			30.3	ug/L		61	(49%-110%)		
Pentachlorophenol	100			48.8	ug/L		49	(31%-110%)		
Phenol	100			23.8	ug/L		24	(16%-44%)		
Pyrene	50.0			42.8	ug/L		86	(68%-117%)		
m,p-Cresols	100			49.2	ug/L		49	(43%-100%)		
o-Cresol	100			50.2	ug/L		50	(47%-87%)		
**2,4,6-Tribromophenol	100			80.0	ug/L		80	(27%-126%)		
**2-Fluorobiphenyl	50.0			33.1	ug/L		66	(32%-109%)		
**2-Fluorophenol	100			34.7	ug/L		35	(13%-73%)		
**Nitrobenzene-d5	50.0			30.7	ug/L		61	(33%-107%)		
**Phenol-d5	100			23.7	ug/L		24	(14%-66%)		
**p-Terphenyl-d14	50.0			46.0	ug/L		92	(36%-130%)		
QC1200312114 MB										
1,2,4-Trichlorobenzene			U	ND	ug/L					10/08/02 11:50
1,2-Dichlorobenzene			U	ND	ug/L					
1,3-Dichlorobenzene			U	ND	ug/L					
1,4-Dichlorobenzene			U	ND	ug/L					
2,4,5-Trichlorophenol			U	ND	ug/L					
2,4,6-Trichlorophenol			U	ND	ug/L					
2,4-Dichlorophenol			U	ND	ug/L					
2,4-Dimethylphenol			U	ND	ug/L					
2,4-Dinitrophenol			U	ND	ug/L					
2,4-Dinitrotoluene			U	ND	ug/L					
2,6-Dinitrotoluene			U	ND	ug/L					
2-Chloronaphthalene			U	ND	ug/L					
2-Chlorophenol			U	ND	ug/L					
2-Methyl-4,6-dinitrophenol			U	ND	ug/L					
2-Methylnaphthalene			U	ND	ug/L					
2-Nitrophenol			U	ND	ug/L					

QC Summary

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-GC/MS Federal											
Batch : 206445											
3,3'-Dichlorobenzidine			U	ND	ug/L						
4-Bromophenylphenylether			U	ND	ug/L						
4-Chloro-3-methylphenol			U	ND	ug/L						
4-Chloroaniline			U	ND	ug/L						
4-Chlorophenylphenylether			U	ND	ug/L						
4-Nitrophenol			U	ND	ug/L						
Acenaphthene			U	ND	ug/L						
Acenaphthylene			U	ND	ug/L						
Anthracene			U	ND	ug/L						
Benzo(a)anthracene			U	ND	ug/L						
Benzo(a)pyrene			U	ND	ug/L						
Benzo(b)fluoranthene			U	ND	ug/L						
Benzo(ghi)perylene			U	ND	ug/L						
Benzo(k)fluoranthene			U	ND	ug/L						
Butylbenzylphthalate			U	ND	ug/L						
Carbazole			U	ND	ug/L						
Chrysene			U	ND	ug/L						
Di-n-butylphthalate			U	ND	ug/L						
Di-n-octylphthalate			U	ND	ug/L						
Dibenzo(a,h)anthracene			U	ND	ug/L						
Dibenzofuran			U	ND	ug/L						
Diethylphthalate			U	ND	ug/L						
Dimethylphthalate			U	ND	ug/L						
Diphenylamine			U	ND	ug/L						
Fluoranthene			U	ND	ug/L						
Fluorene			U	ND	ug/L						
Hexachlorobenzene			U	ND	ug/L						
Hexachlorobutadiene			U	ND	ug/L						
Hexachlorocyclopentadiene			U	ND	ug/L						
Hexachloroethane			U	ND	ug/L						
Indeno(1,2,3-cd)pyrene			U	ND	ug/L						
Isophorone			U	ND	ug/L						
N-Nitrosodipropylamine			U	ND	ug/L						
Naphthalene			U	ND	ug/L						
Nitrobenzene			U	ND	ug/L						
Pentachlorophenol			U	ND	ug/L						
Phenanthrene			U	ND	ug/L						
Phenol			U	ND	ug/L						
Pyrene			U	ND	ug/L						
bis(2-Chloroethoxy)methane			U	ND	ug/L						
bis(2-Chloroethyl) ether			U	ND	ug/L						
bis(2-Chloroisopropyl)ether			U	ND	ug/L						
bis(2-Ethylhexyl)phthalate			U	ND	ug/L						
m,p-Cresols			U	ND	ug/L						
m-Nitroaniline			U	ND	ug/L						
o-Cresol			U	ND	ug/L						
o-Nitroaniline			U	ND	ug/L						
p-Nitroaniline			U	ND	ug/L						

QC Summary

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-GC/MS Federal Batch 206445										
**2,4,6-Tribromophenol	100			69.9	ug/L		70	(27%-126%)		
**2-Fluorobiphenyl	50.0			35.7	ug/L		71	(32%-109%)		
**2-Fluorophenol	100			43.2	ug/L		43	(13%-73%)		
**Nitrobenzene-d5	50.0			40.7	ug/L		81	(33%-107%)		
**Phenol-d5	100			29.8	ug/L		30	(14%-66%)		
**p-Terphenyl-d14	50.0			39.4	ug/L		79	(36%-130%)		
QC1200312116 68305002 MS										
1,2,4-Trichlorobenzene	100		U	ND	ug/L		0*	(44%-102%)		10/10/02 13:10
1,4-Dichlorobenzene	100		U	ND	ug/L		0*	(48%-95%)		
2,4,5-Trichlorophenol	200		U	ND	ug/L		0			
2,4,6-Trichlorophenol	200		U	ND	ug/L		0			
2,4-Dinitrotoluene	100		U	ND	ug/L		0*	(48%-120%)		
2-Chlorophenol	200		U	ND	ug/L		0*	(32%-98%)		
4-Chloro-3-methylphenol	200		U	ND	ug/L		0*	(40%-107%)		
4-Nitrophenol	200		U	ND	ug/L		0*	(16%-78%)		
Acenaphthene	100			85.4	ug/L		85	(32%-127%)		
Hexachlorobenzene	100		U	ND	ug/L		0			
Hexachlorobutadiene	100		U	ND	ug/L		0			
Hexachloroethane	100		U	ND	ug/L		0			
N-Nitrosodipropylamine	100		U	ND	ug/L		0*	(44%-119%)		
Nitrobenzene	100		U	ND	ug/L		0			
Pentachlorophenol	200		U	ND	ug/L		0*	(44%-104%)		
Phenol	200		U	ND	ug/L		0*	(15%-70%)		
Pyrene	100			101	ug/L		101	(29%-142%)		
m,p-Cresols	200		U	ND	ug/L		0			
o-Cresol	200		U	ND	ug/L		0			
**2,4,6-Tribromophenol	200			0.00	ug/L		0*	(27%-126%)		
**2-Fluorobiphenyl	100			70.7	ug/L		71	(32%-109%)		
**2-Fluorophenol	200			0.00	ug/L		0*	(13%-73%)		
**Nitrobenzene-d5	100			69.1	ug/L		69	(33%-107%)		
**Phenol-d5	200			0.00	ug/L		0*	(14%-66%)		
**p-Terphenyl-d14	100			98.3	ug/L		98	(36%-130%)		
QC1200312117 68305002 MSD										
1,2,4-Trichlorobenzene	100		U	ND	ug/L	0	0	(0%-20%)		10/09/02 17:56
1,4-Dichlorobenzene	100		U	ND	ug/L	0	0	(0%-20%)		
2,4,5-Trichlorophenol	200		U	ND	ug/L	0	0			
2,4,6-Trichlorophenol	200		U	ND	ug/L	0	0			
2,4-Dinitrotoluene	100		U	ND	ug/L	0	0	(0%-16%)		
2-Chlorophenol	200		U	ND	ug/L	0	0	(0%-25%)		
4-Chloro-3-methylphenol	200		U	ND	ug/L	0	0	(0%-25%)		
4-Nitrophenol	200		U	ND	ug/L	0	0	(0%-25%)		
Acenaphthene	100			83.6	ug/L	2	84	(0%-24%)		
Hexachlorobenzene	100		U	ND	ug/L	0	0			
Hexachlorobutadiene	100		U	ND	ug/L	0	0			
Hexachloroethane	100		U	ND	ug/L	0	0			
N-Nitrosodipropylamine	100		U	ND	ug/L	0	0	(0%-20%)		
Nitrobenzene	100		U	ND	ug/L	0	0			
Pentachlorophenol	200		U	ND	ug/L	0	0	(0%-17%)		

QC Summary

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-GC/MS Federal											
Batch 206445											
Phenol	200		U	ND	ug/L	0	0	(0%-29%)			
Pyrene	100			64.0	ug/L	44*	64	(0%-30%)			
m,p-Cresols	200		U	ND	ug/L	0	0				
o-Cresol	200		U	ND	ug/L	0	0				
**2,4,6-Tribromophenol	200			0.00	ug/L		0*	(27%-126%)			
**2-Fluorobiphenyl	100			70.3	ug/L		70	(32%-109%)			
**2-Fluorophenol	200			0.00	ug/L		0*	(13%-73%)			
**Nitrobenzene-d5	100			75.0	ug/L		75	(33%-107%)			
**Phenol-d5	200			0.00	ug/L		0*	(14%-66%)			
**p-Terphenyl-d14	100			62.8	ug/L		63	(36%-130%)			

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL.)
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for *gamma* spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

HPLC Narrative
Sandia National Labs (SNLS)
SDG 68288

Method/Analysis Information

Procedure:	**Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC)**
Analytical Method:	SW846 8330
Prep Method:	SW846 8330 PREP
Analytical Batch Number:	206554
Prep Batch Number:	206553

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8330:

Sample ID	Client ID
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68288019	060055-002
68288020	060056-002
68288021	060059-002

68288022	060060-002
1200312387	XBLK01 (Blank)
1200312388	XBLK01LCS (Laboratory Control Sample)
1200312389	060046-002MS (Matrix Spike)
1200312390	060046-002MSD (Matrix Spike Duplicate)

System Configuration

The laboratory utilizes a high performance liquid chromatography (HPLC) instrument configuration for explosives analyses. The chromatographic hardware system consists of an HP Model 1050 HPLC or HP Model 1100 HPLC with programmable gradient pumping and a 100 ul loop injector for the primary system and a 100 ul loop injector for the confirmation system. The HPLC 1050 is coupled to a HP Model G1306A Diode Array UV detector, and the HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitor absorbance at the following five wavelengths: 1) 214 nm; 2) 224 nm; 3) 235 nm; 4) 254 nm; 5) 264 nm.

The primary HPLC system is usually identified with either a designation of HPLC #2, or hplcb in the raw data printouts. The confirmation HPLC system is usually identified with a designation of HPLC #1, or hplca in the raw data printouts. The HP 1100 HPLC system is identified as HPLC #3, or hplcc in the raw data printouts. The HP 1100 HPLC has a Column Switching Valve which enables this system to be used for primary analysis or confirmation analysis.

Chromatographic Columns

Chromatographic separation of nitroaromatic and nitramine components is accomplished through analysis on the following reversed phase columns:

HP: Hypersil BDS-C18, 250 mm x 4 mm O.D. containing 5 um particle size.

Confirmation of nitroaromatic and nitramine components, initially identified on one of the above columns, is accomplished through analysis on the following column:

PH: Develosil CN-UG5-5, 250 mm x 4.6 mm I.D.

The primary column is used for quantitation while the confirmation column is for qualitative purposes only.

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Initial Calibration
All initial calibration requirements have been met for this SDG.

CCV Requirements
All calibration verification standard(s) (CVS, ICV or CCV)requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries
Sample *68288016* (060051-002) failed surrogate recovery. The sample was reextracted out of holding, and the surrogate failures confirmed. The surrogate failures are attributed to matrix interference.

Blank Acceptance
The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement
All the LCS spike recoveries for this SDG were within the established acceptance limits.

QC Sample Designation
The following sample analyzed with this SDG was chosen for matrix spike analysis: *68288012* (060046-002).

MS Recovery Statement
All the matrix spike recoveries were within the established acceptance limits.

MSD Recovery Statement
The matrix spike duplicate recoveries were within the established acceptance limits.

MS/MSD RPD Statement
The relative percent differences (RPD) between the MS and MSD were within the required acceptance limits.

Technical Information

Holding Time Specifications
All samples in this SDG met the specified holding time requirements. GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
None of the samples in this SDG required dilutions.

Miscellaneous Information

Nonconformance (NCR) Documentation
No nonconformance report (NCR) has been generated for this SDG.

Manual Integrations
Some initial calibration standards, continuing calibration standards, and/or samples required manual integrations due to software limitations. All samples.

Additional Comments
Samples *68288015* (060050002) and *68288016* (060051002) had a response for some target analyte whose concentration greatly differed between the primary and confirmation analysis (greater than 40% difference). Because both columns or detectors indicated an acceptable peak in the appropriate retention time window for these analytes, the analytes are reported as positive results. Due to the high percent difference between the two columns, it is indicated as such on the appropriate Certificate of Analysis with a P qualifier. These analytes reported with a percent difference greater than 40% but less than 70% are qualified as N-flagged (presumptive evidence of the presence of the material). Analytes reported with a percent difference greater than 70% should be viewed as undetected.

The Form 8 uses the retention time of the surrogate as a measure of how close the retention time of the samples and QC are to a standard component. The Instrument Blank does not contain the surrogate.

The samples were concentrated prior to analysis to achieve the required detection limit.

Confirmation analysis was performed on some of the samples in this batch. The values reported are from the primary analysis. The confirmation analysis is used for qualitative purposes only.

The following analytes coelute on the cyano column: a.) 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, and 2,6-Dinitrotoluene b.) 1,3,5-Trinitrotoluene and 1,3-Dinitrobenzene c.) m-Nitrotoluene, p-Nitrotoluene and o-Nitrotoluene. As a result some of these analytes may be flagged with a P qualifier. The coelution from the cyano column should be considered and the values as suspect to the sample.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

Reviewer: Deborah Mauer **Date:** 10/28/02

QC Summary

Report Date: October 29, 2002

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC Explosives Federal										
Batch 206554										
QC1200312388 LCS										
1,3,5-Trinitrobenzene	800			716	ug/kg		90	(77%-124%)	JLW	10/11/02 23:59
2,4,6-Trinitrotoluene	800			708	ug/kg		89	(80%-120%)		
2,4-Dinitrotoluene	800			680	ug/kg		85	(77%-122%)		
2,6-Dinitrotoluene	800			665	ug/kg		83	(74%-121%)		
2-Amino-4,6-dinitrotoluene	800			728	ug/kg		91	(81%-125%)		
4-Amino-2,6-dinitrotoluene	800			700	ug/kg		88	(79%-123%)		
HMX	800			718	ug/kg		90	(84%-131%)		
Nitrobenzene	800			672	ug/kg		84	(75%-125%)		
RDX	800			724	ug/kg		91	(80%-123%)		
Tetryl	800			666	ug/kg		83	(65%-124%)		
m-Dinitrobenzene	800			692	ug/kg		87	(77%-124%)		
m-Nitrotoluene	800			676	ug/kg		85	(77%-117%)		
o-Nitrotoluene	800			668	ug/kg		84	(75%-119%)		
p-Nitrotoluene	800			671	ug/kg		84	(76%-121%)		
**1,2-dinitrobenzene	400			397	ug/kg		99	(71%-118%)		
QC1200312387 MB										
1,3,5-Trinitrobenzene			U	ND	ug/kg					10/11/02 23:17
2,4,6-Trinitrotoluene			U	ND	ug/kg					
2,4-Dinitrotoluene			U	ND	ug/kg					
2,6-Dinitrotoluene			U	ND	ug/kg					
2-Amino-4,6-dinitrotoluene			U	ND	ug/kg					
4-Amino-2,6-dinitrotoluene			U	ND	ug/kg					
HMX			U	ND	ug/kg					
Nitrobenzene			U	ND	ug/kg					
RDX			U	ND	ug/kg					
Tetryl			U	ND	ug/kg					
m-Dinitrobenzene			U	ND	ug/kg					
m-Nitrotoluene			U	ND	ug/kg					
o-Nitrotoluene			U	ND	ug/kg					
p-Nitrotoluene			U	ND	ug/kg					
**1,2-dinitrobenzene	400			395	ug/kg		99	(71%-118%)		
QC1200312389 68288012 MS										
1,3,5-Trinitrobenzene	800	U	ND	733	ug/kg		92	(66%-133%)		10/12/02 00:41
2,4,6-Trinitrotoluene	800	U	ND	732	ug/kg		92	(77%-132%)		
2,4-Dinitrotoluene	800	U	ND	703	ug/kg		88	(61%-134%)		
2,6-Dinitrotoluene	800	U	ND	684	ug/kg		86	(70%-121%)		
2-Amino-4,6-dinitrotoluene	800	U	ND	748	ug/kg		94	(79%-124%)		
4-Amino-2,6-dinitrotoluene	800	U	ND	719	ug/kg		90	(71%-120%)		
HMX	800	U	ND	735	ug/kg		92	(75%-138%)		
Nitrobenzene	800	U	ND	698	ug/kg		87	(72%-120%)		
RDX	800	U	ND	722	ug/kg		90	(61%-136%)		
Tetryl	800	U	ND	658	ug/kg		82	(65%-135%)		

QC Summary

Workorder: 68288

Parameter	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlyt	Date Time
HPLC Explosives Federal											
Batch 206554											
m-Dinitrobenzene	800	U	ND		719	ug/kg		90	(75%-125%)		
m-Nitrotoluene	800	U	ND		695	ug/kg		87	(73%-116%)		
o-Nitrotoluene	800	U	ND		696	ug/kg		87	(68%-122%)		
p-Nitrotoluene	800	U	ND		699	ug/kg		87	(67%-125%)		
**1,2-dinitrobenzene	400		394		414	ug/kg		104	(71%-118%)		
QC1200312390 68288012 MSD											
1,3,5-Trinitrobenzene	800	U	ND		764	ug/kg	4	96	(0%-20%)		10/12/02 01:23
2,4,6-Trinitrotoluene	800	U	ND		759	ug/kg	4	95	(0%-20%)		
2,4-Dinitrotoluene	800	U	ND		745	ug/kg	6	93	(0%-24%)		
2,6-Dinitrotoluene	800	U	ND		732	ug/kg	7	92	(0%-21%)		
2-Amino-4,6-dinitrotoluene	800	U	ND		771	ug/kg	3	96	(0%-20%)		
4-Amino-2,6-dinitrotoluene	800	U	ND		748	ug/kg	4	94	(0%-20%)		
HMX	800	U	ND		764	ug/kg	4	96	(0%-38%)		
Nitrobenzene	800	U	ND		733	ug/kg	5	92	(0%-21%)		
RDX	800	U	ND		750	ug/kg	4	94	(0%-35%)		
Tetryl	800	U	ND		690	ug/kg	5	86	(0%-30%)		
m-Dinitrobenzene	800	U	ND		758	ug/kg	5	95	(0%-23%)		
m-Nitrotoluene	800	U	ND		731	ug/kg	5	91	(0%-20%)		
o-Nitrotoluene	800	U	ND		733	ug/kg	5	92	(0%-23%)		
p-Nitrotoluene	800	U	ND		735	ug/kg	5	92	(0%-22%)		
1,2-dinitrobenzene	400		394		417	ug/kg		104	(71%-118%)		

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. 1
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Uncertain identification for gamma spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

HPLC Narrative
Sandia National Labs (SNLS)
SDG 68288-1

Method/Analysis Information

Procedure:	**Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC)**
Analytical Method:	SW846 8330
Prep Method:	SW846 8330 PREP
Analytical Batch Number:	206481
Prep Batch Number:	206479

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8330:

Sample ID	Client ID
68295007	060078-004
1200312201	XBLK01 (Blank)
1200312202	XBLK1 LCS (Laboratory Control Sample)

System Configuration

The laboratory utilizes a high performance liquid chromatography (HPLC) instrument configuration for explosives analyses. The chromatographic hardware system consists of an HP Model 1050 HPLC or HP Model 1100 HPLC with programmable gradient pumping and a 100 ul loop injector for the primary system and a 100 ul loop injector for the confirmation system. The HPLC 1050 is coupled to a HP Model G1306A Diode Array UV detector, and the HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitor absorbance at the following five wavelengths: 1) 214 nm; 2) 224 nm; 3) 235 nm; 4) 254 nm; 5) 264 nm.

The primary HPLC system is usually identified with either a designation of HPLC #2, or hplcb in the raw data printouts. The confirmation HPLC system is usually identified with a designation of HPLC #1, or hplca in the raw data printouts. The HP 1100 HPLC system is identified as HPLC #3, or hplcc in the raw data printouts. The HP 1100 HPLC has a Column Switching Valve which enables this system to be used for primary analysis or confirmation analysis.

Chromatographic Columns

Chromatographic separation of nitroaromatic and nitramine components is accomplished through analysis on the following reversed phase columns:

HP: Hypersil BDS-C18, 250 mm x 4 mm O.D. containing 5 um particle size.

Confirmation of nitroaromatic and nitramine components, initially identified on one of the above columns, is accomplished through analysis on the following column:

PH: Develosil CN-UG5-5, 250 mm x 4.6 mm I.D.

The primary column is used for quantitation while the confirmation column is for qualitative purposes only.

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Initial Calibration
All initial calibration requirements have been met for this SDG.

CCV Requirements
All calibration verification standard(s) (CVS, ICV or CCV)requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries
All the surrogate recoveries were within the established acceptance criteria for this SDG.

Blank Acceptance
The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement
All the LCS spike recoveries were within the established acceptance limits.

QC Sample Designation
A matrix spike was performed on a client sample in SDG 68152.

MS Recovery Statement
One or more of the required spiking analytes were not within the acceptance limits in the matrix spike (MS). The matrix spike duplicate (MSD) also failed recoveries. The failing recoveries are attributed to matrix interference.

MSD Recovery Statement
One or more of the required spiking analytes were not within the acceptance limits in the matrix spike duplicate (MSD). The matrix spike (MS) also failed recoveries. The failing recoveries are attributed to matrix interference.

MS/MSD RPD Statement
The relative percent differences (RPD) between the MS and MSD were not within the required acceptance limits.

Technical Information

Holding Time Specifications
All samples in this SDG met the specified holding time requirements. GEL assigns holding times based on the associated methodology that assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
None of the samples in this SDG required dilutions.

Miscellaneous Information

Nonconformance (NCR) Documentation
No nonconformance report (NCR) has been generated for this SDG.

Manual Integrations
Some initial calibration standards, continuing calibration standards, and/or samples required manual integrations due to software limitations.

Additional Comments

The Form 8 uses the retention time of the surrogate as a measure of how close the retention time of the samples and QC are to a standard component. The Instrument Blank does not contain the surrogate.

The samples were concentrated prior to analysis to achieve the required detection limit.

Confirmation analysis was performed on some of the samples in this batch. The values reported are from the primary analysis. The confirmation analysis is used for qualitative purposes only.

The following analytes coelute on the cyano column: a.) 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, and 2,6-Dinitrotoluene b.) 1,3,5-Trinitrotoluene and 1,3-Dinitrobenzene c.) m-Nitrotoluene, p-Nitrotoluene and o-Nitrotoluene. As a result some of these analytes may be flagged with a P qualifier. The coelution from the cyano column should be considered and the values as suspect to the sample.

Sample *68295007* (060078-004) had a response for some target analyte whose concentration greatly differed between the primary and confirmation analysis (greater than 40% difference). Because both columns or detectors indicated an acceptable peak in the appropriate retention time window for these analytes, the analytes are reported as positive results. Due to the high percent difference between the two columns, it is indicated as such on the appropriate Certificate of Analysis with a P qualifier. These analytes reported with a percent difference greater than 40% but less than 70% are qualified as N-flagged (presumptive evidence of the presence of the material). Analytes reported with a percent difference greater than 70% should be viewed as undetected.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

Reviewer: Robert M Maun Date: 10/24/02

QC Summary

Report Date: October 28, 2002

Client : Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68295

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC Explosives Federal											
Batch 206481											
QC1200312202 LCS											
1,3,5-Trinitrobenzene	1.04				0.977	ug/L		94	(84%-110%)	JLW	10/08/02 16:12
2,4,6-Trinitrotoluene	1.04				1.00	ug/L		96	(85%-110%)		
2,4-Dinitrotoluene	1.04				0.934	ug/L		90	(78%-110%)		
2,6-Dinitrotoluene	1.04				0.979	ug/L		94	(79%-110%)		
2-Amino-4,6-dinitrotoluene	1.04				0.972	ug/L		94	(77%-110%)		
4-Amino-2,6-dinitrotoluene	1.04				0.820	ug/L		79	(59%-110%)		
HMX	1.04				0.949	ug/L		91	(86%-110%)		
Nitrobenzene	1.04				0.879	ug/L		85	(68%-110%)		
RDX	1.04				0.897	ug/L		86	(76%-110%)		
Tetryl	1.04				0.991	ug/L		95	(73%-110%)		
m-Dinitrobenzene	1.04				0.932	ug/L		90	(76%-110%)		
m-Nitrotoluene	1.04				0.935	ug/L		90	(73%-110%)		
o-Nitrotoluene	1.04				0.928	ug/L		89	(69%-110%)		
p-Nitrotoluene	1.04				0.944	ug/L		91	(73%-110%)		
1,2-dinitrobenzene	0.519				0.502	ug/L		97	(59%-118%)		
QC1200312201 MB											
1,3,5-Trinitrobenzene				U	ND	ug/L					10/08/02 15:29
2,4,6-Trinitrotoluene				U	ND	ug/L					
2,4-Dinitrotoluene				U	ND	ug/L					
2,6-Dinitrotoluene				U	ND	ug/L					
2-Amino-4,6-dinitrotoluene				U	ND	ug/L					
4-Amino-2,6-dinitrotoluene				U	ND	ug/L					
HMX				U	ND	ug/L					
Nitrobenzene				U	ND	ug/L					
RDX				U	ND	ug/L					
Tetryl				U	ND	ug/L					
m-Dinitrobenzene				U	ND	ug/L					
m-Nitrotoluene				U	ND	ug/L					
o-Nitrotoluene				U	ND	ug/L					
p-Nitrotoluene				U	ND	ug/L					
** 1,2-dinitrobenzene	0.519				0.476	ug/L		92	(59%-118%)		
QC1200312205 68152002 MS											
1,3,5-Trinitrobenzene	1.04	U	ND		1.71	ug/L		165*	(62%-121%)		10/08/02 16:54
2,4,6-Trinitrotoluene	1.04	U	ND		26.9	ug/L		2590*	(56%-137%)		
2,4-Dinitrotoluene	1.04		0.182		0.946	ug/L		74	(69%-118%)		
2,6-Dinitrotoluene	1.04	U	ND		0.876	ug/L		84	(63%-123%)		
2-Amino-4,6-dinitrotoluene	1.04	U	ND		0.921	ug/L		89	(60%-133%)		
4-Amino-2,6-dinitrotoluene	1.04	U	ND		0.919	ug/L		89	(50%-121%)		
HMX	1.04	U	ND		1.10	ug/L		106	(66%-131%)		
Nitrobenzene	1.04	U	ND		0.723	ug/L		70	(61%-106%)		
RDX	1.04	P	0.230		1.05	ug/L		79	(52%-135%)		
Tetryl	1.04	P	0.649		0.816	ug/L		16*	(52%-124%)		

QC Summary

Workorder: 68295

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
HPLC Explosives Federal Basch 206481											
m-Dinitrobenzene	1.04	U	ND		0.989	ug/L		95	(64%-117%)		
m-Nitrotoluene	1.04	JP	0.0975		0.872	ug/L		75	(56%-129%)		
o-Nitrotoluene	1.04	U	ND		0.821	ug/L		79	(58%-122%)		
p-Nitrotoluene	1.04	U	ND		2.76	ug/L		266*	(65%-116%)		
**1,2-dinitrobenzene	0.519		0.755		0.718	ug/L		138*	(59%-118%)		
QC1200312262 68152002 MSD											
1,3,5-Trinitrobenzene	1.04	U	ND		1.80	ug/L	5	173	(0%-26%)		10/08/02 17:37
2,4,6-Trinitrotoluene	1.04	U	ND		27.6	ug/L	3	2660	(0%-17%)		
2,4-Dinitrotoluene	1.04		0.182		1.03	ug/L	11	82	(0%-25%)		
2,6-Dinitrotoluene	1.04	U	ND		0.976	ug/L	11	94	(0%-31%)		
2-Amino-4,6-dinitrotoluene	1.04	U	ND		0.996	ug/L	8	96	(0%-36%)		
4-Amino-2,6-dinitrotoluene	1.04	U	ND		1.02	ug/L	10	98	(0%-32%)		
HMX	1.04	U	ND		1.02	ug/L	8	98	(0%-33%)		
Nitrobenzene	1.04	U	ND		0.840	ug/L	15	81	(0%-22%)		
RDX	1.04	P	0.230		1.09	ug/L	5	82	(0%-29%)		
Tetryl	1.04	P	0.649		1.62	ug/L	141*	93	(0%-29%)		
m-Dinitrobenzene	1.04	U	ND		1.02	ug/L	3	98	(0%-20%)		
m-Nitrotoluene	1.04	JP	0.0975		1.12	ug/L	27	98	(0%-29%)		
o-Nitrotoluene	1.04	U	ND		1.03	ug/L	23	99	(0%-24%)		
p-Nitrotoluene	1.04	U	ND		3.42	ug/L	21	329	(0%-27%)		
**1,2-dinitrobenzene	0.519		0.755		0.737	ug/L		142*	(59%-118%)		

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. I
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

PCB Case Narrative
Sandia National Labs (SNLS)
SDG# 68288

Method/Analysis Information

Procedure:	**Polychlorinated Biphenyls by Method 8082**
Analytical Method:	SW846 8082
Prep Method:	SW846 3550B
Analytical Batch Number:	206286
Prep Batch Number:	206285

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8082:

Sample ID	Client ID
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68288019	060055-002
68288020	060056-002
68288021	060059-002
68288022	060060-002
1200311720	PBLK01(method Blank)
1200311721	PBLK01LCS(Laboratory Control Sample)
1200312100	060046-002MS(Matrix Spike)
1200312101	060046-002MSD(Matrix Spike Duplicate)

System Configuration

Chromatographic Columns

Column ID	Column Description
J&W1	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.53mm x 1.5um DB-608 Durabond stationary phase* 30m x 0.53mm x 0.5um
J&W2	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.32mm x 1.0um DB-1701 Durabond stationary phase* 30m x 0.32mm x 0.5um
J&W3	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.53mm x 1.5um DB-1701(14% Cyanopropylphenyl)-methylsiloxane 30m x 0.53mm x 0.5um
J&W4	DB-608 Durabond stationary phase* 30m x 0.53mm x .83um DB-XLB* 30m x 0.53mm x 1.5um
J&W5	DB-XLB* 30m x 0.25mm x 0.25um DB-17MS(50%-Phenyl)-methylsiloxane 30m x 0.25mm x 0.25um
J&W6	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.25mm x 0.25um DB-17MS(50%-Phenyl)-methylsiloxane 30m x 0.25mm x 0.25um
RESTEK	Rtx-CLPesticides 30m x 0.25mm x 0.25um Rtx-CLPesticides II 30m x 0.25mm x 0.20um

* Durabond and DB-XLB are trademarks of J & W.

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below.

Instrument ID	System Configuration	Chromatographic Column
ECD1	HP 6890 Series GC ECD/ECD	RESTEK
ECD2	HP 6890 Series GC ECD/ECD	RESTEK
ECD3	HP 6890 Series GC ECD/ECD	RESTEK
ECD4	HP 5890 Series II Plus GC ECD/ECD	J&W5
ECD5	HP 6890 Series GC ECD/ECD	J&W5
ECD7	HP 6890 Series GC ECD/ECD	J&W5
ECD8	HP 6890 Series GC ECD/ECD	RESTEK

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this SDG.

CVS Requirements

All calibration verification standard(s) (CVS, ICV or CCV) requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries

All the surrogate recoveries were not within the established acceptance criteria for this SDG. The surrogate recoveries for samples 68288015 and 68288016 were outside the surrogate recovery criteria due to matrix interference. This was confirmed by re-extraction and re-analysis.

Blank Acceptance

The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement

The Laboratory Control Sample (LCS) spike recoveries for this SDG were within the established acceptance limits.

QC Sample Designation

The following sample was selected for the PCB method QC:

Client Sample ID#	Laboratory Sample ID#
060046-002	68288012

The method QC included a Matrix Spike (MS) and Matrix Spike Duplicate (MSD).

MS Recovery Statement

The matrix spike recoveries for this SDG were within the established acceptance limits.

MSD Recovery Statement

The matrix spike duplicate recoveries for this SDG were within the established acceptance limits.

MS/MSD RPD Statement

The relative percent differences (RPD) between each MS and MSD were within the required acceptance

limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time requirements.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All samples underwent sulfur and alumina cleanup procedure.

Sample Dilutions

The following samples were diluted due to their viscous nature:

Sample ID	Dilutions
68288021	10X
68288022	10X

Sample Re-prep/Re-analysis

Samples 68288015 and 68288016 were re-extracted to confirm the surrogate failure.

Miscellaneous Information

Nonconformance (NCR) Documentation

No nonconformance reports (NCRs) have been generated for this SDG.

Manual Integrations

Certain standards and samples required manual integrations to correctly position the baseline as set in the calibration standard injections. If manual integrations are performed, copies of all manual integration peak profiles will be included in the raw data section of this package.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis and to list any report documents generated as a result of sample analysis or review. The following additional comments were required for this sample set:

Aroclors quantitated on the raw data report by the Target data system do not necessarily represent positive aroclor identification. In order for positive identification to be made, the aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the aroclor is reported as a non-detect on the data report. These situations will be noted on the raw data as DMP, representing "does not

match pattern", or DNC "does not confirm".

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: Jimi Cao **Date:** 10/29/02

QC Summary

Report Date: October 28, 2002

Client : Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Paissant

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-PCB Federal										
Batch 206286										
QC1200311721 LCS										
Aroclor-1260	33.3			23.8	ug/kg		71	(48%-116%)	GH1	10/10/02 11:15
**4cmx	6.67			4.12	ug/kg		62	(31%-120%)		
**Decachlorobiphenyl	6.67			4.67	ug/kg		70	(34%-115%)		
QC1200311720 MB										
Aroclor-1016			U	ND	ug/kg					10/10/02 11:03
Aroclor-1221			U	ND	ug/kg					
Aroclor-1232			U	ND	ug/kg					
Aroclor-1242			U	ND	ug/kg					
Aroclor-1248			U	ND	ug/kg					
Aroclor-1254			U	ND	ug/kg					
Aroclor-1260			U	ND	ug/kg					
**4cmx	6.67			4.58	ug/kg		69	(31%-120%)		
**Decachlorobiphenyl	6.67			5.03	ug/kg		76	(34%-115%)		
QC1200312100 68288012 MS										
Aroclor-1260	33.3	U	ND	22.1	ug/kg		66	(36%-134%)		10/10/02 15:54
**4cmx	6.67		3.18	3.02	ug/kg		45	(31%-120%)		
**Decachlorobiphenyl	6.67		3.58	3.35	ug/kg		50	(34%-115%)		
QC1200312101 68288012 MSD										
Aroclor-1260	33.3	U	ND	19.0	ug/kg	15	57	(0%-30%)		10/10/02 16:07
**4cmx	6.67		3.18	2.92	ug/kg		44	(31%-120%)		
**Decachlorobiphenyl	6.67		3.58	3.39	ug/kg		51	(34%-115%)		

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. I
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

QC Summary

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

PCB Case Narrative
Sandia National Labs (SNLS)
SDG#68288-1

Method/Analysis Information

Procedure:	**Polychlorinated Biphenyls by Method 8082**
Analytical Method:	SW846 8082
Prep Method:	SW846 3510C
Analytical Batch Number:	206677
Prep Batch Number:	206676

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8082:

Sample ID	Client ID
68295006	060078-003
1200312774	PBLK01 (Method Blank)
1200312775	PBLK01LCS (Laboratory Control Sample)
1200312776	PBLK01LCSD (Laboratory Control Sample Duplicate)

System Configuration

Chromatographic Columns

Column ID	Column Description
J&W1	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.53mm x 1.5um DB-608 Durabond stationary phase* 30m x 0.53mm x 0.5um
J&W2	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.32mm x 1.0um DB-1701 Durabond stationary phase* 30m x 0.32mm x 0.5um
J&W3	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.53mm x 1.5um DB-1701(14% Cyanopropylphenyl)-methylsiloxane 30m x 0.53mm x 0.5um
J&W4	DB-608 Durabond stationary phase* 30m x 0.53mm x .83um DB-XLB* 30m x 0.53mm x 1.5um
J&W5	DB-XLB* 30m x 0.25mm x 0.25um DB-17MS(50%-Phenyl)-methylsiloxane 30m x 0.25mm x 0.25um
J&W6	DB-5(5%-Phenyl)-methylsiloxane 30m x 0.25mm x 0.25um DB-17MS(50%-Phenyl)-methylsiloxane 30m x 0.25mm x 0.25um

* Durabond and DB-XLB are trademarks of J & W.

Instrument Configuration

The samples reported in this SDG were analyzed on one or more of the following instrument systems. Instrument systems are referenced in the raw data and individual form headers by the Instrument ID designations listed below.

Instrument ID	System Configuration	Chromatographic Column
ECD1	HP 6890 Series GC ECD/ECD	RESTEK*
ECD2	HP 6890 Series GC ECD/ECD	RESTEK*
ECD3	HP 6890 Series GC ECD/ECD	RESTEK*
ECD4	HP 5890 Series II Plus GC ECD/ECD	J&W5
ECD5	HP 6890 Series GC ECD/ECD	J&W5
ECD7	HP 6890 Series GC ECD/ECD	J&W5
ECD8	HP 6890 Series GC ECD/ECD	RESTEK*

*The columns were changed to RTX-CLPEST1 and RTX-CLPEST2.

Preparation/Analytical Method Verification

Procedures for preparation, analysis, and reporting of analytical data are documented by General Engineering Laboratories, Inc. (GEL) as Standard Operating Procedures (SOP).

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this SDG.

CCV Requirements

All calibration verification standard(s) (CVS, ICV or CCV) requirements have been met for this SDG.

Quality Control (QC) Information

Surrogate Recoveries

All the surrogate recoveries were within the established acceptance criteria for this SDG.

Blank Acceptance

The blank(s) analyzed with this SDG met the established acceptance criteria.

LCS Recovery Statement

The Laboratory Control Sample (LCS) spike recoveries for this SDG were within the established acceptance limits.

LCSD Recovery Statement

The Laboratory Control Sample Duplicate (LCSD) spike recoveries for this SDG were within the established acceptance limits.

LCS/LCSD RPD Statement

The relative percent differences (RPD) between each LCS and LCSD were within the required acceptance limits.

QC Sample Designation

An MS/MSD pair was not performed on any samples contained in this batch. An LCS/LCSD pair was performed to measure precision and accuracy of the batch.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time requirements.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All sample extracts were cleaned using alumina. Additionally, elemental mercury was added to field sample extracts to remove high concentrations of sulfur.

Sample Dilutions

None of the samples in this SDG required any dilutions.

Sample Re-prep/Re-analysis

None of the samples in this sample group were reprepped or reanalyzed.

Miscellaneous Information

Nonconformance (NCR) Documentation

No nonconformance reports (NCRs) have been generated for this SDG.

Manual Integrations

No manual integrations were required for any data file in this SDG. Certain standards and QC samples may have required manual integrations to correctly position the baseline as set in the calibration standard injections. If manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this PCB fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis and to list any report documents generated as a result of sample analysis or review. The following additional comments were required for this sample set:

Aroclors quantitated on the raw data report by the Target data system do not necessarily represent a positive aroclor identification. In order for positive identification to be made, the aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method

8000. When these conditions are not met, the aroclor is reported as a non-detect on the data report. These situations will be noted on the raw data as DMP, representing "does not match pattern", or DNC "does not confirm".

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: Jimi Cao **Date:** 10/28/10

QC Summary

Report Date: October 24, 2002

Client : Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB Federal											
Batch 206677											
QC1200312775 LCS											
Aroclor-1260	1.00			0.840	ug/L		84	(47%-131%)	GH1	10/08/02	10:35
*4cmx	0.200			0.144	ug/L		72	(34%-116%)			
*Decachlorobiphenyl	0.200		B	0.129	ug/L		64	(21%-122%)			
QC1200312776 LCSD											
Aroclor-1260	1.00			0.850	ug/L	1	85	(0%-20%)		10/08/02	10:47
*4cmx	0.200			0.149	ug/L		75	(34%-116%)			
*Decachlorobiphenyl	0.200		B	0.132	ug/L		66	(21%-122%)			
QC1200312774 MB											
Aroclor-1016			U	ND	ug/L					10/08/02	10:23
Aroclor-1221			U	ND	ug/L						
Aroclor-1232			U	ND	ug/L						
Aroclor-1242			U	ND	ug/L						
Aroclor-1248			U	ND	ug/L						
Aroclor-1254			U	ND	ug/L						
Aroclor-1260			U	ND	ug/L						
*4cmx	0.200			0.140	ug/L		70	(34%-116%)			
*Decachlorobiphenyl	0.200			0.128	ug/L		64	(21%-122%)			

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where th
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. F
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

QC Summary

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Inorganic Case Narrative for
Sandia National Laboratory
SDG# 68288

Sample Analysis:

The following samples were prepared and analyzed using the methods referenced in the "Method/Analysis Information" section of this narrative:

Sample ID	Client ID
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68288019	060055-002
68288020	060056-002
68288021	060059-002
68288022	060060-002
1200313344	Method Blank (MB) ICP
1200313348	Laboratory Control Sample (LCS)
1200313346	060046-002L (68288012) Serial Dilution (SD)
1200313345	060046-002D (68288012) Sample Duplicate (DUP)
1200313347	060046-002S (68288012) Matrix Spike (MS)
1200314549	Method Blank (MB) CVAA
1200314552	Laboratory Control Sample (LCS)
1200314550	060046-002D (68288012) Sample Duplicate (DUP)
1200314551	060046-002S (68288012) Matrix Spike (MS)

Method/Analysis Information:

Analytical Batch:	206907, 207430
Prep Batch :	206906, 207428
Standard Operating Procedures:	GL-MA-E-013 REV.6, GL-MA-E-010 REV.10
Analytical Method:	SW846 6010B, SW846 7471A
Prep Method :	SW846 3050B, SW846 7471A

System Configuration

The ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP are set at a power level of 950 watts. The instrument has a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a pressure setting of 26 PSI for the nebulizer.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

Sample Preparation
All samples were prepared in accordance with the referenced SW-846 procedures.

Calibration Information

Initial Calibration
Instrument calibrations are conducted using method and instrument manufacturer's specifications. All initial calibration requirements have been met for this analysis.

CRDL Requirements
All CRDL standards met the referenced advisory control limits.

Continuing Calibration (CCV) Requirements
All CCV standards bracketing this SDG met the established recovery acceptance criteria.

Continuing Calibration Blanks (CCB) Requirements
All continuing calibration blanks (CCB) bracketing this SDG met the established acceptance criteria.

ICSA/ICSAB Requirements
All interference check standard (ICSA and ICSAB) elements associated with this SDG met the established acceptance criteria.

Quality Control (QC) Information

Method Blank Acceptance
The preparation blanks analyzed with this SDG did not contain analytes of interest at concentrations greater than the required detection limits (RDL).

LCS Recovery Statement
All LCS spike recoveries for this SDG were within the established acceptance limits.

QC Sample Designation
Sample 68288012 (060046-002) was designated as the quality control sample for the ICP and CVAA batches. Each batch included a sample duplicate (DUP) and a matrix spike (MS). The ICP batch included a serial dilution (SD).

MS Recovery Statement
The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. All qualifying elements met the established acceptance limits for percent recovery except for barium in the ICP batch. The element, barium, was detected in the parent sample; therefore, the recovery failure may be attributed to non-homogeneity of the sample matrix. Barium results in the serial dilution were acceptable, strongly suggesting that the raw result was not being affected by interference.

RPD Statement
The relative percent difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria of 20% when the sample is greater than five times (5X) the contract required detection limit (RDL). In cases where either the sample or duplicate value is less than 5X the RDL, a control limit of +/- the RDL is used to evaluate the DUP results. All applicable elements met the DUP acceptance criteria except for barium in the ICP batch. The element, barium, was detected in the parent sample; therefore, the RPD failure may be attributed to non-homogeneity of the sample matrix.

Serial Dilution % Difference Statement
The serial dilution is used to assess interference caused by matrix suppression or enhancement. Raw element concentrations that are at least 50X the MDL for ICP analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria.

Technical Information:

Holding Time Specifications
All samples were analyzed within the specified holding times.

Sample Dilutions
Dilutions are performed to minimize matrix interference resulting from elevated mineral element concentrations and/or to bring over range target analyte concentrations into the linear calibration range of the instruments. The samples were diluted the standard 2x for soils on the ICP. A 5x dilution was required for samples 68288017 (060052-002) and 68288018 (060053-002) to bring the concentration of chromium within the linear range of the calibration curve. No dilutions were required for the CVAA analysis.

Miscellaneous Information:

NCR Documentation
Nonconformance reports are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. No NCR's were issued for this SDG.

Additional Comments
The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis and to list any report documents generated as a result of sample analysis or review. Additional comments were not required for this SDG.

Review/Validation:

GEL requires all analytical data to be verified by a qualified data validator.

The following data validator verified the data presented in this SDG:

Reviewer: _____

Date: 10/30/06

QC Summary

Report Date: October 30, 2002
Page 1 of 2

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68288

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP Federal											
Batch 206907											
QC1200313345 68288012 DUP											
Arsenic			2.52		2.48	mg/kg	1		(0%-20%)	HSC	10/21/02 20:10
Barium			57.6		101	mg/kg	55*		(0%-20%)		
Cadmium		J	0.170	J	0.144	mg/kg	N/A ^		(+/-0.490)		
Chromium			7.63		6.55	mg/kg	15		(0%-20%)		
Lead			4.86		4.80	mg/kg	1		(0%-20%)		
Selenium		J	0.162	U	ND	mg/kg	N/A ^		(+/-0.490)		
Silver		U	ND	U	ND	mg/kg	N/A		(+/-0.490)		
QC1200313348 LCS											
Arsenic	192				205	mg/kg		107	(79%-121%)		10/21/02 19:52
Barium	417				450	mg/kg		108	(80%-120%)		
Cadmium	125				136	mg/kg		109	(81%-119%)		
Chromium	133				144	mg/kg		108	(77%-123%)		
Lead	160				174	mg/kg		109	(78%-123%)		
Selenium	97.0				103	mg/kg		106	(72%-128%)		
Silver	115				130	mg/kg		113	(55%-145%)		
QC1200313344 MB											
Arsenic				U	ND	mg/kg					10/21/02 19:46
Barium				U	ND	mg/kg					
Cadmium				U	ND	mg/kg					
Chromium				U	ND	mg/kg					
Lead				U	ND	mg/kg					
Selenium				U	ND	mg/kg					
Silver				U	ND	mg/kg					
QC1200313347 68288012 MS											
Arsenic	25.0		2.52		28.4	mg/kg		104	(75%-125%)		10/21/02 20:16
Barium	25.0		57.6		90.3	mg/kg		131*	(75%-125%)		
Cadmium	25.0	J	0.170		25.6	mg/kg		102	(75%-125%)		
Chromium	25.0		7.63		34.1	mg/kg		106	(75%-125%)		
Lead	25.0		4.86		30.6	mg/kg		103	(75%-125%)		
Selenium	25.0	J	0.162		24.0	mg/kg		95	(75%-125%)		
Silver	25.0	U	ND		26.2	mg/kg		105	(75%-125%)		
QC1200313346 68288012 SDILT											
Arsenic			26.7		5.64	ug/L	5.8				10/21/02 20:04
Barium			610		127	ug/L	4.47				
Cadmium		J	1.81	U	ND	ug/L	N/A				
Chromium			80.9		16.7	ug/L	3.22				
Lead			51.6		11.9	ug/L	15.4				
Selenium		J	1.72	U	ND	ug/L	N/A				
Silver		U	ND	U	ND	ug/L	N/A				
Metals Analysis-Mercury Federal											
Batch 207430											
QC1200314550 68288012 DUP											

QC Summary

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury Federal											
Batch 207430											
Mercury		J 0.00224	J	0.00185	mg/kg	N/A ^		(+/-0.00965)	NOR1	10/23/02	11:13
QC1200314552 LCS											
Mercury	24.0			21.1	mg/kg		88	(66%-134%)		10/23/02	11:09
QC1200314549 MB											
Mercury			U	ND	mg/kg					10/23/02	11:07
QC1200314551 68288012 MS											
Mercury	0.0982	J 0.00224		0.103	mg/kg		102	(75%-125%)		10/23/02	11:15

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fall above the effective MDL and below the effective PQL
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. I
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Metals Case Narrative for
Sandia National Labs (SNLS)
SDG# 68288-1

Sample Analysis:
The following samples first extracted by SW 846 method 1311, then prepared and analyzed using the methods referenced in the "Method/Analysis Information" section of this narrative:

Sample ID	Client ID
68295010	060078-007
1200312632	Method Blank (MB) ICP-206624/206623
1200312636	Laboratory Control Sample (LCS)
1200314514	Method Blank (MB) CVAA-207410/207409
1200314517	Laboratory Control Sample (LCS)

Method/Analysis Information:

Analytical Batch #:	206624, 207410
Prep Batch #:	206623, 207409
Analytical Method:	SW846 6010B, SW846 7470A
Prep Method:	SW846 3010, SW846 7470A
Standard Operating Procedure:	GL-MA-E-013 REV.6, GL-MA-E-010 REV.10

System Configuration
The ICP analysis was performed on a Thermo Jarrell Ash 61E Trace axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Meinhardt nebulizer, cyclonic spray chamber, and yttrium internal standard. Operating conditions for the Trace ICP are set at a power level of 950 watts. The instrument has a peristaltic pump flow rate of 140 RPM (2.0 mL/min sample uptake rate), argon gas flows of 15 L/min and 0.5 L/min for the torch and auxiliary gases, and a pressure setting of 26 PSI for the nebulizer.

Mercury analysis was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-400) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 254 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 5 L/min.

Sample Preparation
All samples were prepared in accordance with the referenced SW-846 procedures.

Calibration Information:

Initial Calibration
Instrument calibrations are conducted using method and instrument manufacturer's specifications. All initial calibration requirements have been met for the analyses.

CRDL Requirements
All element recoveries in the CRDL standards met the advisory control limits (70% - 130), with the exception of mercury, which recovered high. Mercury was below the RDL in the sample in this SDG.

ICSA/ICSAB Requirements
All interference check standard (ICSA and ICSAB) elements associated with this SDG met the established acceptance criteria.

Continuing Calibration (CCV) Requirements
All CCV standards bracketing samples from this SDG met the established recovery acceptance criteria.

Continuing Calibration Blanks (CCB) Requirements
All continuing calibration blanks (CCB) bracketing samples from this SDG met the established acceptance criteria.

Quality Control (QC) Information:

Method Blank Acceptance
The preparation blanks analyzed with this SDG did not contain analytes of interest at concentrations greater than the client required detection limits (CRDL).

LCS Recovery Statement
All LCS spike recoveries for this SDG were within the required acceptance limits.

QC Sample Statement
Sample 060087-003 (68152003) from SNLS SDG 68152 was designated as the quality control sample for the ICP and CVAA batches. A matrix spike (MS) and a sample duplicate (DUP) were analyzed in each batch. A serial dilution (SD) was analyzed in the ICP batch.

MS Recovery Statement
The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS analyses met the recommended quality control acceptance criteria for percent recovery (75%-125%) for all applicable analytes.

DUP RPD Statement
The relative percent difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria of 20% when the sample is greater than five times (5X) the contract required detection limit (RDL). In cases where either the sample or duplicate value is less than 5X the RDL, a control limit of +/- the RDL is used to evaluate the DUP results. All applicable elements met the DUP acceptance criteria.

Serial Dilution % Difference Statement
The serial dilution is used to assess interference caused by matrix suppression or enhancement. Raw element concentrations that are at least 50X the MDL for ICP analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria.

Technical Information:

Holding Time Specifications
All samples in this SDG met the specified holding time requirements.

Sample Dilutions
Dilutions are performed to minimize matrix interferences (e.g., those resulting from elevated mineral element concentrations) present in the sample and/or to bring over range target analyte concentrations into the linear calibration range of the instruments. No dilution was necessary.

Miscellaneous Information:

NCR Documentation
Nonconformance reports (NCR) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. No NCR was generated with this SDG.

Additional Comments
The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis and to list any report documents generated as a result of sample analysis or review. Additional comments were not required for this SDG.

Review/Validation:

GEL requires all analytical data to be verified by a qualified data validator.

The following data validator verified the data presented in this SDG:

Reviewer: GDS:WOLF:S)

Date: 10/15/02

QC Summary

Report Date: October 15, 2002

Client : Sandia National Laboratories
MS-9756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68295

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP Federal											
Batch 206624											
QC1200312633 68152003 DUP											
Arsenic		J	0.00384	J	0.00408	mg/L	N/A ^		(+/-0.005)	HSC	10/10/02 17:54
Barium			0.233		0.230	mg/L	1		(0%-20%)		
Cadmium		J	0.000472	U	ND	mg/L	N/A ^		(+/-0.005)		
Chromium		J	0.00302	J	0.00243	mg/L	N/A ^		(+/-0.005)		
Lead			0.0135		0.0113	mg/L	17 ^		(+/-0.005)		
Selenium		U	ND	J	0.00369	mg/L	N/A		(+/-0.005)		
Silver		U	ND	U	ND	mg/L	N/A		(+/-0.005)		
QC1200312636 LCS											
Arsenic	0.500				0.518	mg/L		104	(80%-120%)		10/10/02 17:36
Barium	0.500				0.511	mg/L		102	(80%-120%)		
Cadmium	0.500				0.509	mg/L		102	(80%-120%)		
Chromium	0.500				0.513	mg/L		103	(80%-120%)		
Lead	0.500				0.519	mg/L		104	(80%-120%)		
Selenium	0.500				0.506	mg/L		101	(80%-120%)		
Silver	0.500				0.496	mg/L		99	(80%-120%)		
QC1200312632 MB											
Arsenic				U	ND	mg/L					10/10/02 17:30
Barium				U	ND	mg/L					
Cadmium				U	ND	mg/L					
Chromium				U	ND	mg/L					
Lead				U	ND	mg/L					
Selenium				U	ND	mg/L					
Silver				U	ND	mg/L					
QC1200312635 68152003 MS											
Arsenic	0.500	J	0.00384		0.542	mg/L		108	(75%-125%)		10/10/02 18:00
Barium	0.500		0.233		0.756	mg/L		105	(75%-125%)		
Cadmium	0.500	J	0.000472		0.520	mg/L		104	(75%-125%)		
Chromium	0.500	J	0.00302		0.528	mg/L		105	(75%-125%)		
Lead	0.500		0.0135		0.538	mg/L		105	(75%-125%)		
Selenium	0.500	U	ND		0.524	mg/L		105	(75%-125%)		
Silver	0.500	U	ND		0.519	mg/L		104	(75%-125%)		
QC1200312634 68152003 SDILT											
Arsenic		J	3.84	U	ND	ug/L	N/A				10/10/02 17:48
Barium			233		44.4	ug/L	4.51				
Cadmium		J	0.472	U	ND	ug/L	N/A				
Chromium		J	3.02	J	0.536	ug/L	11.3				
Lead			13.5	J	2.63	ug/L	2.35				
Selenium		U	ND	U	ND	ug/L	N/A				
Silver		U	ND	U	ND	ug/L	N/A				
Metals Analysis-Mercury Federal											
Batch 207410											
QC1200314515 68152003 DUP											

QC Summary

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analst	Date	Time
Metals Analysis-Mercury Federal											
Batch 207410											
Mercury		BJ 0.000177	B	0.000233	mg/L	N/A		(+/-0.0002)	NOR1	10/11/02	18:36
QC1200314517 LCS											
Mercury	0.002		B	0.0023	mg/L		115	(80%-120%)		10/11/02	18:25
QC1200314514 MB											
Mercury			J	0.000153	mg/L					10/11/02	18:32
QC1200314516 68152003 MS											
Mercury	0.002	BJ 0.000177	B	0.0022	mg/L		101	(75%-125%)		10/11/02	18:38

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. I
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

General Chemistry Narrative
Sandia National Labs (SNLS)
SDG 68288

Method/Analysis Information

Procedure:	**Total Cyanide**
Analytical Method:	SW846 9012A
Prep Method:	SW846 9010B Prep
Analytical Batch Number:	206731
Prep Batch Number:	206730

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9012A:

Sample ID	Client ID
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68288019	060055-002
68288020	060056-002
68288021	060059-002
68288022	060060-002

1200312896	MB
1200312897	DUP of 68288012
1200312899	MS of 68288012
1200312902	LCS

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 Rev. 1.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by General Engineering Laboratories, Inc. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information:

The instrument used in this analysis was the following: Lachat QuickChem FIA+

Initial Calibration
The instrument was properly calibrated.

Calibration Verification Information
All calibration verification standards were within the required limits.

Quality Control (QC) Information:

Blank Acceptance
The method and calibration blanks associated with this data were within the required acceptance limits.

Laboratory Control Sample (LCS) Recovery
The recovery for the laboratory control sample was within the required acceptance limits.

Quality Control
The following sample was designated for Quality Control: 68288012.

Sample Spike Recovery
The spike recovery for this sample set was within the required acceptance limits.

Sample Duplicate Acceptance
The values for the sample and duplicate for this sample group are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable.

Technical Information:

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times
All samples from this sample group were analyzed within the required holding time for this method.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
No samples in this sample group required dilutions.

Sample Reanalysis
The following samples were reanalyzed because the autosampler cups were empty at the time of the original analysis: 68288017, 68288018, 68288019 and 68288022.

Miscellaneous Information:

Nonconformance Reports
No Nonconformance Reports (NCR) were required for any of the samples in this sample group for this analysis.

Method/Analysis Information

Procedure:	**Hexavalent Chromium**
Analytical Method:	SW846 7196A
Prep Method:	SW846 3060A
Analytical Batch Number:	207514
Prep Batch Number:	207513

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 7196A:

Sample ID	Client ID
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68288019	060055-002
68288020	060056-002
68288021	060059-002
68288022	060060-002
1200314756	MB
1200314757	DUP of 68288012
1200314758	DUP of 68288019
1200314759	MS of 68288012
1200314760	MS of 68288019
1200314761	LCS

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-044 REV.4.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by General Engineering Laboratories, Inc. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information:

The instrument used in this analysis was the following: Milton Roy Spectrophotometer 200

Initial Calibration
The instrument was properly calibrated.

Calibration Verification Information
All calibration verification standards were within the required limits.

Quality Control (QC) Information:

Blank Acceptance
The method and calibration blanks associated with this data were within the required acceptance limits.

Laboratory Control Sample (LCS) Recovery
The recovery for the laboratory control sample was within the required acceptance limits.

Quality Control
The following samples were designated for Quality Control: 68288012 and 68288019.

Sample Spike Recovery
The spike recoveries for this sample set were within the required acceptance limits.

Sample Duplicate Acceptance
The Relative Percent Differences between the samples and duplicates for this SDG were within the required acceptance limits.

Technical Information:

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times
All samples from this sample group were analyzed within the required holding time for this method.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The following samples were diluted 1:5 due to turbidity: 68288015 and 68288016.

Miscellaneous Information:

Nonconformance Reports
NCR# 7342 was written for this sample batch due to failure to maintain custody.

Additional Comments
The SNLS contract has specific client QC requirements. Due to recent matrix spike recoveries, the client has allowed GEL the use their own SPC limits rather than the static client contract limits of 75 -125%. See enclosed e-mail.

Certification Statement

* Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: _____ **Date:** 10/28/02

QC Summary

Report Date: October 28, 2002

Client : Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rapid Flow Analysis Federal											
Batch 206731											
QC1200312897 68288012 DUP											
Cyanide, Total	BU	ND	BJ	0.0421	mg/kg	N/A		(+/-0.250)	ADF	10/10/02	13:08
QC1200312902 LCS											
Cyanide, Total	277		B	212	mg/kg		77	(62%-138%)		10/10/02	13:01
QC1200312896 MB											
Cyanide, Total			J	0.074	mg/kg					10/10/02	12:56
QC1200312899 68288012 MS											
Cyanide, Total	4.17 BU	ND	B	4.70	mg/kg		112	(55%-145%)		10/10/02	13:09
Spectrometric Analysis Federal											
Batch 207514											
QC1200314757 68288012 DUP											
Hexavalent Chromium	U	ND	U	ND	mg/kg	N/A		(+/-0.0995)	BEP2	10/15/02	12:00
QC1200314758 68288019 DUP											
Hexavalent Chromium	J	0.0591	U	ND	mg/kg	N/A ^		(+/-0.101)			
QC1200314761 LCS											
Hexavalent Chromium	0.990			0.881	mg/kg		89	(72%-121%)			
QC1200314756 MB											
Hexavalent Chromium			U	ND	mg/kg						
QC1200314759 68288012 MS											
Hexavalent Chromium	0.993 U	ND		0.715	mg/kg		72	(49%-130%)			
QC1200314760 68288019 MS											
Hexavalent Chromium	0.998 J	0.0591		1.02	mg/kg		96	(49%-130%)			

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

*	Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
**	Indicates analyte is a surrogate compound.
B	The analyte was found in the blank above the effective MDL.
H	Holding time was exceeded.
J	Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
P	The response between the confirmation column and the primary column is >40%D
U	The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. J
X	Presumptive evidence that the analyte is not present. Please see narrative for further information.
X	Presumptive evidence that the analyte is not present. Please see narrative for further information.
X	Uncertain identification for gamma spectroscopy.

QC Summary

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Method/Analysis Information

Procedure:	**Total Cyanide**
Analytical Method:	SW846 9012A
Prep Method:	SW846 9010B Prep
Analytical Batch Number:	207325
Prep Batch Number:	207323

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 335.3:

Sample ID	Client ID
68295008	060078-005
1200314302	MB
1200314303	LCS
1200314304	DUP
1200314310	DUP of 68295008
1200314311	MS of 68295008
1200315816	LCSD

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 Rev. 1.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by General Engineering Laboratories, Inc. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information:

The instrument used in this analysis was the following: Lachat QuickChem FIA+

Initial Calibration
The instrument was properly calibrated.

Calibration Verification Information
All calibration verification standards were within the required limits.

Quality Control (QC) Information:

Blank Acceptance
The method and calibration blanks associated with this data were within the required acceptance limits.

Laboratory Control Sample (LCS) Recovery
The recovery for the laboratory control sample was within the required acceptance limits.

LCS Duplicate Recovery
The LCS Duplicate recovery was within the required acceptance limits.

LCS Duplicate Acceptance
The Relative Percent Difference between the LCS and LCS Duplicate was within the required acceptance limits.

Quality Control
Sample 68295008 was designated for Quality Control.

Sample Spike Recovery
The spike recovery was outside of the required acceptance limits due to matrix interference. The LCS was 99.4 %. The project manager was notified.

Sample Duplicate Acceptance
The values for the sample and duplicate for this sample group are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable.

Technical Information:

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times
All samples from this sample group were analyzed within the required holding time for this method.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
No samples in this sample group required dilutions.

Miscellaneous Information:

Nonconformance Reports
No Nonconformance Reports (NCR) were required for any of the samples in this sample group for this analysis.

Certification Statement

* Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: _____ **Date:** 10/29/02

General Chemistry Narrative
Sandia National Labs (SNLS)
SDG 68288-1

Method/Analysis Information

Procedure:	**Hexavalent Chromium**
Analytical Method:	SW846 7196A
Analytical Batch Number:	206338

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 7196A:

Sample ID	Client ID
68295009	060078-006
1200311845	MB
1200311846	DUP of 68295009
1200311847	PS of 68295009
1200311848	LCS

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-044 REV.4.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by General Engineering Laboratories, Inc. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information:

The instrument used in this analysis was the following: Milton Roy Spectrophotometer 200

Initial Calibration
The instrument was properly calibrated.

Calibration Verification Information
All calibration verification standards were within the required limits.

Quality Control (QC) Information:

Blank Acceptance
The method and calibration blanks associated with this data were within the required acceptance limits.

Laboratory Control Sample (LCS) Recovery
The recovery for the laboratory control sample was within the required acceptance limits.

Quality Control
Sample 68295009 was designated for Quality Control.

Sample Spike Recovery
The spike recovery for this sample set was within the required acceptance limits.

Sample Duplicate Acceptance
The values for the sample and duplicate for this sample group are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable.

Technical Information:

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times
Sample 68295009 was received by the lab outside of the method specified holding time.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
No samples in this sample group required dilutions.

Miscellaneous Information:

Nonconformance Reports

No Nonconformance Reports (NCR) were required for any of the samples in this sample group for this analysis.

QC Summary

Report Date: October 29, 2002

Client : Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rapid Flow Analysis Federal										
Batch 207325										
QC1200314310 68295008 DUP										
Cyanide, Total		U	ND	U	ND	mg/L	N/A		(+/-0.005) ADF	10/14/02 09:51
QC1200314303 LCS										
Cyanide, Total	0.050				0.0497	mg/L		99	(90%-110%)	10/14/02 09:37
QC1200315816 LCSD										
Cyanide, Total	0.050				0.0492	mg/L	1	99	(0%-20%)	10/14/02 09:38
QC1200314302 MB										
Cyanide, Total				U	ND	mg/L				10/14/02 09:37
QC1200314311 68295008 MS										
Cyanide, Total	0.100	U	ND		0.0686	mg/L		69*	(72%-133%)	10/14/02 09:52
Spectrometric Analysis Federal										
Batch 206338										
QC1200311846 68295009 DUP										
Hexavalent Chromium		HU	ND	HU	ND	mg/L	N/A		(+/-0.010) AL1	10/04/02 17:15
QC1200311848 LCS										
Hexavalent Chromium	0.100				0.0996	mg/L		100	(89%-110%)	
QC1200311845 MB										
Hexavalent Chromium				U	ND	mg/L				
QC1200311847 68295009 PS										
Hexavalent Chromium	0.100	HU	ND	H	0.0862	mg/L		85	(80%-122%)	

Notes:
RER is calculated at the 95% confidence level (2-sigma).
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where t
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. J
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further infromation.
- X Uncertain identification for gamma spectroscopy.

QC Summary

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Radiochemistry Case Narrative
Sandia National Labs (SNLS)
Workorder 68288

Method/Analysis Information

Batch Number: 206591
Procedure: Determination of Gross Alpha And Gross Non-Volatile Beta in Water
Analytical Method: EPA 900.0

Sample ID	Client ID
68288012	060046-002
68288013	060047-002
68288014	060049-001
68288015	060050-002
68288016	060051-002
68288017	060052-002
68288018	060053-002
68288019	060055-002
68288020	060056-002
68288021	060059-002
68288022	060060-002
1200312517	MB for batch 206591
1200312518	060046-002(68288012DUP)
1200312519	060046-002(68288012MS)
1200312520	060046-002(68288012MSD)
1200312521	LCS for batch 206591

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV.6.

Calibration Information:

Calibration Information
All initial and continuing calibration requirements have been met. The initial calibration was performed on June 12, 2002.

Standards Information
Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

Sample Geometry
All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information
The blank volume is representative of the sample volume(s) in this batch.

Designated QC
The following sample was used for QC: *68288012.*

QC Information
All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time
All sample procedures for this sample set were performed within the required holding time.

Preparation Information
All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis
None of the samples in this sample set required reprep or reanalysis.

Gross Alpha/Beta Preparation Information
High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity. This sequence causes the alpha count run data to record over the beta count run data in AlphaLims, therefore only the alpha count data will appear on the instrument runlog.

Miscellaneous Information:

NCR Documentation
No NCR were generated for the preparation or analysis of this sample set.

Qualifier Information

Manual qualifiers were not required.

Certification Statement
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:
GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.
The following data validator verified the information presented in this case narrative:

Reviewer: Valerie Drum **Date:** 10/28/02

QC Summary

Report Date: October 28, 2002

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68288

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Gravimetric Solids										
Batch 206370										
QC1200311924 68288012 DUP										
Moisture		5.59		5.06	percent	10		(0%-24%)	TCD	10/08/02 09:37
Rad Gas Flow										
Batch 206591										
QC1200312518 68288012 DUP										
Alpha		6.58		8.57	pCi/g	0.564		(0%-20%)	CAFI	10/25/02 17:11
	Uncert:	+/-1.49		+/-1.67						
	TPU:	1.64		1.90						
Beta		16.2		16.9	pCi/g	0.251		(0%-20%)		
	Uncert:	+/-1.40		+/-1.57						
	TPU:	1.43		1.61						
QC1200312521 LCS										
Alpha	9.89			10.8	pCi/g		109	(75%-125%)		10/25/02 09:20
	Uncert:			+/-1.80						
	TPU:			2.44						
Beta	39.6			42.2	pCi/g		107	(75%-125%)		
	Uncert:			+/-2.36						
	TPU:			2.42						
QC1200312517 MB										
Alpha			U	-0.044	pCi/g					10/25/02 17:10
	Uncert:			+/-0.063						
	TPU:			0.0631						
Beta			U	-0.0718	pCi/g					
	Uncert:			+/-0.0751						
	TPU:			0.0751						
QC1200312519 68288012 MS										
Alpha	89.9	6.58		88.9	pCi/g		92	(75%-125%)		10/25/02 09:20
	Uncert:	+/-1.49		+/-17.1						
	TPU:	1.64		18.0						
Beta	361	16.2		334	pCi/g		88	(75%-125%)		
	Uncert:	+/-1.40		+/-20.1						
	TPU:	1.43		20.7						
QC1200312520 68288012 MSD										
Alpha	89.9	6.58		85.0	pCi/g		87			
	Uncert:	+/-1.49		+/-18.5						
	TPU:	1.64		20.2						
Beta	361	16.2		364	pCi/g		97			
	Uncert:	+/-1.40		+/-20.9						
	TPU:	1.43		21.6						

QC Summary

Workorder: 65288

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time

Notes:
The Qualifiers in this report are defined as follows:

- * Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.
- ** Indicates analyte is a surrogate compound.
- B The analyte was found in the blank above the effective MDL.
- H Holding time was exceeded
- J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
- P The response between the confirmation column and the primary column is >40%D
- U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. For radiochemical analytes the result is less than the Decision Level
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Presumptive evidence that the analyte is not present. Please see narrative for further information.
- X Uncertain identification for gamma spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Radiochemistry Case Narrative
Sandia National Labs (SNLS)
SDG 68288-1

Method/Analysis Information

Batch Number: 208471
Procedure: Determination of Gross Alpha And Gross Non-Volatile Beta in Water
Analytical Method: EPA 900.0

Sample ID	Client ID
68295011	060078-008
1200317045	MB for batch 208471
1200317046	060078-008(68295011DUP)
1200317047	060078-008(68295011MS)
1200317048	060078-008(68295011MSD)
1200317049	LCS for batch 208471

SOP Reference
Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, Inc. as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV.6.

Calibration Information:

Calibration Information
All initial and continuing calibration requirements have been met. The initial calibration was performed on June 13, 2002.

Standards Information
Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

Sample Geometry
All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information
The blank volume is representative of the sample volume(s) in this batch.

Designated QC
The following sample was used for QC: *68295011*.

QC Information
All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time
All sample procedures for this sample set were performed within the required holding time.

Preparation Information
All preparation criteria have been met for these analyses.

Sample Re-prep/Re-analysis
None of the samples in this sample set required reprep or reanalysis.

Gross Alpha/Beta Preparation Information
High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating, especially to a dull red heat. For this sample set, the prepared planchet was counted for beta activity before being flamed. After flaming, the planchet was counted for alpha activity. This sequence causes the alpha count run data to record over the beta count run data in AlphaLims, therefore only the alpha count data will appear on the instrument runlog.

Miscellaneous Information:

NCR Documentation
No NCR were generated for the preparation or analysis of this sample set.

Certification Statement
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:
GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: _____ **Date:** 29 Oct 2002

GENERAL ENGINEERING LABORATORIES
Meeting today's needs with a vision for tomorrow.

QC Summary

Report Date: October 29, 2002

Client: Sandia National Laboratories
MS-0756
P.O. Box 5800
Albuquerque, New Mexico
Contact: Pamela M. Puissant

Workorder: 68295

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch 208471											
QC1200317046 68295011 DUP											
Alpha	U	0.0849	U	-0.098	pCi/L	0.255 ^		(+/-1.00)	HOB1	10/22/02	02:18
	Uncert:	+/-0.488		+/-0.229							
	TPU:	0.488		0.229							
Beta	U	0.0851	U	-0.954	pCi/L	0.803 **^		(+/-1.00)			
	Uncert:	+/-0.637		+/-0.657							
	TPU:	0.637		0.657							
QC1200317049 LCS											
Alpha	9.89			11.1	pCi/L		112	(75%-125%)		10/22/02	08:59
	Uncert:			+/-1.16							
	TPU:			1.25							
Beta	39.6			43.1	pCi/L		109	(75%-125%)			
	Uncert:			+/-1.84							
	TPU:			2.51							
QC1200317045 MB											
Alpha			U	0.0195	pCi/L						
	Uncert:			+/-0.183							
	TPU:			0.183							
Beta			U	0.183	pCi/L						
	Uncert:			+/-0.318							
	TPU:			0.318							
QC1200317047 68295011 MS											
Alpha	49.4 U	0.0849		50.8	pCi/L		103	(75%-125%)			
	Uncert:	+/-0.488		+/-5.60							
	TPU:	0.488		6.41							
Beta	198 U	0.0851		231	pCi/L		117	(75%-125%)			
	Uncert:	+/-0.637		+/-9.55							
	TPU:	0.637		11.9							
QC1200317048 68295011 MSD											
Alpha	49.4 U	0.0849		49.8	pCi/L		101	(75%-125%)			
	Uncert:	+/-0.488		+/-5.52							
	TPU:	0.488		5.96							
Beta	198 U	0.0851		219	pCi/L		110	(75%-125%)			
	Uncert:	+/-0.637		+/-9.27							
	TPU:	0.637		13.2							

Notes:
The Qualifiers in this report are defined as follows:

* Recovery or %RPD not within acceptance limits and/or spike amount not compatible with the sample or the duplicate RPD's are not applicable where the concentration falls below the effective PQL.
** Indicates analyte is a surrogate compound.
B The analyte was found in the blank above the effective MDL.

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

QC Summary

Workorder: 63295

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time

H Holding time was exceeded

J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.

P The response between the confirmation column and the primary column is >40%D

U The analyte was analyzed for but not detected below this concentration. For Organic and Inorganic analytes the result is less than the effective MDL. For radiochemical analytes the result is less than the Decision Level

X Presumptive evidence that the analyte is not present. Please see narrative for further information.

X Presumptive evidence that the analyte is not present. Please see narrative for further information.

X Uncertain identification for gamma spectroscopy.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

COC# 605790

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/15/02 5:40:45 PM

Analyzed by: [redacted] 10/16/02 Reviewed by: [redacted] 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060046-003
Lab Sample ID : 20144501

Sample Description : 6596/1105-DW1-BH1-10-S
Sample Quantity : 700.800 gram
Sample Date/Time : 9/26/02 9:35:00 AM
Acquire Start Date/Time : 10/15/02 4:00:25 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	6.78E-001
RA-226	8.36E-001	4.73E-001	7.19E-001
PB-214	5.99E-001	9.30E-002	6.01E-002
BI-214	5.85E-001	9.67E-002	5.40E-002
PB-210	Not Detected	---	2.61E+001
TH-232	6.78E-001	3.26E-001	1.93E-001
RA-228	5.85E-001	1.23E-001	1.31E-001
AC-228	7.15E-001	1.41E-001	1.03E-001
TH-228	4.05E-001	4.56E-001	7.31E-001
RA-224	7.69E-001	1.77E-001	7.46E-002
PB-212	6.66E-001	9.83E-002	3.60E-002
BI-212	7.66E-001	2.94E-001	3.97E-001
TL-208	5.91E-001	1.05E-001	7.82E-002
U-235	Not Detected	---	2.14E-001
TH-231	Not Detected	---	1.05E+001
PA-231	Not Detected	---	1.27E+000
TH-227	Not Detected	---	3.22E-001
RA-223	Not Detected	---	5.31E-001
RN-219	Not Detected	---	3.30E-001
PB-211	Not Detected	---	7.37E-001
TL-207	Not Detected	---	1.16E+001
AM-241	Not Detected	---	3.92E-001
PU-239	Not Detected	---	3.84E+002
NP-237	Not Detected	---	2.08E+000
PA-233	Not Detected	---	5.13E-002
TH-229	Not Detected	---	2.20E-001

[Summary Report] - Sample ID: : 20144501

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.24E-002
AG-110m	Not Detected	---------	2.63E-002
BA-133	Not Detected	---------	4.47E-002
BE-7	Not Detected	---------	2.68E-001
CD-115	Not Detected	---------	2.43E+001
CE-139	Not Detected	---------	2.83E-002
CE-141	Not Detected	---------	6.93E-002
CE-144	Not Detected	---------	2.16E-001
CM-243	Not Detected	---------	1.56E-001
CO-56	Not Detected	---------	3.34E-002
CO-57	Not Detected	---------	2.92E-002
CO-58	Not Detected	---------	3.49E-002
CO-60	Not Detected	---------	3.16E-002
CR-51	Not Detected	---------	3.30E-001
CS-134	Not Detected	---------	3.82E-002
CS-137	Not Detected	---------	2.82E-002
EU-152	Not Detected	---------	8.18E-002
EU-154	Not Detected	---------	1.50E-001
EU-155	Not Detected	---------	1.26E-001
FE-59	Not Detected	---------	8.44E-002
GD-153	Not Detected	---------	9.40E-002
HG-203	Not Detected	---------	3.75E-002
I-131	Not Detected	---------	1.27E-001
IR-192	Not Detected	---------	2.92E-002
K-40	1.93E+001	2.59E+000	2.57E-001
MN-52	Not Detected	---------	2.66E-001
MN-54	Not Detected	---------	3.07E-002
MO-99	Not Detected	---------	2.58E+001
NA-22	Not Detected	---------	3.78E-002
NA-24	Not Detected	---------	5.63E+007
ND-147	Not Detected	---------	5.68E-001
NI-57	Not Detected	---------	3.36E+002
RU-103	Not Detected	---------	3.46E-002
RU-106	Not Detected	---------	2.43E-001
SB-122	Not Detected	---------	5.06E+000
SB-124	Not Detected	---------	3.00E-002
SB-125	Not Detected	---------	6.99E-002
SN-113	Not Detected	---------	3.72E-002
SR-85	Not Detected	---------	3.82E-002
TA-182	Not Detected	---------	1.55E-001
TA-183	Not Detected	---------	4.63E+000
TL-201	Not Detected	---------	1.20E+001
Y-88	Not Detected	---------	2.41E-002
ZN-65	Not Detected	---------	9.55E-002
ZR-95	Not Detected	---------	5.62E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/15/02 7:22:48 PM

* Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060047-003
Lab Sample ID : 20144502

Sample Description : 6596/1105-DW1-BH1-15-S
Sample Quantity : 686.300 gram
Sample Date/Time : 9/26/02 9:50:00 AM
Acquire Start Date/Time : 10/15/02 5:42:33 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	7.50E-001
RA-226	1.92E+000	5.45E-001	7.05E-001
PB-214	8.21E-001	1.20E-001	6.20E-002
BI-214	6.83E-001	1.10E-001	5.45E-002
PB-210	Not Detected	---------	2.76E+001
TH-232	8.61E-001	4.05E-001	2.10E-001
RA-228	8.48E-001	1.57E-001	1.37E-001
AC-228	8.67E-001	1.61E-001	9.84E-002
TH-228	1.06E+000	4.63E-001	6.65E-001
RA-224	1.02E+000	2.22E-001	6.22E-002
PB-212	8.59E-001	1.25E-001	3.95E-002
BI-212	1.01E+000	3.25E-001	4.12E-001
TL-208	7.90E-001	1.29E-001	7.99E-002
U-235	1.09E-001	1.79E-001	2.29E-001
TH-231	Not Detected	---------	1.13E+001
PA-231	Not Detected	---------	1.36E+000
TH-227	Not Detected	---------	3.60E-001
RA-223	Not Detected	---------	5.72E-001
RN-219	Not Detected	---------	3.59E-001
PB-211	Not Detected	---------	8.01E-001
TL-207	Not Detected	---------	1.17E+001
AM-241	Not Detected	---------	4.20E-001
PU-239	Not Detected	---------	4.10E+002
NP-237	Not Detected	---------	2.23E+000
PA-233	Not Detected	---------	5.39E-002
TH-229	Not Detected	---------	2.35E-001

[Summary Report] - Sample ID: : 20144502

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.51E-002
AG-110m	Not Detected	---------	2.68E-002
BA-133	Not Detected	---------	4.77E-002
BE-7	Not Detected	---------	2.85E-001
CD-115	Not Detected	---------	2.59E+001
CE-139	Not Detected	---------	3.04E-002
CE-141	Not Detected	---------	7.48E-002
CE-144	Not Detected	---------	2.36E-001
CM-243	Not Detected	---------	1.70E-001
CO-56	Not Detected	---------	3.55E-002
CO-57	Not Detected	---------	2.98E-002
CO-58	Not Detected	---------	3.50E-002
CO-60	Not Detected	---------	3.21E-002
CR-51	Not Detected	---------	3.55E-001
CS-134	Not Detected	---------	4.17E-002
CS-137	Not Detected	---------	2.87E-002
EU-152	Not Detected	---------	8.56E-002
EU-154	Not Detected	---------	1.62E-001
EU-155	Not Detected	---------	1.33E-001
FE-59	Not Detected	---------	8.48E-002
GD-153	Not Detected	---------	1.01E-001
HG-203	Not Detected	---------	4.05E-002
I-131	Not Detected	---------	1.46E-001
IR-192	Not Detected	---------	3.04E-002
K-40	1.70E+001	2.30E+000	2.76E-001
MN-52	Not Detected	---------	2.76E-001
MN-54	Not Detected	---------	3.15E-002
MO-99	Not Detected	---------	2.68E+001
NA-22	Not Detected	---------	3.73E-002
NA-24	Not Detected	---------	6.27E+007
ND-147	Not Detected	---------	6.24E-001
NI-57	Not Detected	---------	3.88E+002
RU-103	Not Detected	---------	3.54E-002
RU-106	Not Detected	---------	2.60E-001
SB-122	~~1.64E+000~~	~~1.81E+000~~	2.89E+000 NOT DETECTED KS 10-16-02
SB-124	Not Detected	---------	3.29E-002
SB-125	Not Detected	---------	8.21E-002
SN-113	Not Detected	---------	3.75E-002
SR-85	Not Detected	---------	4.20E-002
TA-182	Not Detected	---------	1.58E-001
TA-183	Not Detected	---------	5.00E+000
TL-201	Not Detected	---------	1.30E+001
Y-88	Not Detected	---------	2.99E-002
ZN-65	Not Detected	---------	1.01E-001
ZR-95	Not Detected	---------	6.17E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/15/02 10:46:45 PM

* Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060050-003
Lab Sample ID : 20144504

Sample Description : 6597/1113-DW1-BH1-5-S
Sample Quantity : 847.200 gram
Sample Date/Time : 9/26/02 10:25:00 AM
Acquire Start Date/Time : 10/15/02 9:06:30 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	5.81E-001
RA-226	1.62E+000	4.41E-001	5.58E-001
PB-214	6.01E-001	8.94E-002	5.02E-002
BI-214	5.27E-001	8.46E-002	4.04E-002
PB-210	Not Detected	---	2.27E+001
TH-232	4.61E-001	2.31E-001	1.66E-001
RA-228	5.99E-001	1.13E-001	9.04E-002
AC-228	5.11E-001	1.09E-001	9.28E-002
TH-228	3.05E-001	2.81E-001	4.44E-001
RA-224	6.35E-001	1.46E-001	5.45E-002
PB-212	5.43E-001	8.03E-002	2.93E-002
BI-212	5.35E-001	1.94E-001	2.49E-001
TL-208	4.83E-001	8.40E-002	5.78E-002
U-235	1.47E-001	1.44E-001	1.84E-001
TH-231	Not Detected	---	8.99E+000
PA-231	Not Detected	---	1.06E+000
TH-227	Not Detected	---	2.64E-001
RA-223	Not Detected	---	4.53E-001
RN-219	~~1.35E-001~~	~~2.41E-001~~	2.80E-001 NOT DETECTED KAT 10-16-02
PB-211	Not Detected	---	6.19E-001
TL-207	Not Detected	---	1.01E+001
AM-241	Not Detected	---	3.39E-001
PU-239	Not Detected	---	3.31E+002
NP-237	Not Detected	---	1.76E+000
PA-233	Not Detected	---	4.33E-002
TH-229	Not Detected	---	1.90E-001

Summary Report] - Sample ID: : 20144504

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.62E-002
AG-110m	Not Detected	---------	2.24E-002
BA-133	Not Detected	---------	3.81E-002
BE-7	Not Detected	---------	2.24E-001
CD-115	Not Detected	---------	2.06E+001
CE-139	Not Detected	---------	2.49E-002
CE-141	Not Detected	---------	5.90E-002
CE-144	Not Detected	---------	1.90E-001
CM-243	Not Detected	---------	1.30E-001
CO-56	Not Detected	---------	2.77E-002
CO-57	Not Detected	---------	2.51E-002
CO-58	Not Detected	---------	2.88E-002
CO-60	Not Detected	---------	2.71E-002
CR-51	Not Detected	---------	2.72E-001
CS-134	Not Detected	---------	3.22E-002
CS-137	Not Detected	---------	2.28E-002
EU-152	Not Detected	---------	7.20E-002
EU-154	Not Detected	---------	1.21E-001
EU-155	Not Detected	---------	1.08E-001
FE-59	Not Detected	---------	6.77E-002
GD-153	Not Detected	---------	8.44E-002
HG-203	Not Detected	---------	3.17E-002
I-131	Not Detected	---------	1.15E-001
IR-192	Not Detected	---------	2.43E-002
K-40	1.56E+001	2.10E+000	2.33E-001
MN-52	Not Detected	---------	2.46E-001
MN-54	Not Detected	---------	2.63E-002
MO-99	Not Detected	---------	2.29E+001
NA-22	Not Detected	---------	3.15E-002
NA-24	Not Detected	---------	4.91E+007
ND-147	Not Detected	---------	4.63E-001
NI-57	Not Detected	---------	3.26E+002
RU-103	Not Detected	---------	2.89E-002
RU-106	Not Detected	---------	2.02E-001
SB-122	Not Detected	---------	4.24E+000
SB-124	Not Detected	---------	2.62E-002
SB-125	Not Detected	---------	6.40E-002
SN-113	Not Detected	---------	3.04E-002
SR-85	Not Detected	---------	3.19E-002
TA-182	Not Detected	---------	1.35E-001
TA-183	Not Detected	---------	4.10E+000
TL-201	Not Detected	---------	1.03E+001
Y-88	Not Detected	---------	2.19E-002
ZN-65	Not Detected	---------	8.20E-002
ZR-95	Not Detected	---------	4.63E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 12:28:55 AM

Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060051-003
Lab Sample ID : 20144505

Sample Description : 6597/1113-DW1-BH1-10-S
Sample Quantity : 826.100 gram
Sample Date/Time : 9/26/02 11:50:00 AM
Acquire Start Date/Time : 10/15/02 10:48:29 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	6.59E-001
RA-226	2.08E+000	5.33E-001	6.65E-001
PB-214	8.64E-001	1.22E-001	5.60E-002
BI-214	7.28E-001	1.13E-001	4.93E-002
PB-210	Not Detected	---	2.61E+001
TH-232	7.73E-001	3.61E-001	1.78E-001
RA-228	7.35E-001	1.34E-001	1.10E-001
AC-228	7.48E-001	1.38E-001	8.38E-002
TH-228	7.45E-001	4.06E-001	6.09E-001
RA-224	9.62E-001	2.05E-001	5.72E-002
PB-212	8.25E-001	1.19E-001	3.45E-002
BI-212	7.97E-001	2.65E-001	3.40E-001
TL-208	7.61E-001	1.21E-001	6.80E-002
U-235	Not Detected	---	2.06E-001
TH-231	Not Detected	---	9.97E+000
PA-231	Not Detected	---	1.21E+000
TH-227	Not Detected	---	3.17E-001
RA-223	Not Detected	---	5.12E-001
RN-219	Not Detected	---	3.06E-001
PB-211	Not Detected	---	7.02E-001
TL-207	Not Detected	---	1.03E+001
AM-241	Not Detected	---	3.78E-001
PU-239	Not Detected	---	3.85E+002
NP-237	Not Detected	---	2.01E+000
PA-233	Not Detected	---	4.82E-002
TH-229	Not Detected	---	2.15E-001

[Summary Report] - Sample ID: : 20144505

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.06E-002
AG-110m	Not Detected	---------	2.54E-002
BA-133	Not Detected	---------	4.48E-002
BE-7	Not Detected	---------	2.56E-001
CD-115	Not Detected	---------	2.42E+001
CE-139	Not Detected	---------	2.78E-002
CE-141	Not Detected	---------	6.77E-002
CE-144	Not Detected	---------	2.21E-001
CM-243	Not Detected	---------	1.53E-001
CO-56	Not Detected	---------	3.11E-002
CO-57	Not Detected	---------	2.84E-002
CO-58	Not Detected	---------	3.11E-002
CO-60	Not Detected	---------	2.98E-002
CR-51	Not Detected	---------	3.20E-001
CS-134	Not Detected	---------	3.83E-002
CS-137	Not Detected	---------	2.62E-002
EU-152	Not Detected	---------	8.14E-002
EU-154	Not Detected	---------	1.41E-001
EU-155	Not Detected	---------	1.20E-001
FE-59	Not Detected	---------	7.76E-002
GD-153	Not Detected	---------	9.10E-002
HG-203	Not Detected	---------	3.66E-002
I-131	Not Detected	---------	1.26E-001
IR-192	Not Detected	---------	2.85E-002
K-40	1.64E+001	2.21E+000	2.73E-001
MN-52	Not Detected	---------	2.82E-001
MN-54	Not Detected	---------	2.95E-002
MO-99	Not Detected	---------	2.55E+001
NA-22	Not Detected	---------	3.44E-002
NA-24	Not Detected	---------	6.81E+007
ND-147	Not Detected	---------	5.39E-001
NI-57	Not Detected	---------	3.59E+002
RU-103	Not Detected	---------	3.26E-002
RU-106	Not Detected	---------	2.34E-001
SB-122	Not Detected	---------	4.59E+000
SB-124	Not Detected	---------	2.93E-002
SB-125	Not Detected	---------	7.09E-002
SN-113	Not Detected	---------	3.50E-002
SR-85	Not Detected	---------	3.68E-002
TA-182	Not Detected	---------	1.49E-001
TA-183	Not Detected	---------	4.57E+000
TL-201	Not Detected	---------	1.18E+001
Y-88	Not Detected	---------	2.27E-002
ZN-65	Not Detected	---------	9.30E-002
ZR-95	Not Detected	---------	5.29E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 2:10:56 AM

* Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060052-003
Lab Sample ID : 20144506

Sample Description : 6580/1037-SP1-BH1-5-S
Sample Quantity : 789.600 gram
Sample Date/Time : 9/26/02 2:10:00 PM
Acquire Start Date/Time : 10/16/02 12:30:41 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6002 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	5.72E-001
RA-226	1.23E+000	4.22E-001	5.82E-001
PB-214	5.42E-001	8.25E-002	4.84E-002
BI-214	5.04E-001	8.28E-002	4.38E-002
PB-210	Not Detected	---	2.33E+001
TH-232	4.92E-001	2.46E-001	1.75E-001
RA-228	5.70E-001	1.12E-001	1.01E-001
AC-228	4.98E-001	1.06E-001	8.70E-002
TH-228	4.03E-001	3.67E-001	5.80E-001
RA-224	6.79E-001	1.56E-001	6.37E-002
PB-212	5.45E-001	8.10E-002	3.30E-002
BI-212	3.71E-001	2.16E-001	3.20E-001
TL-208	4.61E-001	8.27E-002	6.05E-002
U-235	Not Detected	---	1.85E-001
TH-231	Not Detected	---	9.26E+000
PA-231	Not Detected	---	1.05E+000
TH-227	Not Detected	---	2.69E-001
RA-223	Not Detected	---	4.61E-001
RN-219	Not Detected	---	2.94E-001
PB-211	Not Detected	---	6.64E-001
TL-207	Not Detected	---	1.03E+001
AM-241	Not Detected	---	3.35E-001
PU-239	Not Detected	---	3.34E+002
NP-237	Not Detected	---	1.83E+000
PA-233	Not Detected	---	4.50E-002
TH-229	Not Detected	---	1.97E-001

[Summary Report] - Sample ID: : 20144506

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.64E-002
AG-110m	Not Detected	---------	2.30E-002
BA-133	Not Detected	---------	3.84E-002
BE-7	Not Detected	---------	2.24E-001
CD-115	Not Detected	---------	2.11E+001
CE-139	Not Detected	---------	2.49E-002
CE-141	Not Detected	---------	6.11E-002
CE-144	Not Detected	---------	2.00E-001
CM-243	Not Detected	---------	1.33E-001
CO-56	Not Detected	---------	3.14E-002
CO-57	Not Detected	---------	2.55E-002
CO-58	Not Detected	---------	2.89E-002
CO-60	Not Detected	---------	2.61E-002
CR-51	Not Detected	---------	2.93E-001
CS-134	Not Detected	---------	3.26E-002
CS-137	Not Detected	---------	2.35E-002
EU-152	Not Detected	---------	7.35E-002
EU-154	Not Detected	---------	1.22E-001
EU-155	Not Detected	---------	1.12E-001
FE-59	Not Detected	---------	7.41E-002
GD-153	Not Detected	---------	8.45E-002
HG-203	Not Detected	---------	3.11E-002
I-131	Not Detected	---------	1.17E-001
IR-192	Not Detected	---------	2.48E-002
K-40	1.63E+001	2.19E+000	2.39E-001
MN-52	Not Detected	---------	2.33E-001
MN-54	Not Detected	---------	2.78E-002
MO-99	Not Detected	---------	2.29E+001
NA-22	Not Detected	---------	3.26E-002
NA-24	Not Detected	---------	5.94E+007
ND-147	Not Detected	---------	4.96E-001
NI-57	Not Detected	---------	3.47E+002
RU-103	Not Detected	---------	2.98E-002
RU-106	Not Detected	---------	2.30E-001
SB-122	Not Detected	---------	4.36E+000
SB-124	Not Detected	---------	2.74E-002
SB-125	Not Detected	---------	6.37E-002
SN-113	Not Detected	---------	3.11E-002
SR-85	Not Detected	---------	3.37E-002
TA-182	Not Detected	---------	1.34E-001
TA-183	Not Detected	---------	4.04E+000
TL-201	Not Detected	---------	1.10E+001
Y-88	Not Detected	---------	2.29E-002
ZN-65	Not Detected	---------	8.46E-002
ZR-95	Not Detected	---------	4.83E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 3:52:55 AM

* Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060053-003
Lab Sample ID : 20144507

Sample Description : 6580/1037-SP1-BH1-10-S
Sample Quantity : 837.100 gram
Sample Date/Time : 9/26/02 2:25:00 PM
Acquire Start Date/Time : 10/16/02 2:12:40 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	5.63E-001
RA-226	9.67E-001	4.20E-001	6.14E-001
PB-214	5.50E-001	8.31E-002	4.85E-002
BI-214	4.72E-001	7.87E-002	4.58E-002
PB-210	Not Detected	---	2.28E+001
TH-232	5.11E-001	2.49E-001	1.58E-001
RA-228	4.97E-001	1.02E-001	1.06E-001
AC-228	5.22E-001	1.06E-001	7.83E-002
TH-228	7.41E-001	3.59E-001	5.26E-001
RA-224	6.17E-001	1.44E-001	6.21E-002
PB-212	5.74E-001	8.46E-002	3.02E-002
BI-212	6.57E-001	2.49E-001	3.35E-001
TL-208	5.37E-001	9.06E-002	5.75E-002
U-235	Not Detected	---	1.84E-001
TH-231	Not Detected	---	9.12E+000
PA-231	Not Detected	---	1.10E+000
TH-227	Not Detected	---	2.72E-001
RA-223	Not Detected	---	4.67E-001
RN-219	Not Detected	---	2.82E-001
PB-211	Not Detected	---	6.40E-001
TL-207	Not Detected	---	9.91E+000
AM-241	Not Detected	---	3.38E-001
PU-239	Not Detected	---	3.32E+002
NP-237	Not Detected	---	1.79E+000
PA-233	Not Detected	---	4.52E-002
TH-229	Not Detected	---	1.86E-001

[Summary Report] - Sample ID: : 20144507

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.76E-002
AG-110m	Not Detected	---------	2.28E-002
BA-133	Not Detected	---------	3.85E-002
BE-7	Not Detected	---------	2.32E-001
CD-115	Not Detected	---------	2.08E+001
CE-139	Not Detected	---------	2.49E-002
CE-141	Not Detected	---------	6.04E-002
CE-144	Not Detected	---------	1.90E-001
CM-243	Not Detected	---------	1.34E-001
CO-56	Not Detected	---------	3.04E-002
CO-57	Not Detected	---------	2.48E-002
CO-58	Not Detected	---------	2.82E-002
CO-60	Not Detected	---------	2.77E-002
CR-51	Not Detected	---------	2.83E-001
CS-134	Not Detected	---------	3.17E-002
CS-137	Not Detected	---------	2.28E-002
EU-152	Not Detected	---------	7.16E-002
EU-154	Not Detected	---------	1.28E-001
EU-155	Not Detected	---------	1.07E-001
FE-59	Not Detected	---------	7.08E-002
GD-153	Not Detected	---------	8.30E-002
HG-203	Not Detected	---------	3.24E-002
I-131	Not Detected	---------	1.17E-001
IR-192	Not Detected	---------	2.46E-002
K-40	1.80E+001	2.41E+000	2.19E-001
MN-52	Not Detected	---------	2.69E-001
MN-54	Not Detected	---------	2.68E-002
MO-99	Not Detected	---------	2.37E+001
NA-22	Not Detected	---------	3.19E-002
NA-24	Not Detected	---------	6.16E+007
ND-147	Not Detected	---------	5.06E-001
NI-57	Not Detected	---------	3.26E+002
RU-103	Not Detected	---------	2.92E-002
RU-106	Not Detected	---------	2.06E-001
SB-122	Not Detected	---------	4.55E+000
SB-124	Not Detected	---------	2.67E-002
SB-125	Not Detected	---------	6.49E-002
SN-113	Not Detected	---------	3.23E-002
SR-85	Not Detected	---------	3.38E-002
TA-182	Not Detected	---------	1.39E-001
TA-183	Not Detected	---------	4.10E+000
TL-201	Not Detected	---------	1.09E+001
Y-88	Not Detected	---------	2.16E-002
ZN-65	Not Detected	---------	8.56E-002
ZR-95	Not Detected	---------	5.03E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 5:34:54 AM

* Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060055-003
Lab Sample ID : 20144508

Sample Description : STACK S. PIT/1098-SP1-BH1-10-S
Sample Quantity : 844.600 gram
Sample Date/Time : 10/02/02 9:50:00 AM
Acquire Start Date/Time : 10/16/02 3:54:38 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---------	6.29E-001
RA-226	1.25E+000	4.65E-001	6.60E-001
PB-214	7.07E-001	1.03E-001	5.45E-002
BI-214	6.48E-001	1.02E-001	4.59E-002
PB-210	Not Detected	---------	2.42E+001
TH-232	6.52E-001	3.10E-001	1.75E-001
RA-228	7.80E-001	1.39E-001	1.07E-001
AC-228	7.17E-001	1.35E-001	8.78E-002
TH-228	8.63E-001	3.91E-001	5.66E-001
RA-224	8.44E-001	1.85E-001	7.03E-002
PB-212	7.64E-001	1.10E-001	3.29E-002
BI-212	7.71E-001	2.59E-001	3.34E-001
TL-208	6.87E-001	1.11E-001	6.70E-002
U-235	Not Detected	---------	1.96E-001
TH-231	Not Detected	---------	9.71E+000
PA-231	Not Detected	---------	1.13E+000
TH-227	Not Detected	---------	3.07E-001
RA-223	Not Detected	---------	3.60E-001
RN-219	Not Detected	---------	2.96E-001
PB-211	Not Detected	---------	6.89E-001
TL-207	Not Detected	---------	9.94E+000
AM-241	Not Detected	---------	3.57E-001
PU-239	Not Detected	---------	3.54E+002
NP-237	Not Detected	---------	1.99E+000
PA-233	Not Detected	---------	4.56E-002
TH-229	Not Detected	---------	2.04E-001

[Summary Report] - Sample ID: : 20144508

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.98E-002
AG-110m	Not Detected	---------	2.33E-002
BA-133	Not Detected	---------	4.16E-002
BE-7	Not Detected	---------	2.25E-001
CD-115	Not Detected	---------	3.92E+000
CE-139	Not Detected	---------	2.56E-002
CE-141	Not Detected	---------	5.72E-002
CE-144	Not Detected	---------	1.97E-001
CM-243	Not Detected	---------	1.42E-001
CO-56	Not Detected	---------	2.93E-002
CO-57	Not Detected	---------	2.58E-002
CO-58	Not Detected	---------	2.77E-002
CO-60	Not Detected	---------	2.83E-002
CR-51	Not Detected	---------	2.64E-001
CS-134	Not Detected	---------	3.50E-002
CS-137	Not Detected	---------	2.50E-002
EU-152	Not Detected	---------	7.57E-002
EU-154	Not Detected	---------	1.37E-001
EU-155	Not Detected	---------	1.19E-001
FE-59	Not Detected	---------	6.57E-002
GD-153	Not Detected	---------	8.69E-002
HG-203	Not Detected	---------	3.12E-002
I-131	Not Detected	---------	7.63E-002
IR-192	Not Detected	---------	2.41E-002
K-40	1.57E+001	2.11E+000	2.02E-001
MN-52	Not Detected	---------	1.25E-001
MN-54	Not Detected	---------	2.78E-002
MO-99	Not Detected	---------	5.47E+000
NA-22	Not Detected	---------	3.24E-002
NA-24	Not Detected	---------	1.09E+005
ND-147	Not Detected	---------	3.59E-001
NI-57	Not Detected	---------	2.40E+001
RU-103	Not Detected	---------	2.72E-002
RU-106	Not Detected	---------	2.32E-001
SB-122	Not Detected	---------	1.06E+000
SB-124	Not Detected	---------	2.54E-002
SB-125	Not Detected	---------	6.64E-002
SN-113	Not Detected	---------	3.23E-002
SR-85	Not Detected	---------	3.16E-002
TA-182	Not Detected	---------	1.30E-001
TA-183	Not Detected	---------	1.99E+000
TL-201	Not Detected	---------	3.07E+000
Y-88	Not Detected	---------	2.06E-002
ZN-65	Not Detected	---------	8.41E-002
ZR-95	Not Detected	---------	4.55E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 7:16:54 AM

Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060056-003
Lab Sample ID : 20144509

Sample Description : STACK S. PIT/1098-SP1-BH1-15-S
Sample Quantity : 825.700 gram
Sample Date/Time : 10/02/02 10:15:00 AM
Acquire Start Date/Time : 10/16/02 5:36:38 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	6.50E-001
RA-226	2.21E+000	5.30E-001	6.33E-001
PB-214	7.86E-001	1.12E-001	5.18E-002
BI-214	6.55E-001	1.03E-001	4.65E-002
PB-210	Not Detected	---	2.47E+001
TH-232	7.69E-001	3.61E-001	1.83E-001
RA-228	8.33E-001	1.45E-001	9.91E-002
AC-228	8.23E-001	1.48E-001	8.08E-002
TH-228	1.01E+000	3.99E-001	5.59E-001
RA-224	9.81E-001	2.09E-001	6.75E-002
PB-212	8.25E-001	1.19E-001	3.40E-002
BI-212	9.83E-001	2.92E-001	3.59E-001
TL-208	7.73E-001	1.22E-001	6.94E-002
U-235	8.44E-002	1.64E-001	2.08E-001
TH-231	Not Detected	---	1.03E+001
PA-231	Not Detected	---	1.21E+000
TH-227	Not Detected	---	3.19E-001
RA-223	Not Detected	---	3.68E-001
RN-219	Not Detected	---	3.11E-001
PB-211	Not Detected	---	6.79E-001
TL-207	Not Detected	---	1.02E+001
AM-241	Not Detected	---	3.91E-001
PU-239	Not Detected	---	3.82E+002
NP-237	Not Detected	---	2.04E+000
PA-233	Not Detected	---	4.75E-002
TH-229	Not Detected	---	2.09E-001

[Summary Report] - Sample ID: : 20144509

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	3.08E-002
AG-110m	Not Detected	---------	2.40E-002
BA-133	Not Detected	---------	4.28E-002
BE-7	Not Detected	---------	2.44E-001
CD-115	Not Detected	---------	4.31E+000
CE-139	Not Detected	---------	2.71E-002
CE-141	Not Detected	---------	6.00E-002
CE-144	Not Detected	---------	2.15E-001
CM-243	Not Detected	---------	1.52E-001
CO-56	Not Detected	---------	3.06E-002
CO-57	Not Detected	---------	2.74E-002
CO-58	Not Detected	---------	2.88E-002
CO-60	Not Detected	---------	2.88E-002
CR-51	Not Detected	---------	2.75E-001
CS-134	Not Detected	---------	3.54E-002
CS-137	Not Detected	---------	2.56E-002
EU-152	Not Detected	---------	8.01E-002
EU-154	Not Detected	---------	1.42E-001
EU-155	Not Detected	---------	1.24E-001
FE-59	Not Detected	---------	6.60E-002
GD-153	Not Detected	---------	9.06E-002
HG-203	Not Detected	---------	3.31E-002
I-131	Not Detected	---------	7.68E-002
IR-192	Not Detected	---------	2.56E-002
K-40	1.60E+001	2.15E+000	2.46E-001
MN-52	Not Detected	---------	1.36E-001
MN-54	Not Detected	---------	2.80E-002
MO-99	Not Detected	---------	6.12E+000
NA-22	Not Detected	---------	3.34E-002
NA-24	Not Detected	---------	1.24E+005
ND-147	Not Detected	---------	3.64E-001
NI-57	Not Detected	---------	2.63E+001
RU-103	Not Detected	---------	2.91E-002
RU-106	Not Detected	---------	2.29E-001
SB-122	Not Detected	---------	1.09E+000
SB-124	Not Detected	---------	2.66E-002
SB-125	Not Detected	---------	7.01E-002
SN-113	Not Detected	---------	3.53E-002
SR-85	Not Detected	---------	3.49E-002
TA-182	Not Detected	---------	1.40E-001
TA-183	Not Detected	---------	2.19E+000
TL-201	Not Detected	---------	3.25E+000
Y-88	Not Detected	---------	2.21E-002
ZN-65	Not Detected	---------	8.86E-002
ZR-95	Not Detected	---------	5.17E-002

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Sandia National Laboratories

Radiation Protection Sample Diagnostics Program

10/16/02 8:58:54 AM

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* Analyzed by: 10/16/02 Reviewed by: 10/16/02 *

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Customer : SANDERS M (6135)
Customer Sample ID : 060057-003
Lab Sample ID : 20144510

Sample Description : 6590/1112-SP1-BH1-15-S
Sample Quantity : 720.700 gram
Sample Date/Time : 10/11/02 9:55:00 AM
Acquire Start Date/Time : 10/16/02 7:18:39 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

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Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	6.81E-001
RA-226	1.79E+000	4.95E-001	6.30E-001
PB-214	6.61E-001	9.97E-002	5.87E-002
BI-214	5.81E-001	9.58E-002	5.35E-002
PB-210	Not Detected	---	2.64E+001
TH-232	7.15E-001	3.41E-001	1.93E-001
RA-228	8.13E-001	1.48E-001	1.12E-001
AC-228	7.06E-001	1.38E-001	9.84E-002
TH-228	7.72E-001	4.14E-001	6.17E-001
RA-224	9.11E-001	2.01E-001	7.50E-002
PB-212	8.20E-001	1.19E-001	3.50E-002
BI-212	7.44E-001	2.54E-001	3.22E-001
TL-208	7.58E-001	1.41E-001	1.30E-001
U-235	Not Detected	---	2.18E-001
TH-231	Not Detected	---	1.07E+001
PA-231	Not Detected	---	1.29E+000
TH-227	Not Detected	---	3.40E-001
RA-223	Not Detected	---	2.24E-001
RN-219	Not Detected	---	3.30E-001
PB-211	Not Detected	---	7.19E-001
TL-207	Not Detected	---	1.16E+001
AM-241	Not Detected	---	4.04E-001
PU-239	Not Detected	---	3.85E+002
NP-237	Not Detected	---	2.15E+000
PA-233	Not Detected	---	5.21E-002
TH-229	Not Detected	---	2.21E-001

[Summary Report] - Sample ID: : 20144510

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)	
AG-108m	Not Detected	---------	3.19E-002	
AG-110m	Not Detected	---------	2.41E-002	
BA-133	Not Detected	---------	4.39E-002	
BE-7	Not Detected	---------	2.20E-001	
CD-115	Not Detected	---------	2.76E-001	
CE-139	Not Detected	---------	2.71E-002	
CE-141	Not Detected	---------	5.20E-002	
CE-144	Not Detected	---------	2.15E-001	
CM-243	Not Detected	---------	1.57E-001	
CO-56	Not Detected	---------	2.58E-002	
CO-57	Not Detected	---------	2.79E-002	
CO-58	Not Detected	---------	2.82E-002	
CO-60	Not Detected	---------	3.21E-002	
CR-51	Not Detected	---------	2.28E-001	
CS-134	Not Detected	---------	3.78E-002	
CS-137	Not Detected	---------	2.63E-002	
EU-152	Not Detected	---------	8.27E-002	
EU-154	Not Detected	---------	1.47E-001	
EU-155	Not Detected	---------	1.30E-001	
FE-59	Not Detected	---------	6.15E-002	
GD-153	Not Detected	---------	9.26E-002	
HG-203	Not Detected	---------	3.03E-002	
I-131	Not Detected	---------	3.92E-002	
IR-192	Not Detected	---------	2.50E-002	
K-40	1.68E+001	2.27E+000	2.62E-001	
MN-52	Not Detected	---------	4.95E-002	
MN-54	Not Detected	---------	1.73E-002	
MO-99	Not Detected	---------	6.54E-001	
NA-22	Not Detected	---------	3.53E-002	
NA-24	Not Detected	---------	6.33E+000	
ND-147	Not Detected	---------	2.15E-001	
NI-57	~~5.29E-001~~	~~2.15E-001~~	2.70E-001	NOT DETECTED KS 10-10-02
RU-103	Not Detected	---------	2.54E-002	
RU-106	Not Detected	---------	2.42E-001	
SB-122	Not Detected	---------	1.21E-001	
SB-124	Not Detected	---------	2.67E-002	
SB-125	Not Detected	---------	7.13E-002	
SN-113	Not Detected	---------	3.26E-002	
SR-85	Not Detected	---------	3.29E-002	
TA-182	Not Detected	---------	1.34E-001	
TA-183	Not Detected	---------	6.75E-001	
TL-201	Not Detected	---------	4.53E-001	
Y-88	Not Detected	---------	2.69E-002	
ZN-65	Not Detected	---------	8.81E-002	
ZR-95	Not Detected	---------	4.91E-002	

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 10:41:03 AM

* Analyzed by: [redacted] 10/17/02 Reviewed by: [redacted] 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060058-003
Lab Sample ID : 20144511

Sample Description : 6590/1112-SP1-BH1-20-S
Sample Quantity : 810.800 gram
Sample Date/Time : 10/11/02 10:10:00 AM
Acquire Start Date/Time : 10/16/02 9:00:37 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	6.21E-001
RA-226	1.56E+000	4.76E-001	6.35E-001
PB-214	6.41E-001	9.66E-002	5.90E-002
BI-214	5.53E-001	9.01E-002	4.85E-002
PB-210	Not Detected	---	2.40E+001
TH-232	6.81E-001	3.26E-001	1.88E-001
RA-228	8.25E-001	1.46E-001	1.07E-001
AC-228	6.61E-001	1.27E-001	8.68E-002
TH-228	7.89E-001	3.84E-001	5.64E-001
RA-224	8.63E-001	1.89E-001	6.82E-002
PB-212	7.48E-001	1.09E-001	3.30E-002
BI-212	7.76E-001	2.74E-001	3.61E-001
TL-208	6.66E-001	1.09E-001	6.90E-002
U-235	Not Detected	---	2.01E-001
TH-231	Not Detected	---	9.77E+000
PA-231	Not Detected	---	1.17E+000
TH-227	Not Detected	---	3.12E-001
RA-223	Not Detected	---	2.04E-001
RN-219	Not Detected	---	3.01E-001
PB-211	Not Detected	---	6.81E-001
TL-207	Not Detected	---	1.11E+001
AM-241	Not Detected	---	3.76E-001
PU-239	Not Detected	---	3.65E+002
NP-237	Not Detected	---	1.93E+000
PA-233	Not Detected	---	4.73E-002
TH-229	Not Detected	---	2.10E-001

[Summary Report] - Sample ID: : 20144511

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.93E-002
AG-110m	Not Detected	---------	2.45E-002
BA-133	Not Detected	---------	4.20E-002
BE-7	Not Detected	---------	2.05E-001
CD-115	Not Detected	---------	2.58E-001
CE-139	Not Detected	---------	2.48E-002
CE-141	Not Detected	---------	4.81E-002
CE-144	Not Detected	---------	2.01E-001
CM-243	Not Detected	---------	1.48E-001
CO-56	Not Detected	---------	2.64E-002
CO-57	Not Detected	---------	2.62E-002
CO-58	Not Detected	---------	2.52E-002
CO-60	Not Detected	---------	2.73E-002
CR-51	Not Detected	---------	2.15E-001
CS-134	Not Detected	---------	3.42E-002
CS-137	Not Detected	---------	2.67E-002
EU-152	Not Detected	---------	7.75E-002
EU-154	Not Detected	---------	1.35E-001
EU-155	Not Detected	---------	1.15E-001
FE-59	Not Detected	---------	6.26E-002
GD-153	Not Detected	---------	8.71E-002
HG-203	Not Detected	---------	2.84E-002
I-131	Not Detected	---------	3.58E-002
IR-192	Not Detected	---------	2.39E-002
K-40	1.62E+001	2.18E+000	2.18E-001
MN-52	Not Detected	---------	4.89E-002
MN-54	Not Detected	---------	2.65E-002
MO-99	Not Detected	---------	6.46E-001
NA-22	Not Detected	---------	3.21E-002
NA-24	Not Detected	---------	6.72E+000
ND-147	Not Detected	---------	2.11E-001
NI-57	Not Detected	---------	2.19E-001
RU-103	Not Detected	---------	2.40E-002
RU-106	Not Detected	---------	2.27E-001
SB-122	Not Detected	---------	1.08E-001
SB-124	Not Detected	---------	2.40E-002
SB-125	Not Detected	---------	6.73E-002
SN-113	Not Detected	---------	3.20E-002
SR-85	Not Detected	---------	3.17E-002
TA-182	Not Detected	---------	1.26E-001
TA-183	Not Detected	---------	6.33E-001
TL-201	Not Detected	---------	4.29E-001
Y-88	Not Detected	---------	2.35E-002
ZN-65	Not Detected	---------	8.13E-002
ZR-95	Not Detected	---------	4.50E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 12:23:08 PM

Analyzed by: [redacted] 10/17/02 Reviewed by: [redacted] 10/11/02

Customer : SANDERS M (6135)
Customer Sample ID : 060059-003
Lab Sample ID : 20144512

Sample Description : 6595/1104-SP1-BH1-11-S
Sample Quantity : 1290.900 gram
Sample Date/Time : 10/01/02 11:00:00 AM
Acquire Start Date/Time : 10/16/02 10:42:51 AM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	4.54E-001
RA-226	1.10E+000	3.15E-001	4.12E-001
PB-214	5.62E-001	7.97E-002	3.79E-002
BI-214	4.82E-001	7.49E-002	3.36E-002
PB-210	Not Detected	---	1.74E+001
TH-232	5.12E-001	2.42E-001	1.33E-001
RA-228	5.27E-001	9.45E-002	8.23E-002
AC-228	4.74E-001	9.16E-002	6.72E-002
TH-228	5.51E-001	2.75E-001	4.08E-001
RA-224	6.56E-001	1.38E-001	3.69E-002
PB-212	5.08E-001	7.35E-002	2.41E-002
BI-212	5.28E-001	1.82E-001	2.39E-001
TL-208	4.53E-001	7.45E-002	4.95E-002
U-235	Not Detected	---	1.47E-001
TH-231	Not Detected	---	7.09E+000
PA-231	Not Detected	---	8.59E-001
TH-227	Not Detected	---	2.06E-001
RA-223	Not Detected	---	2.75E-001
RN-219	Not Detected	---	2.09E-001
PB-211	Not Detected	---	4.73E-001
TL-207	Not Detected	---	7.22E+000
AM-241	Not Detected	---	2.70E-001
PU-239	Not Detected	---	2.72E+002
NP-237	Not Detected	---	1.42E+000
PA-233	Not Detected	---	3.44E-002
TH-229	Not Detected	---	1.53E-001

[Summary Report] - Sample ID: : 20144512

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.11E-002
AG-110m	Not Detected	---------	1.70E-002
BA-133	Not Detected	---------	2.98E-002
BE-7	Not Detected	---------	1.67E-001
CD-115	Not Detected	---------	4.08E+000
CE-139	Not Detected	---------	1.94E-002
CE-141	Not Detected	---------	4.38E-002
CE-144	Not Detected	---------	1.51E-001
CM-243	Not Detected	---------	1.04E-001
CO-56	Not Detected	---------	2.00E-002
CO-57	Not Detected	---------	1.96E-002
CO-58	Not Detected	---------	2.04E-002
CO-60	Not Detected	---------	2.10E-002
CR-51	Not Detected	---------	1.93E-001
CS-134	Not Detected	---------	2.46E-002
CS-137	Not Detected	---------	1.83E-002
EU-152	Not Detected	---------	5.72E-002
EU-154	Not Detected	---------	9.74E-002
EU-155	Not Detected	---------	8.49E-002
FE-59	Not Detected	---------	4.62E-002
GD-153	Not Detected	---------	6.43E-002
HG-203	Not Detected	---------	2.31E-002
I-131	Not Detected	---------	5.90E-002
IR-192	Not Detected	---------	1.83E-002
K-40	1.28E+001	1.71E+000	1.72E-001
MN-52	Not Detected	---------	1.10E-001
MN-54	Not Detected	---------	1.95E-002
MO-99	Not Detected	---------	5.41E+000
NA-22	Not Detected	---------	2.30E-002
NA-24	Not Detected	---------	2.90E+005
ND-147	Not Detected	---------	2.79E-001
NI-57	Not Detected	---------	3.01E+001
RU-103	Not Detected	---------	1.99E-002
RU-106	Not Detected	---------	1.59E-001
SB-122	Not Detected	---------	1.07E+000
SB-124	Not Detected	---------	1.94E-002
SB-125	Not Detected	---------	4.86E-002
SN-113	Not Detected	---------	2.23E-002
SR-85	Not Detected	---------	2.38E-002
TA-182	Not Detected	---------	9.57E-002
TA-183	Not Detected	---------	1.78E+000
TL-201	Not Detected	---------	3.02E+000
Y-88	Not Detected	---------	1.65E-002
ZN-65	Not Detected	---------	6.07E-002
ZR-95	Not Detected	---------	3.45E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/15/02 3:03:48 PM

Analyzed by: 10/15/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060060-003
Lab Sample ID : 20144513

Sample Description : 6595/1104-SP1-BH1-16-S
Sample Quantity : 1170.500 gram
Sample Date/Time : 10/01/02 11:30:00 AM
Acquire Start Date/Time : 10/15/02 1:23:29 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6004 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	5.07E-001
RA-226	1.68E+000	4.09E-001	4.98E-001
PB-214	6.24E-001	8.89E-002	4.43E-002
BI-214	5.64E-001	8.68E-002	3.63E-002
PB-210	Not Detected	---	1.91E+001
TH-232	5.50E-001	2.60E-001	1.43E-001
RA-228	6.55E-001	1.13E-001	8.58E-002
AC-228	6.60E-001	1.20E-001	7.39E-002
TH-228	5.71E-001	2.82E-001	4.16E-001
RA-224	8.40E-001	1.74E-001	4.68E-002
PB-212	6.78E-001	9.71E-002	2.73E-002
BI-212	7.63E-001	2.14E-001	2.54E-001
TL-208	6.09E-001	9.57E-002	5.54E-002
U-235	Not Detected	---	1.67E-001
TH-231	Not Detected	---	8.23E+000
PA-231	Not Detected	---	9.70E-001
TH-227	Not Detected	---	2.48E-001
RA-223	Not Detected	---	3.01E-001
RN-219	Not Detected	---	2.49E-001
PB-211	Not Detected	---	5.64E-001
TL-207	Not Detected	---	8.50E+000
AM-241	Not Detected	---	2.93E-001
PU-239	Not Detected	---	2.97E+002
NP-237	Not Detected	---	1.62E+000
PA-233	Not Detected	---	3.84E-002
TH-229	Not Detected	---	1.71E-001

[Summary Report] - Sample ID: : 20144513

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---------	2.47E-002
AG-110m	Not Detected	---------	1.92E-002
BA-133	Not Detected	---------	3.27E-002
BE-7	Not Detected	---------	1.77E-001
CD-115	Not Detected	---------	3.49E+000
CE-139	Not Detected	---------	2.17E-002
CE-141	Not Detected	---------	4.89E-002
CE-144	Not Detected	---------	1.67E-001
CM-243	Not Detected	---------	1.14E-001
CO-56	Not Detected	---------	2.27E-002
CO-57	Not Detected	---------	2.20E-002
CO-58	Not Detected	---------	2.25E-002
CO-60	Not Detected	---------	2.22E-002
CR-51	Not Detected	---------	2.11E-001
CS-134	Not Detected	---------	2.76E-002
CS-137	Not Detected	---------	2.02E-002
EU-152	Not Detected	---------	6.45E-002
EU-154	Not Detected	---------	1.14E-001
EU-155	Not Detected	---------	9.61E-002
FE-59	Not Detected	---------	5.50E-002
GD-153	Not Detected	---------	7.46E-002
HG-203	Not Detected	---------	2.52E-002
I-131	Not Detected	---------	6.19E-002
IR-192	Not Detected	---------	2.02E-002
K-40	1.38E+001	1.84E+000	1.82E-001
MN-52	Not Detected	---------	1.07E-001
MN-54	Not Detected	---------	2.23E-002
MO-99	Not Detected	---------	4.95E+000
NA-22	Not Detected	---------	2.56E-002
NA-24	Not Detected	---------	1.26E+005
ND-147	Not Detected	---------	3.00E-001
NI-57	Not Detected	---------	2.30E+001
RU-103	Not Detected	---------	2.21E-002
RU-106	Not Detected	---------	1.76E-001
SB-122	Not Detected	---------	9.07E-001
SB-124	Not Detected	---------	2.04E-002
SB-125	Not Detected	---------	5.48E-002
SN-113	Not Detected	---------	2.61E-002
SR-85	Not Detected	---------	2.59E-002
TA-182	Not Detected	---------	1.07E-001
TA-183	Not Detected	---------	1.70E+000
TL-201	Not Detected	---------	2.74E+000
Y-88	Not Detected	---------	1.77E-002
ZN-65	Not Detected	---------	6.73E-002
ZR-95	Not Detected	---------	3.77E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/15/02 9:04:47 PM

* Analyzed by: 10/16/02 Reviewed by: 10/16/02

Customer : SANDERS M (6135)
Customer Sample ID : 060062-001
Lab Sample ID : 20144503

Sample Description : 6596/1105-DW1-BH1-10-DU
Sample Quantity : 669.500 gram
Sample Date/Time : 9/26/02 9:35:00 AM
Acquire Start Date/Time : 10/15/02 7:24:31 PM
Detector Name : LAB02
Elapsed Live/Real Time : 6000 / 6003 seconds

Comments:
U-235/Ra-226 peaks not resolved. Either isotope may be overestimated.

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
U-238	Not Detected	---	7.50E-001
RA-226	2.06E+000	5.71E-001	7.32E-001
PB-214	8.40E-001	1.22E-001	6.25E-002
BI-214	6.92E-001	1.12E-001	5.92E-002
PB-210	Not Detected	---	2.84E+001
TH-232	7.48E-001	3.62E-001	2.24E-001
RA-228	8.84E-001	1.61E-001	1.29E-001
AC-228	8.97E-001	1.79E-001	1.44E-001
TH-228	7.82E-001	4.51E-001	6.79E-001
RA-224	1.09E+000	2.38E-001	8.58E-002
PB-212	9.12E-001	1.32E-001	4.01E-002
BI-212	1.16E+000	3.17E-001	3.57E-001
TL-208	7.54E-001	1.28E-001	8.80E-002
U-235	Not Detected	---	2.35E-001
TH-231	Not Detected	---	1.14E+001
PA-231	Not Detected	---	1.38E+000
TH-227	Not Detected	---	3.72E-001
RA-223	Not Detected	---	5.74E-001
RN-219	Not Detected	---	3.44E-001
PB-211	Not Detected	---	7.92E-001
TL-207	Not Detected	---	1.28E+001
AM-241	Not Detected	---	4.42E-001
PU-239	Not Detected	---	4.17E+002
NP-237	Not Detected	---	2.27E+000
PA-233	Not Detected	---	5.58E-002
TH-229	Not Detected	---	2.46E-001

[Summary Report] - Sample ID: : 20144503

Nuclide Name	Activity (pCi/gram)	2-sigma Error	MDA (pCi/gram)
AG-108m	Not Detected	---	3.47E-002
AG-110m	Not Detected	---	2.85E-002
BA-133	Not Detected	---	5.04E-002
BE-7	Not Detected	---	2.94E-001
CD-115	Not Detected	---	2.84E+001
CE-139	Not Detected	---	3.23E-002
CE-141	Not Detected	---	7.74E-002
CE-144	Not Detected	---	2.36E-001
CM-243	Not Detected	---	1.69E-001
CO-56	Not Detected	---	3.70E-002
CO-57	Not Detected	---	3.21E-002
CO-58	Not Detected	---	3.40E-002
CO-60	Not Detected	---	3.31E-002
CR-51	Not Detected	---	3.47E-001
CS-134	Not Detected	---	4.11E-002
CS-137	Not Detected	---	3.05E-002
EU-152	Not Detected	---	9.23E-002
EU-154	Not Detected	---	1.60E-001
EU-155	Not Detected	---	1.35E-001
FE-59	Not Detected	---	8.32E-002
GD-153	Not Detected	---	1.07E-001
HG-203	Not Detected	---	4.06E-002
I-131	Not Detected	---	1.38E-001
IR-192	Not Detected	---	2.97E-002
K-40	1.72E+001	2.32E+000	2.91E-001
MN-52	Not Detected	---	3.18E-001
MN-54	Not Detected	---	3.41E-002
MO-99	Not Detected	---	3.03E+001
NA-22	Not Detected	---	3.77E-002
NA-24	Not Detected	---	6.87E+007
ND-147	Not Detected	---	6.14E-001
NI-57	Not Detected	---	4.01E+002
RU-103	Not Detected	---	3.60E-002
RU-106	Not Detected	---	2.55E-001
SB-122	Not Detected	---	5.46E+000
SB-124	Not Detected	---	3.22E-002
SB-125	Not Detected	---	8.01E-002
SN-113	Not Detected	---	3.83E-002
SR-85	Not Detected	---	4.16E-002
TA-182	Not Detected	---	1.67E-001
TA-183	Not Detected	---	5.31E+000
TL-201	Not Detected	---	1.35E+001
Y-88	Not Detected	---	2.80E-002
ZN-65	Not Detected	---	1.04E-001
ZR-95	Not Detected	---	6.57E-002

Sandia National Laboratories
Radiation Protection Sample Diagnostics Program
10/16/02 3:40:03 PM

Analyzed by: 10/16/02 Reviewed by: 10/17/02

Customer : SANDERS M (6135)
Customer Sample ID : LAB_CONTROL_SAMPLE_USING_CG-134
Lab Sample ID : 20144514

Sample Description : MIXED_GAMMA_STANDARD_CG-134
Sample Quantity : 1.000 Each
Sample Date/Time : 11/01/90 12:00:00 PM
Acquire Start Date/Time : 10/16/02 3:29:46 PM
Detector Name : LAB02
Elapsed Live/Real Time : 600 / 604 seconds

Comments:

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
U-238	Not Detected	---	3.95E+003
RA-226	Not Detected	---	5.74E+003
PB-214	Not Detected	---	5.77E+002
BI-214	Not Detected	---	4.66E+002
PB-210	Not Detected	---	2.70E+005
TH-232	Not Detected	---	1.81E+003
RA-228	Not Detected	---	1.78E+003
AC-228	Not Detected	---	1.01E+003
TH-228	Not Detected	---	4.46E+005
RA-224	Not Detected	---	1.50E+004
PB-212	Not Detected	---	3.44E+004
BI-212	Not Detected	---	2.21E+005
TL-208	Not Detected	---	5.59E+004
U-235	Not Detected	---	1.50E+003
TH-231	Not Detected	---	6.93E+004
PA-231	Not Detected	---	1.22E+004
TH-227	Not Detected	---	2.60E+003
RA-223	Not Detected	---	1.00E+026
RN-219	Not Detected	---	5.59E+003
PB-211	Not Detected	---	1.29E+004
TL-207	Not Detected	---	1.68E+005
AM-241	8.25E+004	1.22E+004	3.96E+003
PU-239	Not Detected	---	2.67E+006
NP-237	Not Detected	---	1.42E+004
PA-233	Not Detected	---	5.25E+002
TH-229	Not Detected	---	1.49E+003

[Summary Report] - Sample ID: : 20144514

Nuclide Name	Activity (pCi/Each)	2-sigma Error	MDA (pCi/Each)
AG-106m	Not Detected	---------	2.31E+002
AG-110m	Not Detected	---------	2.41E+008
BA-133	Not Detected	---------	7.79E+002
BE-7	Not Detected	---------	1.00E+026
CD-115	Not Detected	---------	1.00E+026
CE-139	Not Detected	---------	6.88E+011
CE-141	Not Detected	---------	1.00E+026
CE-144	Not Detected	---------	6.14E+007
CM-243	Not Detected	---------	1.90E+003
CO-56	Not Detected	---------	2.76E+019
CO-57	Not Detected	---------	1.33E+007
CO-58	Not Detected	---------	8.20E+020
CO-60	8.00E+004	1.04E+004	6.58E+002
CR-51	Not Detected	---------	1.00E+026
CS-134	Not Detected	---------	1.23E+004
CS-137	6.99E+004	8.85E+003	3.18E+002
EU-152	Not Detected	---------	1.08E+003
EU-154	Not Detected	---------	2.61E+003
EU-155	Not Detected	---------	5.10E+003
FE-59	Not Detected	---------	1.00E+026
GD-153	Not Detected	---------	1.73E+008
HG-203	Not Detected	---------	1.00E+026
I-131	Not Detected	---------	1.00E+026
IR-192	Not Detected	---------	1.55E+020
K-40	Not Detected	---------	1.17E+003
MN-52	Not Detected	---------	1.00E+026
MN-54	Not Detected	---------	4.11E+006
MO-99	Not Detected	---------	1.00E+026
NA-22	Not Detected	---------	3.55E+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	---------	7.93E+006
SB-122	Not Detected	---------	1.00E+026
SB-124	Not Detected	---------	1.00E+026
SB-125	Not Detected	---------	1.95E+004
SN-113	Not Detected	---------	9.78E+013
SR-85	Not Detected	---------	1.00E+026
TA-182	Not Detected	---------	2.00E+014
TA-183	Not Detected	---------	1.00E+026
TL-201	Not Detected	---------	1.00E+026
Y-88	Not Detected	---------	2.63E+014
ZN-65	Not Detected	---------	1.41E+008
ZR-95	Not Detected	---------	1.00E+026

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Sandia National Laboratories

Radiation Protection Sample Diagnostics Program

Quality Assurance Report

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Report Date : 10/16/02 3:40:11 PM
QA File : C:\GENIE2K\CAMFILES\LCS2.QAF
Analyst : RPREESE
Sample ID : 20144514
Sample Quantity : 1.00 Each
Sample Date : 11/01/90 12:00:00 PM
Measurement Date : 10/16/02 3:29:46 PM
Elapsed Live Time : 600 seconds
Elapsed Real Time : 604 seconds

Parameter	Mean	1S Error	New Value	< LU	SD	UD	BS >
AM-241 Activity	8.249E-002	3.507E-003	8.249E-002	<			>
CS-137 Activity	7.192E-002	2.766E-003	6.994E-002	<			>
CO-60 Activity	8.014E-002	4.117E-003	7.903E-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: _____ 10/16/02