

Nevada  
Environmental  
Restoration  
Project

DOE/NV--913



Closure Report for Corrective  
Action Unit 330: Areas 6, 22, and  
23 Tanks and Spill Sites, Nevada  
Test Site, Nevada

Controlled Copy No.: \_\_\_\_\_

Revision: 0

July 2003

Environmental Restoration  
Division

U.S. Department of Energy  
National Nuclear Security Administration  
Nevada Site Office

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**CLOSURE REPORT  
FOR CORRECTIVE ACTION UNIT 330:  
AREAS 6, 22, AND 23 TANKS AND SPILL SITES,  
NEVADA TEST SITE, NEVADA**

**Prepared for:  
U.S. Department of Energy  
National Nuclear Security Administration  
Nevada Site Office  
Work Performed Under Contract No. DE-AC08-96NV11718**

**Controlled Copy No: \_\_\_\_\_**

**Revision: 0**

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**CLOSURE REPORT  
FOR CORRECTIVE ACTION UNIT 330:  
AREAS 6, 22, AND 23 TANKS AND SPILL SITES,  
NEVADA TEST SITE, NEVADA**

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REVIEW SHEET

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## ACRONYMS AND ABBREVIATIONS

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AIP	Animal Investigation Program
AST	Aboveground Storage Tank
BN	Bechtel Nevada
bgs	below ground surface
CAS	Corrective Action Site(s)
CAU	Corrective Action Unit
CR	Closure Report
cm	centimeter(s)
COC	contaminant(s) of concern
COPC	contaminant(s) of potential concern
CSM	conceptual site model(s)
DOE/NV	U.S. Department of Energy, Nevada Operations Office
DQO	Data Quality Objective(s)
EPA	U.S. Environmental Protection Agency
FFACO	Federal Facility Agreement and Consent Order
ft	foot(feet)
gal	gallon(s)
in	inch(es)
L	liter(s)
m	meter(s)
m <sup>3</sup>	cubic meter(s)
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per Liter
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NNSA/NV	U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office
NTS	Nevada Test Site
PCB	Polychlorinated Biphenyls
pCi/g	picocurie per gram
pCi/L	picocurie per Liter

## **ACRONYMS AND ABBREVIATIONS (continued)**

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RCRA	Resource Conservation and Recovery Act
SAA	Satellite Accumulation Area
SAFER	Streamlined Approach for Environmental Restoration
SVOC	Semi-volatile Organic Compound(s)
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per Liter
UST	Underground Storage Tank
VOC	Volatile Organic Compound(s)
yd <sup>3</sup>	cubic yard(s)

## EXECUTIVE SUMMARY

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Corrective Action Unit (CAU) 330 consists of four Corrective Action Sites (CASs) located in Areas 6, 22, and 23 of the Nevada Test Site (NTS). The unit is listed in the Federal Facility Agreement and Consent Order (FFACO, 1996) as CAU 330: Areas 6, 22, and 23 Tanks and Spill Sites. CAU 330 consists of the following CASs:

- CAS 06-02-04, Underground Storage Tank (UST) and Piping
- CAS 22-99-06, Fuel Spill
- CAS 23-01-02, Large Aboveground Storage Tank (AST) Farm
- CAS 23-25-05, Asphalt Oil Spill/Tar Release

CAU 330 was closed in accordance with the FFACO and the Nevada Division of Environmental Protection-approved Streamlined Approach for Environmental Restoration Plan for CAU 330: Areas 6, 22, and 23 Tanks and Spill Sites, Nevada Test Site, Nevada (U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office [NNSA/NV], 2001). CAU 330 was closed by implementing the following corrective actions:

- CAS 06-02-04 was a UST and piping associated with Building 660. Total Petroleum Hydrocarbons (TPH) at concentrations greater than action levels were identified in the sludge at the bottom of the UST. The site was clean closed by excavating, removing, and disposing of the UST, the contents of the UST, and all associated piping. The excavations were backfilled with clean fill.
- CAS 22-99-06 was a waste oil release that occurred when Camp Desert Rock was an active facility (NNSA/NV, 2001). The site was clean closed by the removal and disposal of approximately 49.7 cubic meters (65 cubic yards) of TPH-impacted soil. The excavation was backfilled with clean fill.
- CAS 23-01-02 was a large AST Farm that provided gasoline and diesel storage in Area 23. The site was clean closed by demolishing the two ASTs, a fill stand, and associated piping using hydraulic shears. The metal was cut into manageable sized pieces with the majority of the scrap metal being recycled by a scrap metal vendor. The remaining smaller pieces were disposed of in the NTS Area 23 Sanitary Landfill. In addition, a small section of concrete, which was removed from the concrete pad to access the underground piping was disposed of in the NTS Area 9 U10c Landfill.
- CAS 23-25-05 is an asphalt oil spill/tar release located in a wash. The spill may be a result of the operation of an asphalt plant or an area where asphalt oil was stored in tanks (NNSA/NV, 2001). The site was clean closed by excavating the asphalt oil/ tar and removing all of the reinforced concrete from the wash. In addition, the site contained a 208 liter (55-gallon) drum containing a petroleum hydrocarbon product that exhibited a hazardous characteristic for ignitability was identified (U.S. Environmental Protection

Agency, 2002a). The contents of the drum were transferred to a Satellite Accumulation Area (SAA) and then transported to the Area 5 Hazardous Waste Storage Pad for off-site disposal.

## 1.0 INTRODUCTION

---

This Closure Report (CR) documents the activities performed to close Corrective Action Unit (CAU) 330: Areas 6, 22, and 23 Tanks and Spill Sites, in accordance with the Federal Facility Agreement and Consent Order (FFACO of 1996), and the Nevada Division of Environmental Protection (NDEP)-approved Streamlined Approach for Environmental Restoration (SAFER) Plan for CAU 330: Areas 6, 22, and 23 Tanks and Spill Sites, Nevada Test Site (NTS), Nevada (U.S. Department of Energy, National Nuclear Security Administration Nevada Operation Office [NNSA/NV], 2001). CAU 330 consists of the following four Corrective Action Sites (CASs): 06-02-04, 22-99-06, 23-01-02, and 23-25-05 (Figure 1).

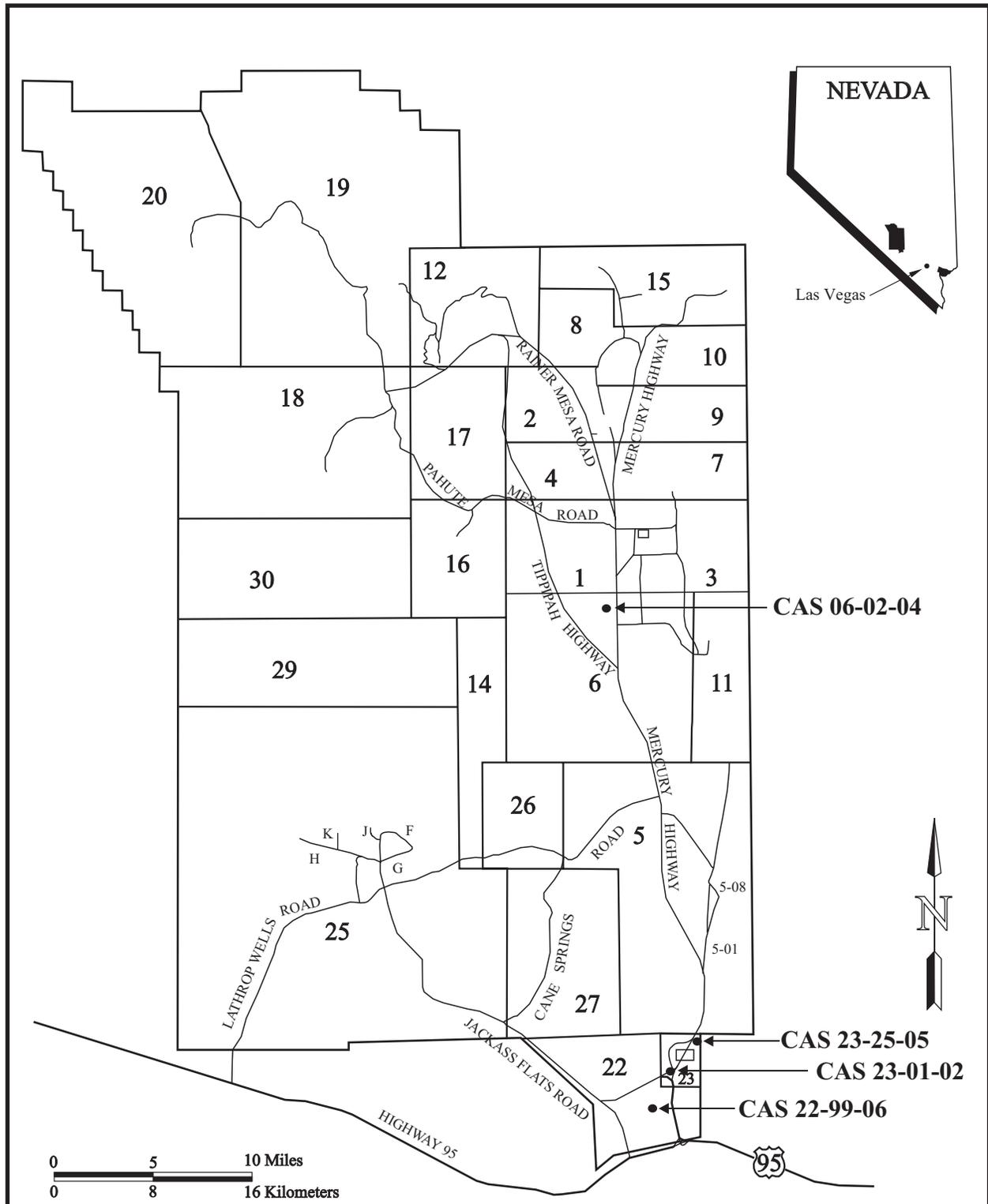
### 1.1 PURPOSE

The purpose of this CR is to document that the closure of CAU 330 complied with all of the closure requirements as stated in the NDEP-approved CAU 330 SAFER Plan (NNSA/NV, 2001). CAU 330 consists of four CASs which are located in Areas 6, 22, and 23 of the NTS. All four CASs were clean closed by removal of all impacted soil, material, concrete, tanks, piping, and a drum.

**CAS 06-02-04** included a Underground Storage Tank (UST) and piping located in Area 6 near an area that was part of the Animal Investigation Program (AIP) conducted by the U.S. Public Health Service. The purpose of the AIP was to study and perform tests on the cattle and wild animals on the NTS that were exposed to radionuclides. It is unknown if this tank was part of these operations (NNSA/NV, 2001). The site was clean closed by pumping the liquid and sludge from the UST for disposal, removing the UST and associated piping for disposal, and then backfilling excavations with clean fill to the existing grade.

**CAS 22-99-06** was a waste oil release near the T-1001 concrete foundation in Area 22, which occurred when Camp Desert Rock was an active facility (NNSA/NV, 2001). This site was clean closed by excavating and disposing of the Total Petroleum Hydrocarbons (TPH)-impacted soil followed by backfilling the excavation with clean fill to match the existing grade. In addition, general housekeeping debris was removed including wood and scrap metal.

**CAS 23-01-02** was a large Aboveground Storage Tank (AST) Farm in Area 23 that was constructed to provide gasoline and diesel storage. The site consisted of two 1,893 cubic meters (m<sup>3</sup>) (500,000 gallon [gal]) ASTs (gasoline and diesel), associated piping, fill stand, and a surrounding earthen berm (NNSA/NV, 2001). This site was clean closed by demolishing the two ASTs, associated piping, and fill stand using hydraulic shears. All scrap metal was cut into manageable sized pieces and then recycled by a scrap metal vendor. The soil from the earthen berm was used as clean fill for backfilling the CAS 22-99-06 excavation. The remaining soil from the earthen berm containing small scrap pieces of metal that could not be recycled was hauled to the NTS Area 23 Sanitary Landfill. A small section of the concrete pad that was removed to access a portion of the underground piping was disposed of in the NTS Area 9 U10c Landfill. In addition, six fuel pumps were disconnected from the system and were processed through the excess system as excess material.



**FIGURE 1**  
**CAU 330 CORRECTIVE ACTION SITE LOCATIONS**

**CAS 23-25-05** was an asphalt oil spill/tar release located in a wash behind warehouse row in Area 23 and was believed to be an area where an asphalt plant was in operation or where asphalt oil may be stored in tanks (NNSA/NV, 2001). In addition, a 208 liter (L) (55-gal) drum and large pieces of reinforced concrete were present in the wash. This site was clean closed by excavating the asphalt oil/tar and removing the large pieces of reinforced concrete from the wash. Although typical asphalt oil/tar contains TPH as the predominant contaminant, no Contaminants of Concern (COC) above action levels were identified in the soil directly underneath the spill/release. This was confirmed by past analytical sampling activities performed at the site (NNSA/NV, 2001). The contents of the drum were sampled and identified as being a petroleum hydrocarbon product that exhibited the hazardous characteristic for ignitability (U.S. Environmental Protection Agency [EPA], 2002a). The contents were repackaged, transferred to a Satellite Accumulation Area (SAA), and then transported to the Area 5 Hazardous Storage Pad for off-site disposal. No COC were identified in the area around the drum, confirming that the drum had not leaked to the ground.

## **1.2 SCOPE**

The closure strategy for CAU 330 was specified in the NDEP-approved SAFER Plan for CAU 330 (NNSA/NV, 2001). The implemented closure strategy consisted of the following activities.

### **CAS 06-02-04, UST and Piping**

- Samples of liquid and sludge were collected from the tank to identify any COC. TPH (diesel/oil) was identified in the sludge at levels slightly greater than the Nevada State Action Level of 100 milligrams per kilogram (mg/kg). The liquid contained no other COC above action levels.
- The liquid and sludge were pumped from the tank and disposed of in the NTS Area 23 Sewage Lagoon.
- The tank and associated piping were excavated. The tank was disposed of in the NTS Area 9 U10c Sanitary Landfill and the piping was disposed of in the NTS Area 6 Hydrocarbon Landfill.
- Samples were collected from the excavated soil, underneath the tank, and from each end of the tank to verify that the tank had not leaked into the surrounding soil. The excavated soil was used as clean fill for backfilling, as well as some additional clean fill from a borrow pit.
- The piping was removed from the excavation using a back-hoe. No staining was identified during the excavation activities.
- Soil samples were collected from underneath the piping at two different pipe joints to verify that the surrounding soil was free of COC.
- The pipe excavation was backfilled with clean fill to match the existing grade.

### **CAS 22-99-06, Fuel Spill**

- The TPH-impacted soil was excavated and disposed of in the NTS Area 6 Hydrocarbon Landfill.
- Soil samples were collected from the excavation to verify that clean up levels were met. As a result, TPH was not present in the soil at levels greater than the Nevada State Action Level of 100 mg/kg.
- The excavation was backfilled with clean fill transported from the CAS 23-01-02 earthen berm and then graded to the approximate surrounding topography.

### **CAS 23-01-02, Large AST Farm**

- The man-ways on the tanks were opened to verify that both ASTs were empty and clean. In addition, various spool covers and valve covers were opened on the associated piping to determine if any residual liquid remained in the piping.
- The two ASTs, fill stand, and associated piping were demolished using hydraulic shears.
- The scrap metal was cut into manageable sized pieces and recycled by a scrap metal vendor.
- The remaining smaller pieces of scrap metal that were mixed in the dirt from the earthen berm were transported to the NTS Area 23 Sanitary Landfill.
- The section of the concrete pad that was removed to access the underground piping was disposed of in the NTS Area 9 U10c Landfill.
- Samples were collected from underneath the asphalt pads to verify that fuel had not leaked from either AST. TPH was not present in the soils underneath the asphalt pads at levels greater than the Nevada State Action Level of 100 mg/kg.
- The site was graded to match the surrounding topography.

### **CAS 23-25-05, Asphalt Oil Spill/Tar Release**

- The asphalt oil/tar material was removed from the wash and disposed of in the NTS Area 6 Hydrocarbon Landfill.
- The large pieces of reinforced concrete were removed from the wash and disposed of in the NTS Area 9 U10c Sanitary Landfill.
- Samples were collected from the contents of the 208-L (55-gal) drum to characterize for disposal purposes. The contents were transferred to a container with no rust, stored in an SAA, and subsequently transported to the Area 5 Hazardous Storage Pad for off-site disposal.

- Soil samples were collected from around the drum to verify that the soil had not been contaminated by leaks or spills from the drum. Analytical results verified that the soil was clear of any COC.

### **1.3 CLOSURE REPORT CONTENTS**

This CR is divided into the following sections:

- Section 1.0 - Introduction
- Section 2.0 - Closure Activities
- Section 3.0 - Waste Disposition
- Section 4.0 - Closure Verification Results
- Section 5.0 - Conclusions and Recommendations
- Section 6.0 - References
- Appendix A - Data Quality Objectives (DQOs) for CAU 330
- Appendix B - Verification Sample Analytical Results
- Appendix C - Hazardous Waste Disposition Documentation
- Appendix D - Field Photographs
- Appendix E - Closure Certification
- Appendix F - As-Built Documentation
- Appendix G - Modifications to the Post-Closure Plan
- Appendix H - Nevada Environmental Restoration Project Document Review Sheet
- Distribution List

The following standard appendices are included in this CR per the FFACO CR outline but do not contain any material because they do not apply to closure of CAU 330:

- Closure Certification - Not applicable.
- As-Built Documentation - Not applicable, no engineered structures were constructed.
- Modifications to the Post-Closure Plan - Not Applicable. CAU 330 was clean closed; no post-closure monitoring is required.

This report was developed using information and guidance from the following documents:

- Streamlined Approach for Environmental Restoration Plan for Corrective Action Unit 330: Areas 6, 22, and 23 Tanks and Spill Sites, Nevada Test Site, Nevada (NNSA/NV, 2001).
- Nevada Environmental Restoration Project, Industrial Sites Quality Assurance Project Plan, Nevada Test Site, Nevada (NNSA/NV, 2002).

### **1.3.1 Data Quality Objectives**

The DQOs used for closure of CAU 330 were presented in Appendix A of the CAU 330 SAFER Plan (NNSA/NV, 2001) and are included as Appendix A of this report.

The general conceptual site models (CSM) as presented in the SAFER Plan (NNSA/NV, 2001) was applied to all the CASs in CAU 330 and assumed that any additional contamination was the result of both designed and accidental releases. The potential contamination would be restricted to those areas immediately beneath and/or adjacent to the system components (i.e., UST or AST). The extent of the potential contamination was dependent upon such variables as release volume, system design, geologic conditions, and nature of contaminants.

CAU 330 characterization activities determined that actual site conditions were in agreement with the CSM with the exception of CAS 23-01-02. No diesel spill was identified near the location of the diesel AST. This information is presented in the SAFER Plan (NNSA/NV, 2001).

Details of the DQO assessment are included in Section 4.1 of this report.

## 2.0 CLOSURE ACTIVITIES

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This section details the specific corrective action activities completed during the closure of CAU 330: Areas 6, 22, and 23 Tanks and Spill Sites. Copies of the analytical data for all collected soil samples are included in Appendix B.

### 2.1 DESCRIPTION OF CORRECTIVE ACTION ACTIVITIES

#### 2.1.1 Preplanning and Site Preparation

Closure of CAU 330 was completed using the NDEP-approved SAFER Plan (NNSA/NV, 2001). Prior to beginning closure activities, the following pre-field activities were completed:

- Preparation of National Environmental Policy Act documentation (checklist).
- Preparation of the Field Management Plan for Corrective Action Unit 330: Areas 6, 22, and 23 Tanks and Spill Sites, Nevada Test Site, Nevada, (Bechtel Nevada [BN], 2002a).
- Preparation of the Site-Specific Health and Safety Plan for Corrective Action Unit 330: Areas 6, 22, and 23 Tanks and Spill Sites, Nevada Test Site, (BN, 2002b).
- Preparation of the U.S. Department of Energy, National Nuclear Security Administration Nevada Operations Office (NNSA/NV) Real Estate/Operations Permit.
- Preparation of a BN Excavation and Penetration Permit.

The following is the scope of the closure actions implemented for CAU 330.

#### 2.1.2 CAS 06-02-04: UST and Piping

During site characterization activities conducted in 1994 by Reynolds Electrical and Engineering Company, Incorporated, one sample was collected of the liquid in the tank and analyzed for TPH, Toxicity Characteristic Leaching procedure (TCLP) Volatile Organic Compounds (VOCs), TCLP Semi-Volatile Organic Compounds (SVOCs), TCLP Resource Conservation and Recovery Act (RCRA) metals, pH, chlorinated compounds using a Clor-d-tect kit, gamma spectroscopy, plutonium 238/239, and tritium. All analytical results were below action levels for the liquid (NNSA/NV, 2001).

In December 2002, additional characterization samples were collected from the liquid and no COC were detected in the liquid. These samples (060204-T1, 060204-T2, and 060204-T) were analyzed for TPH, TCLP VOCs, TCLP SVOCs, TCLP RCRA metals, Polychlorinated Biphenyls (PCBs), gamma emitters, tritium, and gross alpha/beta emitters. The liquid sample results provided in Table 1 show that all analytical results were below action levels.

**TABLE 1 - ANALYTICAL RESULTS OF LIQUID FOR CAS 06-02-04**

SAMPLE IDENTIFICATION	GASOLINE RANGE <sup>a</sup> (µg/L) <sup>b</sup>	DIESEL RANGE <sup>a</sup> (µg/L)	OIL RANGE <sup>a</sup> (µg/L)	TPH <sup>a</sup> (µg/L)	TCLP <sup>c</sup> RCRA <sup>d</sup> METALS (µg/L)	TCLP VOCs <sup>e</sup> (mg/L) <sup>f</sup>	TCLP SVOCs <sup>g</sup> (mg/L)	PCBs <sup>h</sup> (µg/L)	GAMMA EMITTERS (pCi/L) <sup>i</sup>	GROSS ALPHA/BETA EMITTERS and TRITIUM (pCi/L)
<b>Sample Delivery Groups 1809 and 1810</b>										
060204-T1 (Liquid)	ND <sup>j</sup>	ND	ND	ND	< Action Levels <sup>k</sup>	ND	ND	ND	< Background Levels <sup>l</sup>	NS <sup>m</sup>
060204-T2 (Liquid)	ND	ND	ND	ND	< Action Levels <sup>k</sup>	ND	ND	ND	< Background Levels	NS
<b>Sample Delivery Group 1888</b>										
060204-T (Liquid)	NS	NS	NS	NS	NS	NS	NS	NS	NS	Tritium - ND <sup>n</sup> Gross Alpha - ND Gross Beta - 20.3 <sup>o</sup>

<sup>a</sup>Total Petroleum Hydrocarbons full scan, gasoline, diesel, and oil by SW-846 method 8015 modified (U.S. Environmental Protection Agency [EPA], 1996).

<sup>b</sup> microgram(s) per liter

<sup>c</sup>Toxicity Characteristic Leaching Procedure, sample preparation SW-846 method Ext. 1311 (EPA, 1996).

<sup>d</sup> Resource Conservation and Recovery Act metals by SW-846 methods 6010B and 7471A Ext. 1311 (EPA, 1996).

<sup>e</sup> Volatile Organic Compounds by SW-846 method 8260 Ext. 1311 (EPA, 1996).

<sup>f</sup> milligram(s) per liter

<sup>g</sup> Semi-Volatile Organic Compounds by SW-846 method 8270 Ext. 1311 (EPA, 1996).

<sup>h</sup> Polychlorinated Biphenyls by SW-846 method 8082 (EPA, 1996).

<sup>i</sup> pCiCurie(s) per liter

<sup>j</sup> Not Detected at the laboratory reporting limit

<sup>k</sup> Less than the toxicity characteristic for hazardous waste according to RCRA Table 261.24 (EPA, 2002b).

<sup>l</sup> Background levels established in McArthur and Miller, 1989.

<sup>m</sup> Not Sampled

<sup>n</sup> Result is less than the minimum detectable concentration.

<sup>o</sup> Detected above the minimum detectable concentrations, but below the NTS sewage lagoon disposal limit of 50 pCi/L (NDEP, 1999)

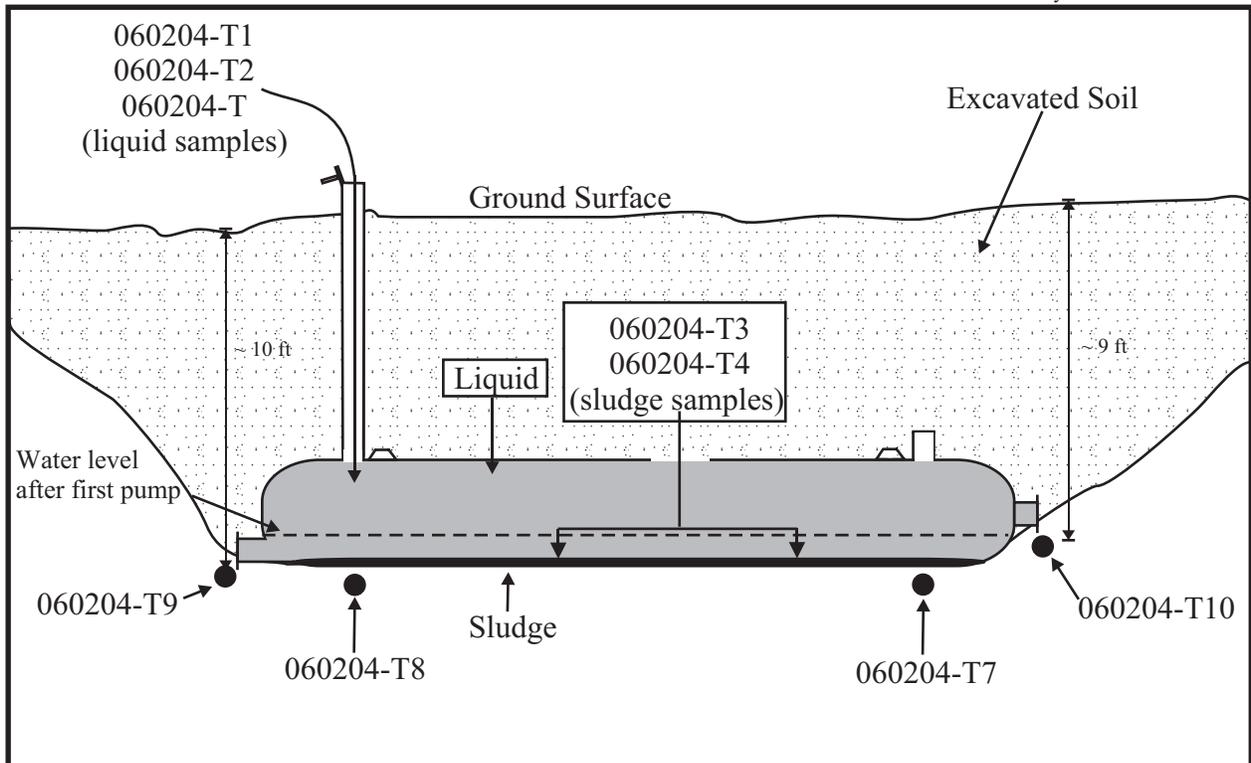
In February 2003 the top of the tank was excavated to determine the structure and the dimensions of the tank and to locate access ports. The top of the tank was found to be metal, cylindrical in shape with two small ports measuring approximately 12.7 centimeters (cm) (5 inches [in]) in diameter protruding from the top of the tank. The tank dimensions were approximately 8.8 meters (m) (29 feet [ft]) in length with a diameter of 0.9 m (3 ft). One of the ports had a pipe connected to the top of the tank that protruded above the ground surface. The second port was identified once the top of the tank was exposed and was determined to be an inlet pipe from Building 660.

In March 2003, the top portion of the liquid was pumped from the tank and disposed of in the NTS Area 23 Sewage Lagoon. Approximately 4,000 L (1,056.7 gal) of the liquid was pumped from the tank (top two-thirds). This was done to reduce the potential of a liquid release when cutting the tank to determine if any sludge was present. A small hole was cut in the top of the tank measuring 0.6 by 0.3 m (2 by 1 ft). The hole was used to inspect the inside of the tank. A 2.5 to 5 cm (1 to 2 in) thick layer of sludge was identified at the bottom of the tank. Two sludge samples (060204-T3 and 060204-T4) were collected and analyzed for TPH, TCLP VOCs, TCLP SVOCs, TCLP RCRA metals, PCBs, gamma emitters, tritium, and gross alpha/beta emitters. The sample locations are shown in Figure 2. Both sample results provided in Table 2 indicate that TPH (diesel/oil) in the sludge was slightly greater than the Nevada State Action Level of 100 mg/kg. The TPH level for samples 060204-T3 and 060204-T4 were 191 mg/kg and 156 mg/kg. All other analytical results were below action levels.

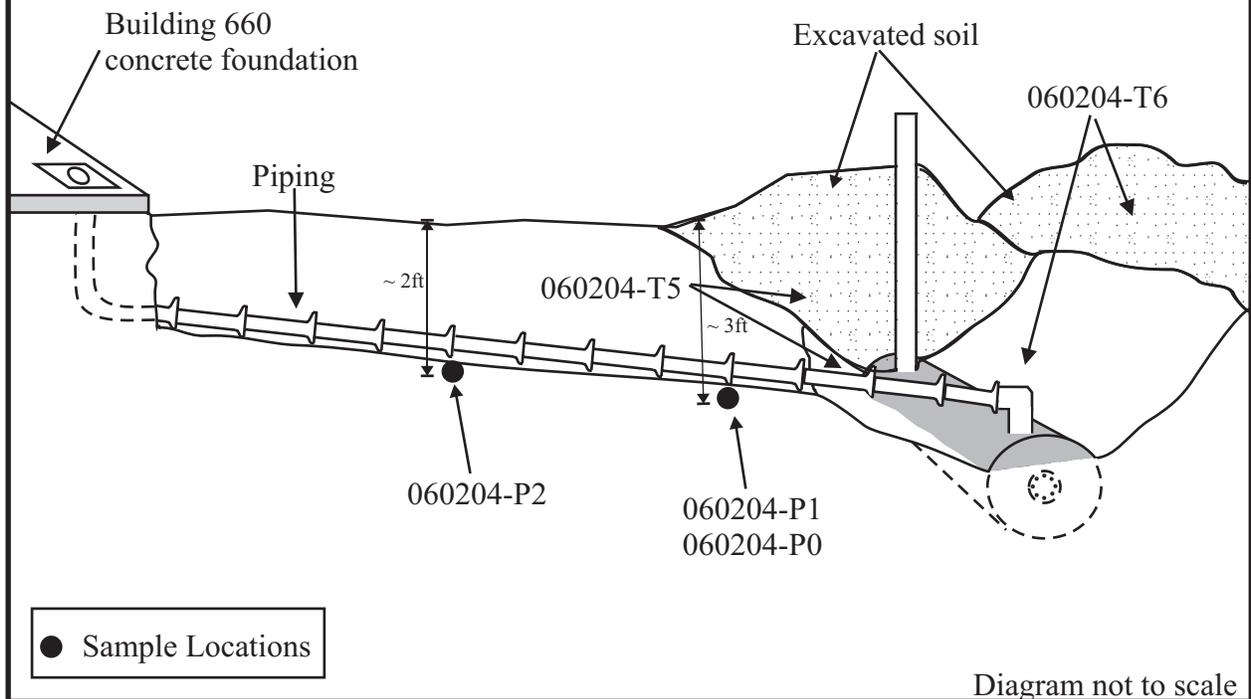
In April 2003, the remaining liquid (bottom one-third) and the sludge were pumped from the tank and disposed of in the NTS Area 23 Sewage Lagoon. The amount of liquid and sludge removed was approximately 2,000 L (528.3 gal) making the total liquid and sludge pumped from the tank at approximate 6,000 L (1,585 gal). The piping was constructed of vitrified clay and was excavated and disposed of in the NTS Area 6 Hydrocarbon Landfill. While the piping was being excavated, it was determined to be connected to a drain that had been previously grouted closed inside of Building 660. No staining or odors were identified in the soil surrounding the piping during excavation. The soil samples (060204-P1 [060204-P0-duplicate] and 060204-P2) were collected from beneath the pipeline at approximately 1 and 0.6 m (3 and 2 ft) below ground surface (bgs). The samples were collected from soil taken by backhoe bucket from two different pipe joint locations to verify that there was no TPH contamination in the surrounding soil. The sample locations are shown in Figure 2. The two soil sample results provided in Table 3 show that TPH (diesel/oil) was below laboratory detection limits.

The soil surrounding the tank was stockpiled and two grab samples (060204-T5 and 060204-T6) were collected by hand from the stockpiles (Figure 2). The samples were analyzed for TPH, VOCs, SVOCs, RCRA metals, PCBs, and gamma emitters. The sample results provided in Table 4 show that TPH was below detection limits. All other analyses were below action levels. The empty tank was removed and disposed of in the NTS Area 9 U10c Sanitary Landfill, the excavation was backfilled, and the site was graded to match the existing topography.

Soil samples (060204-T7 and 060204-T8) were collected under each end of the tank (directly below the two original openings) and were field screened for TPH using a PetroFlag<sup>®</sup> test kit. The samples were collected from soil taken by backhoe bucket from approximately 3 m (10 ft) bgs and were submitted to an offsite laboratory and analyzed for TPH, VOCs, SVOCs, RCRA metals, PCBs, and gamma emitters (Figure 2). The sample results provided in Table 4 show that



**CROSS-SECTION VIEW**



**FIGURE 2**  
**CAS 06-02-04 SAMPLE LOCATIONS**

**TABLE 2 - ANALYTICAL RESULTS OF SLUDGE FOR CAS 06-02-04**

SAMPLE IDENTIFICATION	GASOLINE RANGE <sup>a</sup> (mg/kg) <sup>b</sup>	DIESEL RANGE <sup>a</sup> (mg/kg)	OIL RANGE <sup>a</sup> (mg/kg)	TPH <sup>a</sup> (mg/kg)	TCLP <sup>c</sup> RCRA <sup>d</sup> METALS (µg/L) <sup>e</sup>	TCLP VOCs <sup>f</sup> (mg/L) <sup>g</sup>	TCLP SVOCs <sup>h</sup> (mg/L)	PCBS <sup>i</sup> (µg/kg) <sup>j</sup>	GAMMA EMITTERS (pCi/g) <sup>k</sup>	GROSS ALPHA/BETA EMITTERS and TRITIUM (pCi/g)
<b>Sample Delivery Groups 1912 and 1913</b>										
060204-T3 (Sludge)	ND <sup>l</sup>	71	120	191	< Action Levels <sup>m</sup>	ND	ND	ND	< Background Levels <sup>n</sup>	Tritium - ND <sup>o</sup> Gross Alpha/Beta - LT <sup>p</sup>
060204-T4 (Sludge)	ND	58	98	156	< Action Levels <sup>m</sup>	ND	ND	ND	< Background Levels <sup>n</sup>	Tritium - ND <sup>o</sup> Gross Alpha/Beta - LT <sup>p</sup>

<sup>a</sup>Total Petroleum Hydrocarbons full scan, gasoline, diesel, and oil by SW-846 8015 modified (EPA, 1996).

<sup>b</sup> milligram(s) per kilogram

<sup>c</sup>Toxicity Characteristic Leaching Procedure, sample preparation method SW-846 Ext. 1311 (EPA, 1996).

<sup>d</sup> Resource Conservation and Recovery Act metals by SW-846 6010B and 7471A Ext. 1311 (EPA, 1996).

<sup>e</sup> microgram(s) per liter

<sup>f</sup> Volatile Organic Compounds by SW-846 8260 Ext. 1311 (EPA, 1996).

<sup>g</sup> milligram(s) per liter

<sup>h</sup> Semi-Volatile Organic Compounds by SW-846 8270 Ext. 1311 (EPA, 1996).

<sup>i</sup> Polychlorinated Biphenyls by SW-846 8082 (EPA, 1996).

<sup>j</sup> microgram(s) per kilogram

<sup>k</sup> picoCurie(s) per gram

<sup>l</sup> Not Detected at the laboratory reporting limit

<sup>m</sup> Less than the toxicity characteristic for hazardous waste according to RCRA Table 261.24(EPA, 2002b).

<sup>n</sup> Background levels established in McArthur and Miller, 1989.

<sup>o</sup> Results are less than the minimum detectable concentration.

<sup>p</sup> LT - Results are less than requested minimum detectable concentrations, but greater than sample specific minimum detectable concentrations

**TABLE 3 - ANALYTICAL RESULTS OF SOIL FOR CAS 06-02-04  
 (Soil Underneath Piping)**

SAMPLE IDENTIFICATION	GASOLINE RANGE <sup>a</sup> (mg/kg) <sup>b</sup>	DIESEL RANGE <sup>a</sup> (mg/kg)	OIL RANGE <sup>a</sup> (mg/kg)	TPH <sup>a</sup> (mg/kg)
<b>Sample Delivery Group 1958</b>				
060204-P1	NS <sup>c</sup>	ND <sup>d</sup>	ND	ND
060204-P0 (Duplicate of 060204-P1)	NS	ND	ND	ND
060204-P2	NS	ND	ND	ND

<sup>a</sup>Total Petroleum Hydrocarbons full scan, gasoline, diesel, and oil by method SW-846 8015 modified (EPA, 1996).

<sup>b</sup> milligram(s) per kilogram

<sup>c</sup>Not Sampled

<sup>d</sup>Not Detected at the laboratory reporting limit

TPH was below detection limits. All other analytical results were below action levels. After the tank was removed from the excavation, additional openings were found that had been previously closed off with metal plates. The plates were bolted to the tank and had rubber gaskets to seal the connection. Additional soil samples (060204-T9 and 060204-T10) were collected from underneath the openings at approximately 2.7 and 2.4 m (9 and 8 ft) bgs, and field screened for TPH using a PetroFlag<sup>®</sup> test kit to determine if the openings had leaked (Figure 2). The samples were submitted to an offsite laboratory and analyzed for TPH. The sample results provided in Table 4 show that TPH concentrations for both samples were below detection limits.

In June 2003, the tank and piping excavations were backfilled with clean fill material and the site was then graded to the surrounding topography

### 2.1.3 CAS 22-99-06: Fuel Spill

During a site visit in 1996, samples were collected by Shaw Environmental Incorporated (formerly International Technologies Corporation [IT]) and TPH (oil) and lead were identified as being Contaminants of Potential Concern (COPC) (NNSA/NV, 2001). In addition, general housekeeping debris was identified and included wood and scrap metal.

In April 2001, BN collected seven surface and seven subsurface (1.2 m [4 ft] below ground surface) soil samples. The soil samples were analyzed for TPH. TPH (oil) was identified in the surface soil at five of the seven locations at levels greater than the Nevada State Action Level of 100 mg/kg. TPH results for the seven subsurface samples were below detection limits (NNSA/NV, 2001).

In October 2002, BN collected two soil samples (330L-0-1 and 330L-0-2), including one duplicate (330L-0-0) from the locations previously sampled by IT and analyzed for TCLP-lead. The results provided in Table 5 show that the soil is not a hazardous waste for lead.

**TABLE 4 - ANALYTICAL RESULTS OF SOIL FOR CAS 06-02-04 ( Soil Surrounding UST)**

SAMPLE IDENTIFICATION	GASOLINE RANGE <sup>a</sup> (mg/kg) <sup>b</sup>	DIESEL RANGE <sup>a</sup> (mg/kg)	OIL RANGE <sup>a</sup> (mg/kg)	TPH <sup>a</sup> (mg/kg)	RCRA <sup>c</sup> METALS (mg/kg)	VOCs <sup>d</sup> (µg/kg) <sup>e</sup>	SVOCs <sup>f</sup> (µg/kg)	PCBs <sup>g</sup> (µg/kg)	GAMMA EMITTERS (pCi/g) <sup>h</sup>
<b>Sample Delivery Groups V1962 and V1963</b>									
060204-T5	ND <sup>i</sup>	ND	ND	ND	< Action Levels <sup>j</sup>	Methylene Chloride...16 Acetone .....2 2-Butanone.....1 All others.....ND	ND	ND	< Background Levels <sup>k</sup>
060204-T6	ND	ND	ND	ND	< Action Levels	Methylene Chloride...21 Acetone .....5 2-Butanone.....2 All others.....ND	bis (2-Ethylhexyl) phthalate.....27 All others.....ND	ND	< Background Levels <sup>k</sup>
<b>Sample Delivery Groups V1964 and V1965</b>									
060204-T7	ND	ND	ND	ND	< Action Levels	Methylene Chloride...21 Acetone .....3 All others.....ND	Diethylphthalate....26 bis (2-Ethylhexyl) phthalate.....19 All others.....ND	ND	< Background Levels <sup>k</sup>
060204-T8	ND	ND	ND	ND	< Action Levels	Methylene Chloride...45 Acetone.....4 All others.....ND	Di-n-octyl phthalate.....61 All others.....ND	ND	< Background Levels <sup>k</sup>
060204-T9	ND	ND	ND	ND	NS <sup>l</sup>	NS	NS	NS	NS
060204-T10	ND	ND	ND	ND	NS	NS	NS	NS	NS

<sup>a</sup>Total Petroleum Hydrocarbons full scan, gasoline, diesel, and oil by SW-846 8015 modified (EPA, 1996).

<sup>b</sup>milligram(s) per kilogram

<sup>c</sup>Resource Conservation and Recovery Act metals by SW-846 6010B and 7471A (EPA, 1996).

<sup>d</sup>Volatile Organic Compounds by SW-846 8260 (EPA, 1996).

<sup>e</sup>microgram(s) per kilogram

<sup>f</sup>Semi-Volatile Organic Compounds by SW-846 8270 (EPA, 1996).

<sup>g</sup>Polychlorinated Biphenyls by SW-846 8082 (EPA, 1996).

<sup>h</sup>picoCurie(s) per gram

<sup>i</sup>Not Detected at the laboratory reporting limit

<sup>j</sup>Preliminary Remediation Goals used as action levels were established by U.S. EPA Region 9 (EPA, 2002c).

<sup>k</sup>Background levels established in McArthur and Miller, 1989.

<sup>l</sup>Not Sampled

In March 2003 the site was clean closed by excavating and disposing of TPH-impacted soil following the NDEP-approved SAFER Plan (NNSA/NV, 2001). Approximately 49.7 m<sup>3</sup> (65 cubic yards [yd<sup>3</sup>]) of TPH-impacted soil was excavated from the site and disposed of at the NTS Area 6 Hydrocarbon Landfill. Sixteen soil samples were collected by hand from the bottom of the excavation at approximately 1 m (3 ft) bgs. The sample locations are shown in Figure 3. The samples were field screened for TPH using a PetroFlag<sup>®</sup> test kit and then submitted to an offsite laboratory for TPH oil analysis. The sample results provided in Table 5 show that TPH (oil) was not present in the soil at levels greater than the Nevada State Action Level of 100 mg/kg. In addition, as a best management practice, all housekeeping debris was removed from the site and disposed of as sanitary waste.

In April 2003 the excavation was backfilled with clean fill and graded to the surrounding topography.

#### **2.1.4 CAS 23-01-02: Large AST Farm**

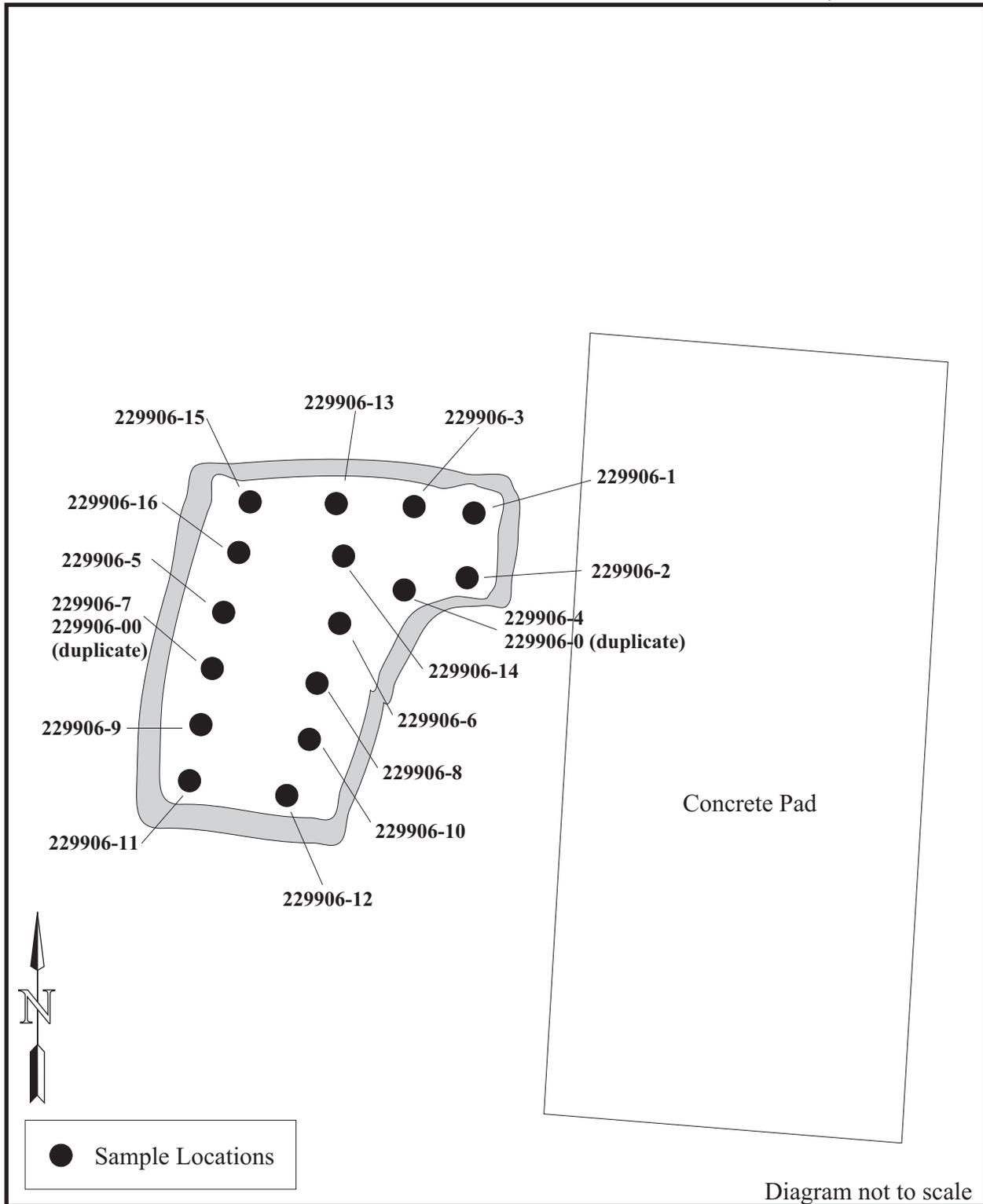
CAS 23-01-02 consisted of two large 1,893 m<sup>3</sup> (500,000 gal) ASTs, a fill stand, associated piping, and surrounding earthen berm. In February and March of 2003, the site was clean closed by using hydraulic shears to demolish both tanks, the fill stand, and associated piping. In addition, soil samples were collected around and underneath both asphalt pads that the tanks sat on prior to removal. The metal from the demolition activities was recycled by a scrap metal vendor. The remaining earthen berm containing the smaller pieces of scrap metal was disposed of in the NTS Area 23 Sanitary Landfill. The earthen berm was used as fill material in the landfill. Some additional earthen berm material was hauled to CAS 22-99-06 and used as clean fill for the excavation. Three separate phases were undertaken to complete the clean closure of CAS 23-01-02: pre-demolition, demolition/removal, and post-demolition activities.

##### **2.1.4.1 Pre-demolition Activities**

In January 2003, drain valves, access ports to both tanks, and check valve covers were opened to inspect the system. This information was critical to plan for required safety precautions during the dismantlement of the system. Both tanks and the majority of the piping were found to be clean, with the exception of a small section of the diesel piping that was located underneath the concrete pad.

##### **2.1.4.2 Demolition Activities**

In February and March 2003, both tanks, the fill stand, and associated piping were demolished/removed using hydraulic shears and the metal was cut into manageable sized pieces. Prior to demolishing the fill stand, a small portion of gasoline and diesel piping, which was located underneath a concrete pad was removed. This was accomplished by removing a section of the concrete pad to expose the piping using heavy equipment. The gasoline pipe was found to be clean and dry, while the diesel portion contained approximately 68.1 L (18 gal) of diesel/soapy water mixture resulting from past cleaning efforts. The liquid was pumped into a 208-L (55-gal) drum. The liquid was then solidified using soil and vermiculite and transported to the NTS Area 6 Hydrocarbon Landfill for disposal. In addition, six fuel pumps were disconnected and set aside to be processed through the excess system.



**FIGURE 3**  
**CAS 22-99-06 SAMPLE LOCATIONS**

**TABLE 5 - ANALYTICAL RESULTS FOR CAS 22-99-06**

SAMPLE IDENTIFICATION	TPH OIL RANGE <sup>a</sup> (mg/kg) <sup>b</sup>
<b>Sample Delivery Group V1916</b>	
229906-1	ND <sup>c</sup>
229906-2	ND
229906-3	ND
229906-4	14
229906-0 (duplicate of 229906-4)	ND
229906-5	ND
229906-6	ND
229906-7	ND
229906-00 (duplicate of 229906-7)	16
229906-8	16
229906-9	ND
229906-10	ND
229906-11	13
229906-12	ND
229906-13	ND
229906-14	ND
229906-15	ND
229906-16	18

<sup>a</sup>Total Petroleum Hydrocarbons - oil range by SW-846 method 8015 modified (EPA, 1996).

<sup>b</sup>milligram(s) per kilogram

<sup>c</sup>Not Detected at the laboratory reporting limit

SAMPLE IDENTIFICATION	TCLP <sup>a</sup> LEAD (mg/L) <sup>b</sup>
<b>Sample Delivery Group V1755</b>	
330L-0-1	0.77
330L-0-0*	1.2
330L-0-2	0.62

<sup>a</sup>Toxicity Characteristic Leaching Procedure, sample preparation method SW-846 Ext. 1311 (EPA, 1996).

<sup>b</sup>milligram(s) per liter

\*Duplicate sample of 330L-0-1

### 2.1.4.3 Post-demolition Activities

In March 2003 soil samples were collected at approximately 0.3 m (1 ft) below both asphalt pads (approximately 0.45 m [1.5 ft] bgs) to verify that no leaks had occurred from the tanks. Six soil samples (230102-1 through 230102-6) were collected underneath the diesel AST asphalt pad and one additional biased (grab) soil sample (230102-7) was collected at the outside edge of the concrete ring where a minor leak was reported to have occurred sometime in the past (Figure 4). All samples were collected using a Geoprobe<sup>®</sup> direct push apparatus. The samples were field screened for TPH using a PetroFlag<sup>®</sup> test kit and then submitted to an offsite laboratory for TPH diesel analysis. The sample results provided in Table 6 show that TPH (diesel) was not present in the soil at levels greater than the Nevada State Action Level of 100 mg/kg. In addition, three soil samples (230102-1G through 230102-3G) were collected from underneath the gasoline AST asphalt pad at approximately 0.3 m (1 ft) bgs to verify that no leaks had occurred from the tank. The sample locations are shown in Figure 4. The samples were field screened for TPH using a PetroFlag<sup>®</sup> test kit and then submitted to an offsite laboratory for TPH (gasoline) analysis. The sample results provided in Table 6 show that TPH (gasoline) was not present in the soil at levels greater than the Nevada State Action Level of 100 mg/kg.

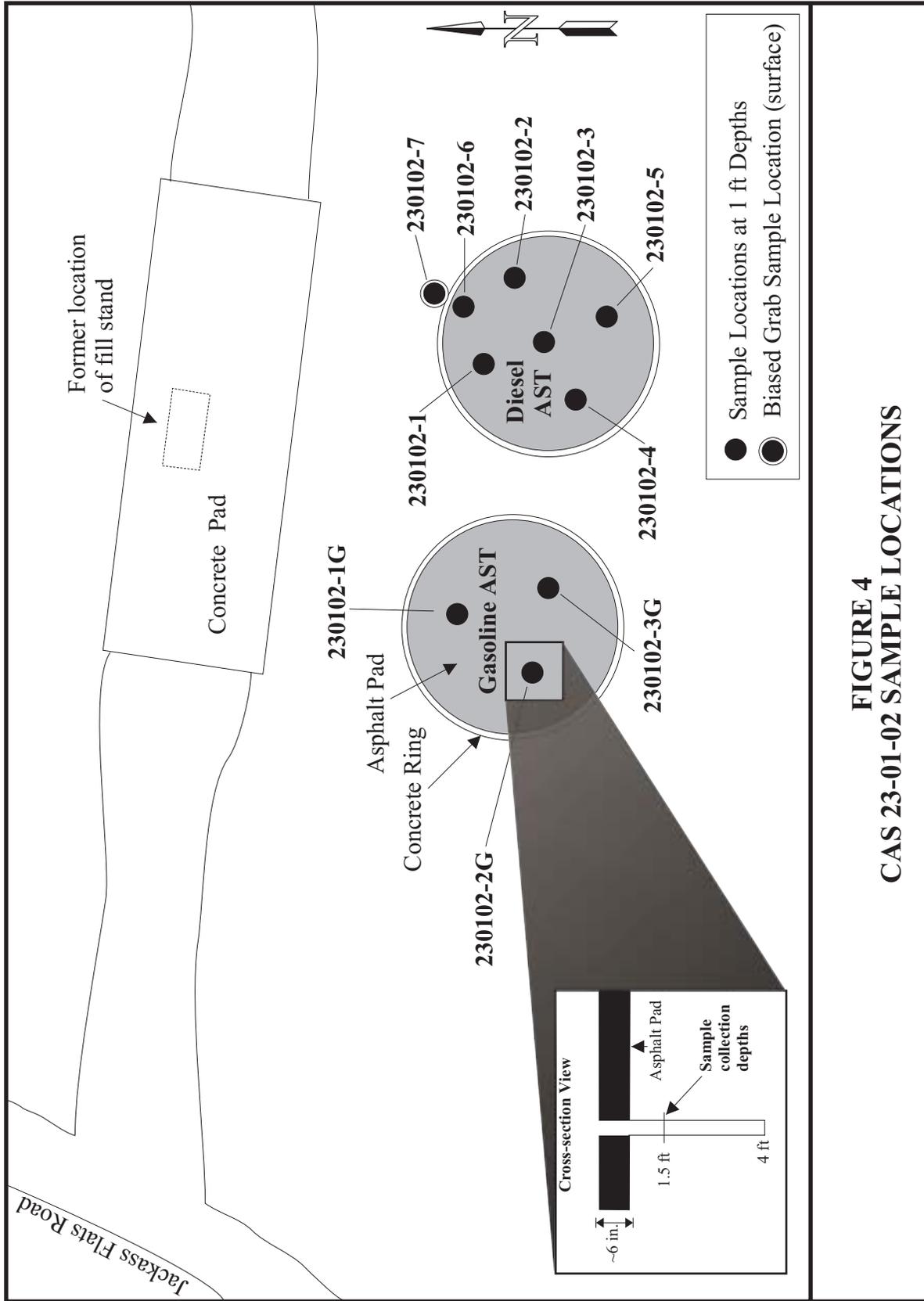
The scrap metal was moved into piles at the southern end of the site and was transported off-site by a metal recycler. The total amount of scrap metal recycled equated to approximately 306 m<sup>3</sup> (400 yd<sup>3</sup>). The remaining soil from the earthen berm that contained small pieces of scrap metal was transported to the NTS Area 23 Sanitary Landfill for disposal. Approximately 27.5 m<sup>3</sup> (36 yd<sup>3</sup>) of concrete removed from the concrete pad was transported to the NTS Area 9 U10c Landfill for disposal. The six fuel pumps were disconnected from the system and were processed through the excess system as excess material.

### 2.1.5 CAS 23-25-05: Asphalt Oil Spill/Tar Release

During the site sampling activities conducted by IT in 1997, two soil samples were collected from the soil underneath the asphalt oil spill/tar release and were analyzed for TPH, VOCs, SVOCs, RCRA metals, PCBs, gamma emitters, and gross alpha/beta emitters. All analytical results were below action levels (NNSA/NV, 2001). In addition to the spill, a 208-L (55-gal) drum was present in the wash, partially buried in a dirt mound.

In December 2002, during sampling activities, it was apparent that the contents of the 208-L (55-gal) drum had separated into two distinct layers, a whitish liquid with a viscosity similar to water at the bottom and a thick black tar-like material with a viscosity similar to syrup at the top. Samples (232505-1 and 232505-2) were collected from each layer using a coliwasa and both samples were analyzed for TPH, TCLP VOCs, TCLP SVOCs, TCLP RCRA metals, PCBs, gamma emitters, and flash point. The sample locations are shown in Figure 5. The sample results provided in Table 7 show that TPH was present in both samples and the top layer exhibited a hazardous characteristic for ignitability (EPA, 2002a). All other analytical results were below RCRA hazardous waste levels.

In January 2003, the contents inside of the 208-L (55-gal) drum were transferred to a new 208-L (55-gal) drum that was set up as an SAA. The new drum was then moved out of the wash and onto level ground. After the drum was removed from the wash, two soil samples (232505-3 and



**FIGURE 4**  
**CAS 23-01-02 SAMPLE LOCATIONS**

**TABLE 6 - ANALYTICAL RESULTS FOR CAS 23-01-02**

<b>SAMPLE IDENTIFICATION</b>	<b>TPH - DIESEL RANGE<sup>a</sup> (mg/kg)<sup>b</sup></b>	<b>TPH - GASOLINE RANGE<sup>a</sup> (mg/kg)</b>
<b>Diesel AST</b>		
<b>Sample Delivery Group V1926</b>		
230102-1	ND <sup>c</sup>	NS <sup>d</sup>
230102-2	ND	NS
230102-3	ND	NS
230102-4	ND	NS
230102-5	ND	NS
230102-6	17	NS
230102-7	ND	NS
<b>Gasoline AST</b>		
230102-1G	NS	ND
230102-2G	NS	ND
230102-3G	NS	ND

<sup>a</sup>Total Petroleum Hydrocarbons - diesel/gasoline ranges by SW-846 method 8015 modified (EPA, 1996).

<sup>b</sup>milligrams(s) per kilogram

<sup>c</sup>Not Detected at the laboratory reporting limit

<sup>d</sup>Not Sampled

232505-4) were collected by hand from the soil directly beneath the former drum location. The samples were analyzed for TPH, VOCs, SVOCs, RCRA metals, PCBs, and gamma emitters. The sample locations are shown in Figure 5. The soil sample results provided in Table 8 show that TPH was not present in the soil at levels greater than the Nevada State Action Level of 100 mg/kg. All other analytical results were below action levels.

In March 2003, approximately 523.7 m<sup>3</sup> (685 yd<sup>3</sup>) of asphalt oil/tar were excavated from the wash and disposed of in the NTS Area 6 Hydrocarbon Landfill. Approximately 224 m<sup>3</sup> (293 yd<sup>3</sup>) of reinforced concrete was removed from the wash and disposed of in the NTS Area 9 U10c Landfill. The 55-gal drum in the SAA was transported to the Area 5 Hazardous Waste Storage Pad for off-site disposal.

**TABLE 7 - ANALYTICAL RESULTS FOR CAS 23-25-05 (Drum Contents)**

SAMPLE IDENTIFICATION	DIESEL RANGE <sup>a</sup> mg/kg <sup>k</sup>	OIL RANGE <sup>a</sup> mg/kg	GASOLINE RANGE <sup>a</sup> mg/kg	TPH <sup>a</sup> mg/kg	TCLP <sup>b</sup> RCRA <sup>c</sup> METALS (µg/L) <sup>d</sup>	TCLP VOCs <sup>e</sup> (mg/L) <sup>f</sup>	TCLP SVOCs <sup>g</sup> (mg/L)	PCBs <sup>h</sup> (µg/L)	GAMMA EMITTERS (pCi/g) <sup>i</sup>	FLASH POINT (°F) <sup>j</sup>
<b>Sample Delivery Groups V1805 and V1806</b>										
232505-1	120000 mg/kg <sup>k</sup>	700000 mg/kg	93 mg/kg	820093 mg/kg	< Action Levels <sup>l</sup>	2-Butanone. .....0.042 All others...ND	2-Methylphenol .....0.008 3-and/or 4-Methylphenol .....0.016 All others.....ND	ND <sup>n</sup>	< Background Levels <sup>n</sup>	54.4 °
232505-2	16000 mg/L	160000 * mg/L	9300 ** µg/L	185300 µg/L	< Action Levels <sup>l</sup>	2-Butanone .....2.8 All others...ND	ND	ND	< Background Levels <sup>n</sup>	No Flash Point observed

\*Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution (see associated Case Narrative, Appendix B).  
 \*\*Required a 5-fold instrument dilution due to the high concentration of target analytes (see associated Case Narrative, Appendix B).

<sup>a</sup> Total Petroleum Hydrocarbons full scan, gasoline, diesel, and oil by SW-846 method 8015 modified (EPA, 1996).

<sup>b</sup> Toxicity Characteristic Leaching Procedure, sample preparation method SW-846 Ext. 1311 (EPA, 1996).

<sup>c</sup> Resource Conservation and Recovery Act metals by SW-846 methods 6010B and 7471A Ext. 1311 (EPA, 1996).

<sup>d</sup> microgram(s) per liter

<sup>e</sup> Volatile Organic Compounds by SW-846 method 8260 Ext. 1311 (EPA, 1996).

<sup>f</sup> milligram(s) per liter

<sup>g</sup> Semi-Volatile Organic Compounds by SW-846 method 8270 Ext. 1311 (EPA, 1996).

<sup>h</sup> Polychlorinated Biphenyls by SW-846 method 8082 (EPA, 1996).

<sup>i</sup> picoCurie(s) per gram

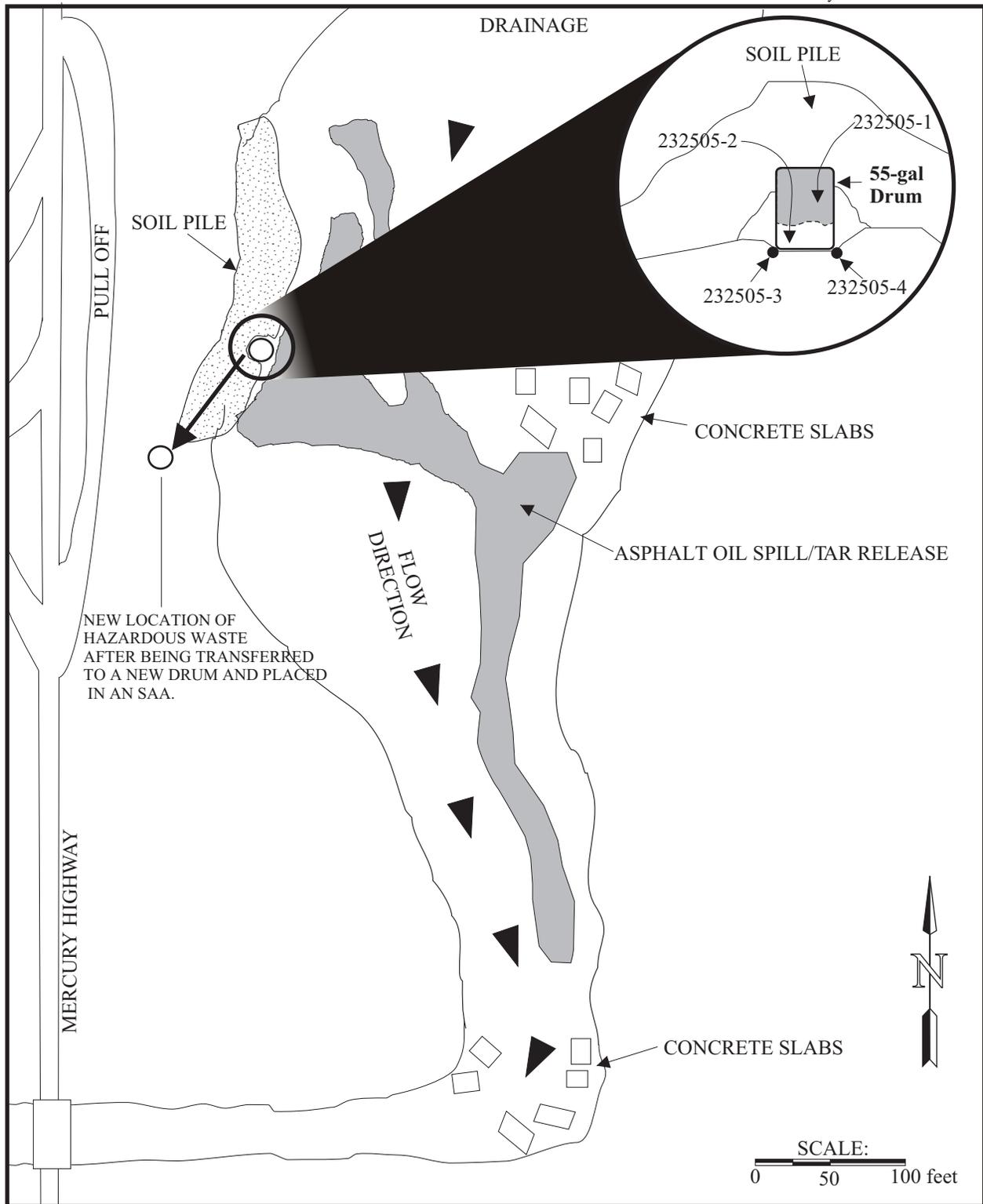
<sup>j</sup> Degrees Fahrenheit

<sup>k</sup> milligram(s) per kilogram

<sup>l</sup> Less than the toxicity characteristic for hazardous waste according to RCRA Table 261.24 (EPA, 2002b).

<sup>m</sup> Not Detected at the laboratory reporting limit

<sup>n</sup> Background levels established in McArthur and Miller, 1989.



**FIGURE 5**  
**CAS 23-25-05 SAMPLE LOCATIONS**

**TABLE 8 - ANALYTICAL RESULTS FOR CAS 23-25-05 (Soil Around Drum)**

SAMPLE IDENTIFICATION	DIESEL RANGE <sup>a</sup> (mg/kg) <sup>y</sup>	OIL RANGE <sup>a</sup> (mg/kg)	GASOLINE RANGE <sup>a</sup> (mg/kg)	TPH <sup>a</sup> (mg/kg)	RCRA <sup>c</sup> METALS (mg/kg)	VOCs <sup>d</sup> (µg/kg) <sup>e</sup>	SVOCs <sup>f</sup> (µg/kg)	PCBS <sup>g</sup> (µg/kg)	GAMMA SPECTROSCOPY (pCi/g) <sup>h</sup>
<b>Sample Delivery Groups V1879 and V1880</b>									
232505-3	ND <sup>i</sup>	12*	ND	12*	< Action Levels <sup>j</sup>	Methylene Chloride.....19 All others.....ND	bis (2-Ethylhexyl) phthalate.....33 All others.....ND	ND	< Back ground Levels <sup>k</sup>
232505-4	ND	25	ND	25	< Action Levels <sup>j</sup>	Methylene Chloride.....20 All others.....ND	bis (2-Ethylhexyl) phthalate.....23 All others.....ND	ND	< Back ground Levels <sup>k</sup>

\*Indicates an estimated value (see associated Case Narrative, Appendix B).

<sup>a</sup> Total Petroleum Hydrocarbons full scan, gasoline, diesel, and oil by SW-846 method 8015 modified (EPA, 1996).

<sup>b</sup> milligram(s) per kilogram

<sup>c</sup> Resource Conservation and Recovery Act metals by SW-846 methods 6010B and 7471A Ext. 1311 (EPA, 1996).

<sup>d</sup> Volatile Organic Compounds by SW-846 method 8260 Ext. 1311 (EPA, 1996).

<sup>e</sup> microgram(s) per kilogram

<sup>f</sup> Semi-Volatile Organic Compounds by SW-846 method 8270 Ext. 1311 (EPA, 1996).

<sup>g</sup> Polychlorinated Biphenyls by SW-846 method 8082 (EPA, 1996).

<sup>h</sup> picoCurie(s) per gram

<sup>i</sup> Not Detected at the laboratory reporting limit

<sup>j</sup> Preliminary Remediation Goals used as action levels were established by U.S. EPA Region 9 (EPA, 2002c).

<sup>k</sup> Background levels established in McArthur and Miller, 1989.

## 2.2 DEVIATIONS FROM SAFER PLAN AS APPROVED

There were no deviations from the NDEP-approved SAFER plan (NNSA/NV, 2001).

## 2.3 CORRECTIVE ACTION SCHEDULE AS COMPLETED

The corrective action field activities began January 2003 and were completed in June 2003. Details of the closure field activities schedule are provided below.

### CAS 06-02-04 closure activities:

- Sample liquid December 12, 2002 and February 6, 2003
- Mobilize equipment/personnel to site February 5, 2003
- Complete excavating soil above UST February 5 - 6, 2003
- Pump top portion of liquid from tank and sample sludge March 5, 2003
- Pump remaining liquid and sludge from tank April 14, 2003
- Excavate piping, remove tank, and sample soil April 17 - 23, 2003
- Backfill and demobilize June 4, 2003

### CAS 22-99-06 closure activities:

- Excavate and sample soil March 6 - 11, 2003
- Backfill and demobilize site April 9, 2003

### CAS 23-01-02 closure activities:

- Pre-demolition activities January 14 - 16, 2003
- Mobilize equipment/personnel and site set-up February 11 - 12, 2003
- Demolition activities February 13 - April 17, 2003
- Sample soil March 12, 2003
- Remove scrap metal from site and haul earthen berm to landfill April - May 2003
- Grade site April - May 2003

CAS 23-25-05 closure activities:

- Sample contents inside drum December 11, 2002
- Sample soil around drum January 29, 2003
- Mobilize equipment/personnel and site set-up March 11, 2003
- Excavate asphalt oil/tar and concrete March 11 - 20, 2003
- Remove drum for disposal March 18, 2003
- Demobilize site March 20, 2003

## **2.4 SITE PLAN/SURVEY PLAT**

Because engineered construction was not required as part of this closure, as-built drawings were not generated, and therefore, are not included in this CR.

## 3.0 WASTE DISPOSITION

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The following types of waste were produced at CAU 330 during closure activities: hydrocarbon, hazardous, sanitary, and construction debris. The majority of the scrap metal that resulted from the demolition activities was recycled. All waste was managed in accordance with state and federal regulations, U.S. Department of Energy orders, and BN procedures.

### **CAS 06-02-04**

During closure activities at CAS 06-02-04, approximately 42.6 m (140 ft) of vitrified clay pipe was excavated and transported to the NTS Area 6 Hydrocarbon Landfill for disposal as hydrocarbon waste. Approximately 6 m<sup>3</sup> (1,585 gal) of liquid and slightly TPH-impacted sludge was pumped from the tank and disposed of in the NTS Area 23 Sewage Lagoon. The UST was excavated and disposed of in the NTS Area 9 U10c Landfill.

### **CAS 22-99-06**

During closure activities at CAS 22-99-06, approximately 49.7 m<sup>3</sup> (65 yd<sup>3</sup>) of TPH-impacted soil was excavated and transported to the NTS Area 6 Hydrocarbon Landfill for disposal. Debris in the area, including wood and scrap metal was removed and disposed of in the NTS Area 9 U10c Landfill.

### **CAS 23-01-02**

During closure activities at CAS 23-01-02, approximately 306 m<sup>3</sup> (400 yd<sup>3</sup>) of scrap metal was recycled through a scrap metal vendor. The smaller pieces of scrap metal were disposed of in the NTS Area 23 Sanitary Landfill.

Approximately 27.5 m<sup>3</sup> (36 yd<sup>3</sup>) of concrete was removed from a section of the concrete pad and disposed of in the NTS Area 9 U10c Landfill.

Approximately 68.1 L (18 gal) of diesel/soapy water mixture was pumped from a portion of the piping into a 55-gal drum. After the liquid was solidified, it was transported to the NTS Area 6 Hydrocarbon Landfill for disposal.

### **CAS 23-25-05**

During closure activities at CAS 23-25-05, approximately 523.7 m<sup>3</sup> (685 yd<sup>3</sup>) of asphalt/tar was excavated and disposed of in the NTS Area 6 Hydrocarbon Landfill. Approximately 224 m<sup>3</sup> (293 yd<sup>3</sup>) of reinforced concrete pieces were removed from the wash and disposed of in the NTS Area 9 U10c Landfill. In addition, the 55-gal drum containing a petroleum substance was transported to the Area 5 Hazardous Storage Pad for disposal because the contents exhibited a hazardous characteristic for ignitability (EPA, 2002a). Hazardous waste disposition for the 55-gal drum is provided in Appendix C.

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## 4.0 CLOSURE VERIFICATION RESULTS

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CAU 330 closure was verified through the following actions:

- CAS 06-02-04: The CAU 330 NDEP-approved SAFER plan (NNSA/NV, 2001) DQOs presented as Appendix A of this report specified that at least four verification samples would be collected at this site. A total of eight soil samples were collected and analyzed to confirm PetroFlag<sup>®</sup> results and to verify that COCs had not leaked from the tank or piping (Tables 3 and 4). Two of the soil samples were collected by hand from the soil stockpiles removed from each side of the tank; this soil was used as clean fill for the excavation. The remaining soil samples were biased (grab) and collected in the vicinity and underneath the UST and piping at approximately 2.7 to 3 m (9 to 10 ft) and 0.6 to 1 m (2 to 3 ft) respectively. Samples from under the UST and piping were collected from soil retrieved by backhoe bucket from the excavations. All samples were collected by hand using sterile sampling supplies and were placed on ice for transport and storage. Figure 2 shows the locations of the soil samples. The samples collected from underneath the UST were analyzed for a full suite analysis according to the NDEP-approved SAFER plan (NNSA/NV, 2001). The samples collected from underneath the piping and underneath the UST near the two end caps were analyzed for TPH because TPH diesel/oil was the only COC present in the sludge from the UST. Sample results showed that the remaining soil in the vicinity and underneath the tank and piping were below action levels. The action level for TPH in soil is 100 mg/kg as established by the state of Nevada (Nevada Administrative Code [NAC], 2002).
- CAS 22-99-06: The CAU 330 NDEP-approved SAFER plan (NNSA/NV, 2001) DQOs presented as Appendix A of this report specified that 16 verification samples would be collected at this site. The removal of soil with TPH levels greater than 100 mg/kg was verified by collecting and analyzing 16 verification samples (Table 5) collected from the bottom of the excavation at approximately 1 m (3 ft) bgs. All samples were collected by hand using sterile sampling supplies and were placed on ice for transport and storage. Figure 3 shows the locations of the verification samples. Verification sample results showed that the remaining soil was below the action level for TPH (oil) and the site was backfilled with approximately 49.7 m<sup>3</sup> (65 yd<sup>3</sup>) of clean fill.
- CAS 23-01-02: The CAU 330 NDEP-approved SAFER plan (NNSA/NV, 2001) DQOs presented as Appendix A of this report specified that ten verification samples would be collected at this site. Six Geoprobe<sup>®</sup> soil samples were collected underneath the diesel AST asphalt pad at approximately 0.45 m (1.5 ft) bgs, and one additional biased (grab) sample was collected from the soil surface surrounding the asphalt pad. These soil samples were collected and analyzed to confirm PetroFlag<sup>®</sup> results and to verify that diesel was not present at concentrations greater than the action level of 100 mg/kg in the soil beneath the diesel asphalt pad (Table 5) (NAC, 2002). In addition, three Geoprobe<sup>®</sup> soil samples were collected underneath the gasoline AST asphalt pad. These soil samples were collected and analyzed to confirm PetroFlag<sup>®</sup> results and to verify that gasoline was not present at concentrations greater than the action level of 100 mg/kg in the soil beneath the gasoline asphalt pad (Table 6) (NAC, 2002). Figure 4 shows the locations of the samples. Nine of the ten soil samples were collected using a Geoprobe<sup>®</sup> drill rig. All

samples were collected using sterile sampling supplies and were placed on ice for transport and storage.

- CAS 23-25-05: Two soil samples were collected by hand from directly beneath the former location of the 208-L (55-gal) drum to verify that TPH was not present in the soil surrounding the drum at levels greater than the Nevada State Action Level of 100 mg/kg. Figure 5 shows the locations of the soil samples. Sample results showed that the remaining soil in the vicinity of the 208-L (55-gal) drum were below action levels (Table 8). All other analytical results were below action levels. All samples were collected using sterile sampling supplies and were placed on ice for transport and storage.

## **4.1 DATA QUALITY ASSESSMENT**

All samples were collected with disposable polyethylene dippers and placed in appropriately labeled sample containers secured with custody seals. All samples were labeled with a unique sample number, placed on ice in coolers, and transported under chain-of-custody to an off-site laboratory.

During collection of all samples, standard quality assurance/quality control (QA/QC) samples were also collected; e.g., one field duplicate per 20 samples submitted blind to the analytical laboratory for analysis. Also, the analytical laboratory followed standard QA/QC procedures during sample analysis. This included matrix spike/matrix spike duplicate and spiked surrogate percent recovery analysis.

CAU 330 closure activities were performed to the criteria specified in the DQOs provided in the NDEP-approved CAU 330 SAFER Plan (NNSA/NV, 2001), which are also provided in Appendix A of this CR. The DQOs primary CSMs are considered the probable scenarios for the conditions at the four CASs.

### **CAS 06-02-04**

The primary CSM assumed that the contents inside the tank would not contain radionuclides or hazardous chemicals above action levels. This was confirmed through sample analyses. Additional site characterization provided further confirmation that no radionuclides or hazardous chemicals were inside the tank; however, TPH was identified slightly above action levels in the sludge only. The CSM for CAS 06-02-04 was an accurate representation of the site and the data collected for the site met all the DQOs.

### **CAS 22-99-06**

The primary CSM assumed that TPH was the COC at the site. Soil sample results from the site showed this to be the case. The conceptual site model for CAS 22-99-06 was an accurate representation of the site, and the data collected met all DQOs.

### **CAS 23-01-02**

The primary CSM assumed gasoline and diesel were the COCs identified at the site. A potential diesel spill had been documented in historical records. The alternative site model assumed that diesel did not leak from the tank. Soil sampling and field screening results from the site showed this to be the case. The alternative site model of CAS 23-01-02 was an accurate representation of the site and the data collected met all the DQOs.

### **CAS 23-25-05**

The primary CSM assumed that no COC were associated with the soil underneath the asphalt oil/tar spill based on previous characterization sampling and process knowledge. The site was clean closed. The primary CSM for CAS 23-25-05 was an accurate representation of the site.

## **4.2 USE RESTRICTIONS**

CAU 330 was clean closed and the land use is, therefore, unrestricted. Because CAU 330 has been clean closed, no land use restrictions or post-closure monitoring requirements are applicable.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

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### 5.1 CONCLUSION

The following site closure activities were performed at each CAS included in CAU 330 and are documented in the report:

#### **CAS 06-02-04**

The UST, contents inside the UST, and piping have been disposed of appropriately. All soil samples collected in the vicinity of the UST and underneath the piping show that COCs were not present above action levels. The excavations were backfilled and graded to match the existing topography. CAS 06-02-04 has been clean closed with no restrictions on the use of the site.

#### **CAS 22-99-06**

The TPH-impacted soil has been removed from the site and disposed of in the NTS Area 6 Hydrocarbon Landfill. Verification samples collected from the excavation indicated that TPH concentrations in the soil are no longer present above the Nevada State Action Level of 100 mg/kg. The excavation was backfilled with clean fill and graded to match the existing topography. CAS 22-99-06 has been clean closed with no restrictions on the use of the site.

#### **CAS 23-01-02**

The two ASTs, fill stand, and associated piping were demolished and the majority of the scrap metal was recycled by a scrap metal vendor (approximately 306 m<sup>3</sup> [400 yd<sup>3</sup>]). The remaining smaller pieces of metal mixed with the earthen berm material were disposed of in the NTS Area 23 Sanitary Landfill. A small portion of the concrete pad was excavated during the removal of underground piping and disposed of in the NTS Area 9 U10c Landfill. Soil samples were collected underneath both AST asphalt pads to verify that diesel and gasoline concentrations in the remaining soil are below the Nevada State Action Level of 100 mg/kg. The asphalt pads were left in place and the remainder of the site was graded to match the existing topography. In addition, six fuel pumps were disconnected from the system and processed through the excess system. CAS 23-01-02 has been clean closed with no restrictions on the use of the site.

#### **CAS 23-25-05**

This site was clean closed by excavating and properly disposing of the asphalt/tar and reinforced concrete from the wash. In addition, a 55-gal drum that was present in the wash was transferred to an SAA, ultimately being transported to the Area 5 Hazardous Storage Pad for off-site disposal. Sample results indicated the material in the drum to be a petroleum hydrocarbon substance and exhibited a hazardous characteristic for ignitability (EPA, 2002a). Additional soil samples were collected in the vicinity of the drum and the results showed the substance to be below action levels. CAS 23-25-05 has been clean closed with no restrictions on the use of the site instituted.

## **5.2 RECOMMENDATIONS**

Based on completion of site closure activities as documented by this CR, it is requested that a Notice of Completion be provided by the NDEP for CAU 330. Upon closure approval, CAU 330 will be promoted from Appendix III to Appendix IV of the FFACO (1996), "Closed Corrective Action Units."

## 6.0 REFERENCES

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BN, see Bechtel Nevada.

Bechtel Nevada. 2002a. Field Management Plan for Corrective Action Unit 330: Areas 6, 22, and 23 Tanks and Spill Sites, Nevada Test Site, Nevada, Las Vegas, NV.

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FFACO, see Federal Facility Agreement and Consent Order.

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# **APPENDIX A**

## **DATA QUALITY OBJECTIVES FOR CAU 330\***

\*As presented and published in the approved U.S. Department of Energy, National Nuclear Security Administration Nevada Operation Office, Streamlined Approach for Environmental Restoration Plan for Corrective Action Unit 330: Area 6, 22, and 23 Tanks and Spill Sites, Nevada Test Site, Nevada, DOE/NV--745-REV1. Las Vegas, NV. (NNSA/NV, 2001).

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## **ACRONYMS AND ABBREVIATIONS**

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AIP	Animal Investigation Program
AST	Aboveground Storage Tank
CAS	Corrective Action Site
CAU	Corrective Action Unit
COC	Constituents of Concern
DQO	Data Quality Objective(s)
EPA	U.S. Environmental Protection Agency
mg/L	milligram(s) per liter
mg/kg	milligram(s) per kilogram
ml	milliliter
NAC	Nevada Administrative Code
PA	Preliminary Assessment
pCi/g	picoCuries(s) per gram
ppm	parts per million
PRGs	Preliminary Remediation Goals
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative percent difference
SAFER	Streamlined Approach for Environmental Restoration
SVOC	Semivolatile Organic Compound(s)
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compound(s)

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## **DATA QUALITY OBJECTIVES (DQOs)**

### **DQO Overview**

The goal of the DQO process is to ensure that a sufficient amount of technically and legally valid data is collected to characterize a site, prepare a defensible corrective action, and executed according to the objectives. The U.S. Environmental Protection Agency (EPA) DQO guidance outline (EPA, 1994) should be followed. The DQO is to be integrated into the project life cycle of each project. Quality Assurance/Quality Control (QA/QC) must be incorporated into the scope, budget, schedule, pre-field activities, field work, sampling, and post field-activities, including the review of analytical data. This will begin in the planning stages/phases of a project. Steps used in this process build on the background research and previously acquired data which support the development of a Streamlined Approach for Environmental Restoration (SAFER) Plan.

The following characteristics are used in establishing DQOs:

**Accuracy** - Closeness of a measurement or the mean of a set of results to the true value. Accuracy is a measure of the bias of the measurement system. Indicators for measurement are based on the percent recoveries associated with the laboratory analytical control spikes, surrogate spikes, or matrix spikes.

**Comparability** - A qualitative judgement which expresses the confidence with which one set can be compared to another. Items used to determine comparability include the analytical method and reporting units.

**Completeness** - Indicators for this measurement are the amount of valid data obtained from a measurement system compared to the amount that was expected and needed to be obtained to meet the project data goals.

**Precision** - A measurement which represents the repeatability of the analytical system. Indicators for measurement are based on the relative percent difference (RPD) between field duplicates, laboratory splits, or laboratory replicate analysis. It is usually expressed as the RPD or standard deviation.

**Representativeness** - A qualitative judgement which refers to a sample or group of samples that reflect the characteristics of the media at the sampling point. It also includes how well the sampling point represents the actual parameter variations which are under study.

## Planning Team Members

- |   |   |
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| <u>Primary Decision Maker</u><br>Janet Appenzeller- Wing |
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## Step 1: State the Problem

Constituents of Concern (COCs) could be present at Corrective Action Unit (CAU) 330 and be a threat to workers and the environment.

### Field Sampling Strategy

The field sampling strategy is to use biased sampling only. Verification samples will be taken directly from excavations where soils have been removed.

### Constituents of Concern

#### CAS 06-02-04 Underground Tank and Piping

The primary source of these COCs would be from the Animal Investigation Program (AIP) if the tank is associated with this study. Consequently, this CAS may contain the following COCs: cesium-137, strontium-90, plutonium-90, tritium, iodine-131, iodine-129 (radionuclides), and chemicals associated with cleaning activities. However, a sample was collected from the tank on October 3, 1998, as part of the preliminary assessment activities. The analysis consisted of total petroleum hydrocarbons (TPH), volatile organic compounds (VOC), semivolatile organic compounds (SVOC), Resource Conservation and Recovery Act (RCRA) metals, pH, chlorine, gamma, plutonium, and tritium. The results indicated that no radiological or hazardous COCs were detected above detection limits. It is unlikely, however, that the listed radionuclides associated with the AIP would be present at this Corrective Action Site (CAS). The study dealt with natural exposure to nuclear test fallout. Concentrations of radionuclides within the animals was shown to be low and not a health risk.

### **CAS 22-99-06 Fuel Spill**

The Performance Assessment (PA) group sampled this CAS on August 19, 1998. The only COC identifiable from this list is petroleum hydrocarbon.

### **CAS 23-01-02 Large Aboveground Storage Tank (AST) Farm**

There are no COCs found at this site. However, a diesel spill has been documented in historical records.

### **CAS 23-25-05 Asphalt Oil Spill/Tar Release**

Samples collected in 1997 indicated the presence of TPH, VOCs, SVOCs, RCRA metals, and radionuclides present above laboratory detection limits. Radionuclides were comparable to background levels. All analytical results were below the EPA region 9 Preliminary Remediation Goals (PRGs) (EPA, 2000). The soil beneath the tar/asphalt spill is not considered impacted with any COCs.

## **Step 2: Identify the Decision**

Determine the extent of COCs at or above the action level(s) before and after remediation.

Prior to developing this SAFER plan, the PA group compiled the available historical data and collected samples from the CASs. This information was used to develop the DQOs for closure activities. As a result of this planning phase, it was determined that only a limited number of samples were required to develop a closure strategy. All field sampling will be biased. Data verification/validation will be accomplished by the following:

**Accuracy** - Closeness of a measurement or the mean of a set of results to the true value. Accuracy is a measure of the bias of the measurement system. Indicators for measurement are based on the percent recoveries associated with the laboratory analytical control spikes, surrogate spikes, or matrix spikes.

**Comparability** - A qualitative judgement which expresses the confidence with which one set can be compared to another. Items used to determine comparability include the analytical method and reporting units.

**Completeness** - Indicators for this measurement are the amount of valid data obtained from a measurement system compared to the amount that was expected and needed to be obtained to meet the project data goals.

**Precision** - A measurement which represents the repeatability of the analytical system. Indicators for measurement are based on the relative percent difference (RPD) among field duplicates, laboratory splits, or laboratory replicate analysis. It is usually expressed as the RPD or standard deviation.

Representativeness - A qualitative judgement which refers to a sample or group of samples that reflect the characteristics of the media at the sampling point. It also includes how well the sampling point represents the actual parameter variations which are under study.

### **Laboratory Control Samples**

One matrix spike and one matrix spike duplicate will be required for each batch of VOCs, SVOCs analysis and TPH run. One replicate and one lab blank will be run per batch of samples.

### **Field Control Samples**

Field duplicates will be taken for not less than 10 percent of the samples. One trip blank will accompany every batch of VOC samples. One rinse blank will be completed per day. Field blanks will be provided for not less than 5 percent of the samples.

All of the sample analytical data will be provided in a SAFER Closure Report at the end of the project.

### **Step 2A: Alternative Actions to the Decision**

Further assessment of the site would be required if the action levels are exceeded after cleanup or if the completeness criteria is missed.

### **Step 3: Identify the Inputs to the Decision**

Professional judgement, process knowledge, and historical knowledge have been used to determine the possible COCs present at CAU 330. In this case, because sufficient information exists, biased sampling will be performed where contamination is likely to be present.

Environmental variables or characteristics that may be important in biased sampling:

1. Records of COC releases. Known or suspected location(s) of the release(s).
2. Configuration of CAS. This includes building, concrete pad, or other items that could direct the flow or been the source of releases.
3. Configuration of tanks, piping, or other utilities.
4. Observation of the surface features, or sub-surface features if a trench, hole, or ditch is present.
5. Field-screening results.
6. Previous sampling/characterization.

The suspected COCs and detection methods are shown in the following tables.

**Verification Soil Sampling Requirements for CAU 330**

GROUP	SAMPLE NUMBER	METHOD	METHOD DETECTION LIMIT	NUMBER OF QC SAMPLES	CLOSURE STANDARD	CONTAINER TYPE
<b>CAS 06-02-04 Underground Tank and Piping</b>						
VOCs	4	8260B <sup>A</sup> Ext. 1311	0.050 mg/L	1 Trip Blank 1 Matrix Spike, 1 Matrix Spike Duplicate	Region 9 PRGs (EPA, 1996)	2 - 120 ml glass, zero head space
SVOCs	4	8270C <sup>A</sup> Ext. 1311	0.50 mg/L	1 Trip Blank 1 Matrix Spike, 1 Matrix Spike Duplicate	Region 9 PRGs (EPA, 1996)	500 ml glass
TPH	4	8015 B\Mod <sup>A</sup>	0.5 mg/kg	None Required	100 ppm	120 ml glass, zero head space
Metals - RCRA 8	4	6010B <sup>A</sup>	Metal Dependent	1 Field Duplicate	Region 9 PRGs (EPA, 1996)	250 ml glass
Gamma-Spec (20 min)	4	901.1 <sup>B</sup>	1 pCi/g	None Required	7 pCi/g <sup>C</sup>	500 ml p plastic
<b>CAS 22-99-06 Fuel Spill</b>						
TPH	16	8015 B\Mod <sup>A</sup>	0.5 mg/kg	2 Field Duplicate	100 ppm	120 ml glass, zero head space
<b>CAS 23-01-02 Large AST Farm</b>						
TPH	10	8015 B\Mod <sup>A</sup>	0.5 mg/kg	1 Field Duplicate	100 ppm	120 ml glass, zero head space

**Verification Soil Sampling Requirements for CAU 330 (Continued)**

GROUP	SAMPLE NUMBER	METHOD	METHOD DETECTION LIMIT	NUMBER OF QC SAMPLES	CLOSURE STANDARD	CONTAINER TYPE
			<b>CAS 23-25-05 Asphalt Oil Spill/Tar Release</b>			
			Verification Sampling Dependent on Drum Characterization			

mg/L - milligrams per liter  
 ml - milliliter

ppm - parts per million  
 pCi/g - picoCuries per gram  
 mg/kg - milligrams per kilogram

RCRA - Resource Conservation and Recovery Act  
 TCLP - Toxicity Characteristic Leaching Procedure

A - Environmental Protection Agency Test Methods for Evaluating Solid Waste, 3<sup>rd</sup> Edition, Parts 1-4, SW-846 (EPA, 1996).

B - EPA Method 901.1 (EPA, 1996).

C - Closure standard based on the high end of NTS background for Cesium-137 (McArthur and Miller, 1989).

**Waste Disposal Sampling for Liquid and Sludge.**

GROUP	SAMPLE NUMBER	METHOD	METHOD DETECTION LIMIT	NUMBER OF QC SAMPLES	CLOSURE STANDARD	CONTAINER TYPE
<b>CAS 06-02-04 Underground Tank and Piping</b>						
Volatiles (Sludge)	2	8260B <sup>A</sup> Ext. 1311	0.050 mg/L	1 Trip Blank 1 Matrix Spike, 1 Matrix Spike Duplicate	Region 9 PRGs (EPA, 1996)	2 - 120 ml glass, zero head space.
Volatiles (Liquid)	2	8260B Ext. 1311	0.050 mg/L	1 Trip Blank 1 Matrix Spike, 1 Matrix Spike Duplicate	Region 9 PRGs (EPA, 1996)	2 - 120 ml glass, zero head space.
Semi-volatiles (Sludge)	2	8270C <sup>A</sup> Ext. 1311	0.50 mg/L	1 Trip Blank 1 Matrix Spike, 1 Matrix Spike Duplicate	Region 9 PRGs (EPA, 1996)	500 ml glass
Semi-volatiles (Liquid)	2	8270C Ext. 1311	0.50 mg/L	1 Trip Blank 1 Matrix Spike, 1 Matrix Spike Duplicate	Region 9 PRGs (EPA, 1996)	500 ml glass
Total Petroleum Hydrocarbons (Sludge)	2	8015 B\Mod <sup>A</sup>	0.5 mg/kg	None Required	100 ppm	120 ml glass, zero head space.
Total Petroleum Hydrocarbons (Liquid)	2	8015 B\Mod	0.5 mg/kg	None Required	100 ppm	120 ml glass, zero head space.
Metals - RCRA 8 (Sludge)	2	6010B/1311 <sup>A</sup>	variable	None Required	Region 9 PRGs (EPA, 1996)	250 ml glass

**Waste Disposal Sampling for Liquid and Sludge (Continued).**

GROUP	SAMPLE NUMBER	METHOD	METHOD DETECTION LIMIT	NUMBER OF QC SAMPLES	CLOSURE STANDARD	CONTAINER TYPE
Metals - RCRA 8 (Liquid)	2	6010B/1311	variable	None Required	Region 9 PRG's (EPA, 2000)	250 ml glass
Gamma-Spec (20 min) (Sludge)	2	901.1 <sup>B</sup>	1 pCi/g	None Required	7 pCi/g <sup>C</sup>	500 ml plastic
Gamma-Spec (20 min) (Liquid)	2	901.1	1 pCi/g	None Required	7 pCi/g	500 ml plastic

mg/L - milligrams per liter

ml - milliliter

ppm - parts per million

pCi/g - picoCuries per gram

mg/kg - milligrams per kilogram

RCRA - Resource Conservation and Recovery Act

TCLP - Toxicity Characteristic Leaching Procedure

A - Environmental Protection Agency Test Methods for Evaluating Solid Waste, 3<sup>rd</sup> Edition, Parts 1-4, SW-846 (EPA, 1996).

B - EPA Method 901.1 (EPA, 1996).

C - Closure standard based on the high end of NTS background for Cesium-137 (McArthur and Miller, 1989)

**Further Basis for Closure Standards**

- EPA Region 9 risk-based Preliminary Remediation Goals for industrial soils (EPA, 2000).
- TPH concentrations above the TPH limit of 100 mg/kg per the *Nevada Administrative Code* (NAC) Section 445A.2272 (NAC, 1999).

## **Step 4: Define the Boundaries**

The target populations are different for each CAS

- CAS 06-02-04 consists of an underground tank and piping. The population of interest includes the liquids and sludge within the tank and the soils in the vicinity of the tank.
- CAS 22-99-06 consists of an area that involves a fuel spill that was believed to be a result of a waste oil release that occurred when Camp Desert Rock was an active facility. The population of interest is the soil impacted by the fuel spill, but not to exceed 10 feet beyond the depression used to dump waste oil.
- CAS 23-01-02 consists of a large AST farm that was constructed to provide a gasoline and diesel storage location. All tank farm structures will be removed. The population of interest for remediation consists of diesel-impacted soil beneath the AST.
- CAS 23-25-05 consists of a wash covered with asphalt oil/tar material, a half buried 55-gallon drum, rebar, and concrete located in the vicinity. All of these elements are included in the population. However, remediation of these site can be determined by visual inspection because no COCs are present.

Because each CAS is geographically independent, the domain of the field remediation activities is restricted to the four different CAS-themselves. The decision constraints will be confined to the physical location and descriptions of the four separate CASs independently. Temporal boundaries for the remediation activities include those constraints set up by weather conditions, availability of resources, and project schedules set in the baseline. Weather conditions at the Nevada Test Site may impact scheduled activities in the baseline. Unforseen resource conflicts could also cause delays. The current deadline for submitting the SAFER Plan is September 28, 2001. The field remediation will not occur until fiscal year 2002.

## **Step 5: Develop a Decision Rule**

If the observed concentrations exceed the closure standards in the populations as described in Step 4, then further remediation will be required, followed by a new set of verification sampling. If the observed concentrations do not exceed the closure standards for the above population, then remediation activities will cease and a SAFER Closure Report will be developed.

Analytical results from a contract laboratory will be compared to the Closure Standards, as previously defined, to determine if the site has been sufficiently cleaned. If any COC exceeds its limits described in Step 4, additional material will be excavated and additional samples collected for analysis. This process will continue until the site has been cleaned of COCs to concentrations less than its respective action level.

In addition analytical results will have at least an 80 percent completeness. That is, the number of samples which have acceptable data divided by the total number of samples taken times 100 will be at least 80 percent. Factors affecting QA/QC are discussed in Section 6. Legal factors affecting sample acceptability include a proper chain of custody and a custody tape seal on the sample. If this completeness criteria is not met, then sampling will be made as close as possible to the samples which failed and analysis performed until the 80 percent criteria is met.

Measurement methods, action levels, sample quantities and volumes have been defined in Step 3. In all cases the measurement method detection limit is less than the closure standard.

## **Step 6: Specify Acceptable Limits on Decision Error**

Since the CAU has been identified in the Federal Facilities and Consent Order as being a site with potential contamination, the null hypothesis is that COCs are above action levels. The alternative statement is therefore that COCs are not above action levels.

The false rejection (alpha error) is to reject the null hypothesis in error. This means COCs would incorrectly be determined to be below action levels. This is also known as a false negative. This is the more serious error as contamination would be left in place without knowing about it. This possibility is minimized in biased sampling, as the most likely sites for contamination have been chosen for analysis. (This possibility is minimized in unbiased sampling by requiring analytical results to be at the 95<sup>th</sup> percentile for the upper confidence limit that the action level is not exceeded.) Because biased sampling is being used, a statistical analysis is not appropriate.

The false acceptance (beta error) is to accept the null hypothesis in error. This means COCs would incorrectly be determined to be above action levels. This is also known as a false positive. This is the less serious error as an extra amount of uncontaminated material would be removed and disposed of as contaminated. QA/QC sample results and checking of raw results when a hit above the action level occurs can help reduce this type of error. Scrupulous adherence to using clean sampling equipment and good sample collection techniques also help eliminate contamination of samples.

## **Step 7: Optimize Sampling and Analysis Design**

### **CAS 06-02-04 Underground Tank and Piping**

Fluids within the tank will be removed, sampled for waste disposal, solidified (if necessary), and disposed of accordingly. Prior to sampling, the liquids will be agitated in order to homogenize the contents of the tank. If the contents can not be homogenized, then samples will also be collected from the sludge. Once liquids have been removed, the tank will be excavated and removed for disposal. Soil removed during the excavation will be stockpiled on plastic sheets. This soil will be characterized for disposal. If, however, the soil is found to be clean, it will be used to back fill the excavation. Inlet and outlet piping (if found to exist) will be grouted closed

and left in place if COCs are not identified in the tank, otherwise they will be removed for disposal. Although previous sampling has shown the contents of the tank to be nonhazardous and nonradioactive, soils in the vicinity of both ends of the tank will be sampled for TPH, VOC, SVOC, RCRA metals, and gamma. If COCs are present above established clean-up levels (Section 3.3 Verification) these constituents will be removed by excavating more soil. The excavated areas will be resampled to verify that no COCs remain. Once verification samples indicate that COCs have been removed to below the established level, the inlet and outlet lines (if present) will be grouted closed or removed as the case may be. The excavation will be back filled with clean fill. Impacted soils will be removed for waste disposal.

### **CAS 22-99-06 Fuel Spill**

The TPH-impacted soils will be removed and disposed of accordingly. Once TPH has been removed, verification sampling will be done on all sides of the excavation. Sixteen samples within an estimated 400-square-foot area will be collected. If samples indicate that TPH remains above the established remediation level, additional soils will be excavated for disposal. Once verification samples indicate that TPH has been removed below the established remediation level, the excavation will be filled with clean fill material.

### **CAS 23-01-02 Large AST Farm**

Initial phases of the remedial action for this CAS will include the dismantlement/demolition of two large fuel tanks, associated piping, and fill stand. Where possible metal scrap will be salvaged. Once the tanks and piping have been removed, the soils in the vicinity of the diesel tank will be sampled for TPH impacts. If sampling analytical data indicate that TPH for diesel is present, these soils will be removed for disposal. Additional sampling will be done to verify that diesel has been removed below the established remediation level. Once verification samples indicate that TPH has been removed below the established remediation level, the excavation will be filled with clean fill material.

### **CAS 23-25-05 Asphalt Oil Spill/Tar Release**

Visible tar will be excavated and hauled away. In addition, the drum, concrete slabs and rebar will be removed from this site. Verification sampling will not be required unless COCs are identified in the drum. If COCs are identified within the drum, samples will be collected to verify that the soils have not been impacted by the drum contents.

## REFERENCES

EPA, see U.S. Environmental Protection Agency.

McArthur, R. D. and Miller, F. L., Jr. 1989. Off-site Radiation Exposure Review Project (ORERP), Phase II Soil Program, DOE/NV/10384-23. Las Vegas, NV.

NAC, see Nevada Administrative Code.

Nevada Administrative Code. 1999. Section 445a.2272: "Contamination of Soil: Establishment of Action Levels." Carson City, NV.

U.S. Environmental Protection Agency. 1994. Guidance for the Data Quality Objectives Process, EPA AQ/ G-4. Washington D.C.

U.S. Environmental Protection Agency. 1996. Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846) Third Edition. Washington D.C.

U.S. Environmental Protection Agency. 2000. Region IX Preliminary Remediation Goals (PRGs), San Francisco, CA.

# **APPENDIX B**

## **SAMPLE ANALYTICAL RESULTS**

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## TABLE OF CONTENTS - SAMPLE ANALYTICAL RESULTS BY SAMPLE DELIVERY GROUP

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Note: Analytical results are presented in this Appendix in the order indicated below.

### CAS 06-02-04

SDG V1809: Liquid samples from UST .....	060204-T1 and 060204-T2
Trip Blanks (VOC) .....	330-TB3 and 330-TB4
SDG V1810: Liquid samples from UST .....	060204-T1 and 060204-T2
SDG V1888: Liquid samples from UST .....	060204-T
SDG V1912: Sludge samples from UST .....	060204-T3 and 060204-T4
Trip Blanks (VOC) .....	330-TB7 and 330-TB8
SDG V1913: Sludge samples from UST .....	060204-T3 and 060204-T4
SDG V1958: Soil samples from underneath piping .....	060204-P0, P1, and P2
SDG V1962: Soil samples from each side of the UST .....	060204-T5 and 060204-T6
Trip Blanks (VOC) .....	330-TB9 and 330-TB10
SDG V1963: Soil samples from each side of the UST .....	060204-T5 and 060204-T6
SDG V1964: Soil samples collected at each end of the UST .....	060204-T7, T8, T9, and T10
Trip Blanks (VOC) .....	330-TB11 and 330-TB12
SDG V1965: Soil samples collected at each end of the UST .....	060204-T7 and 060204-T8

### CAS 22-99-06

SDG V1755: Soil samples from fuel spill .....	330L-0-0, 330L-0-1, and 330L-0-2
SDG V1916: Soil samples from excavation .....	229906-1 through 229906-16

### CAS 23-01-02

SDG V1926: Soil samples from underneath asphalt pads .....	230102-1 through 3G
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### CAS 23-25-05

SDG V1805: Samples of contents from inside the drum .....	232505-1 and 232505-2
Trip Blanks (VOC) .....	330-TB1 and 330-TB2
SDG V1806: Samples of contents from inside the drum .....	232505-1 and 232505-2
SDG V1879: Soil samples from around the drum .....	232505-3 and 232505-4
Trip Blanks (VOC) .....	330-TB5 and 330-TB6
SDG V1880: Soil samples from around the drum .....	232505-3 and 232505-4

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## **SAMPLE DELIVERY GROUP**

**V1809**

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30 December 2002

Mr. Theodore Redding  
Bechtel Nevada Corporation  
2621 Losee Road  
Mail Stop NTS273  
Las Vegas, NV 89030-4134

**RE: Subcontract No. 30028, Task Order No. 1**  
**Data Report for LVL Batch 0212L340**  
**SDG#: V1809 Chain: None (Project CAU330)**

Dear Mr. Redding:

Enclosed please find the data report for 4 water samples received 13 December 2002 for analysis for TPH, metals, VOAs, SVOAs and PCBs on a 14 day turnaround time. The invoice is enclosed. The EDD is being emailed. These data were faxed 24 and 26 December.

Please do not hesitate to contact me at (610) 280-3029 with any questions or at any time we may be of service.

Very truly yours,

Lionville Laboratory Incorporated

Judith L. Stone  
Senior Project Manager

Enclosure:

<b>PROJECT/CLIENT INFORMATION</b>		<b>REPORT &amp; TURNAROUND INFORMATION</b>	
Project: CA4330	BN Orig #: 8502	Send Report to: <u>Marcus Dixon</u>	
Charge Number: 5802-BD50	Phone: 702-295-7778	Phone: 702-295-4801	MS: <u>NTS 306</u>
Project Manager: <u>Jeffrey Smith</u>	Fax: 702-245-2761	Fax: 702-295-7761	MS: <u>NTS 306</u>
Phone: 702-295-7778	Fax: 702-245-2761	Turnaround: <input type="checkbox"/> Standard - 14 days (H), 28 days Non-rad Env, 45 Days Rad Env, <input checked="" type="checkbox"/> Rush Preliminary by:	
		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 7 <input type="checkbox"/> 14 (IH)	
		<input type="checkbox"/> 1 <input type="checkbox"/> 7 <input type="checkbox"/> 14 (non-Rad Env)	
		<input type="checkbox"/> 1 <input type="checkbox"/> 7 <input type="checkbox"/> 14 (Radiochemical Env)	

**SAMPLE MANAGEMENT INFORMATION**

SDG: (IH) V1809 (Non-Rad Env) \_\_\_\_\_ (Rad Env)

Samples submitted are associated with a signed Project SOW  Yes  No

Analyses entered here agree with the SOW  Yes  No  N/A

If not, identify the variation: \_\_\_\_\_

Subcontract Lab(s) used for this work: LIONVILLE

ID/DESCRIPTION	SAMPLING		MATRIX	CONTAINER			QC			Pres - Analysis eg. HCl - VOCs
	DATE	TIME		#	Est. Vol	MD	MS	MSD		
330 CA4-TB3	12/12/02	7:16	Water	40 mL						H <sub>2</sub> SO <sub>4</sub>
330 CA4-TB4	12/12/02	7:18	Water	40 mL						H <sub>2</sub> SO <sub>4</sub>
060204-T1	12/12/02	8:20	Water	per method						
060204-T2	12/12/02	8:40	Water	per method						
19st Item										

CUSTODY TRANSFER		SAMPLE INFORMATION	
Sampled/Relinquished (print)	Signature	Date/Time	Received by (print)
Marcus Dixon	<i>Marcus Dixon</i>	12/12/02 12:38	<i>TED REDDICK</i>
CA Contractura for TAP	CACASIALENA	12/12/02 13:00	FED <del>REDDICK</del>
FEF-7		12-13-02 09:20	Cal King

Pay Item, Analysis, Method

TPH Full Scan	8015	TCP Metals	(010, 7470 ext 1311)	TCLP SVOCs	8270 ext 1311	TCLP VOCs	8260 ext 1311	PCBs	8082
VOCs	X								

## **Case Narrative**



## Analytical Report

Client: BECHTEL NEVADA V1809  
LVL#: 0212L340

W.O.#: 60052-001-001-0001-00  
Date Received: 12-13-2002

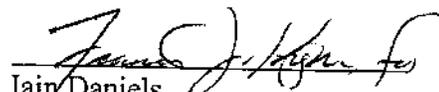
### PCB

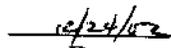
Two (2) water samples were collected on 12-12-2002.

The samples and their associated QC samples were extracted on 12-16-2002, and analyzed according to Lionville Laboratory OPs based on SW846, 3rd Edition procedures on 12-18-2002. The extraction procedures were based on methods 3520 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The samples and their associated QC samples received a Sulfuric acid cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. All blank spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

son:\group\data\pest\bechtel\12L-340.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage



## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## Sample Data

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER Lab Sample ID: 0212L340-003

Sample wt/vol: 970 (g/mL) ML Lab File ID: BLK08330.01

Level: (low/med) LOW Date Received: 12/13/02

% Moisture: not dec.        dec. Date Extracted: 12/16/02

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 12/18/02

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	<u>UG/L</u>
12674-11-2-----	Aroclor-1016	1.0	U
11104-28-2-----	Aroclor-1221	2.1	U
11141-16-5-----	Aroclor-1232	1.0	U
53469-21-9-----	Aroclor-1242	1.0	U
12672-29-6-----	Aroclor-1248	1.0	U
11097-69-1-----	Aroclor-1254	1.0	U
11096-82-5-----	Aroclor-1260	1.0	U

FORM 1 PEST

12/88 Rev.

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER Lab Sample ID: 0212L340-004

Sample wt/vol: 970 (g/mL) ML Lab File ID: BLK08330.01

Level: (low/med) LOW Date Received: 12/13/02

% Moisture: not dec.        dec. Date Extracted: 12/16/02

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 12/18/02

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

12674-11-2-----	Aroclor-1016	1.0	U
11104-28-2-----	Aroclor-1221	2.1	U
11141-16-5-----	Aroclor-1232	1.0	U
53469-21-9-----	Aroclor-1242	1.0	U
12672-29-6-----	Aroclor-1248	1.0	U
11097-69-1-----	Aroclor-1254	1.0	U
11096-82-5-----	Aroclor-1260	1.0	U

FORM 1 PEST

12/88 Rev.

# Case Narrative



**Analytical Report**

**Client :** BECHTEL NEVADA V1809  
**LVL# :** 0212L340

**W.O.# :** 60052-001-001-0001-00  
**Date Received :** 12-13-02

**SW846 METALS**

1. This narrative covers the analyses of 2 water samples.
2. The samples were prepared and analyzed in accordance with SW-846 protocol and reported with a CLP deliverable.
3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.
4. All analyses were performed within the required holding times.
5. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
6. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits.
7. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
8. All preparation/method blanks were within method criteria. Refer to form 3.
9. All ICP Interference Check Standards were within control limits. Refer to form 4.
10. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.
11. All serial dilution percent differences were within SW-846 control limits. Refer to form 9.
12. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to form 5A.
13. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to form 6.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

14. All sample IDs were changed to accommodate the EPA naming convention which allows a maximum of 6 characters on all CLP Forms. Refer to the comments section of form 1 for the original ID.
15. Recoveries on the Laboratory Summary Report and CLP forms will vary depending on the number of significant figures used in the recovery calculation.

*Pata*

Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

gmbvm12-340

12-20-02

Date

## METHOD REFERENCES AND DATA QUALIFIERS

### DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

### Q QUALIFIERS

- E = The reported value is estimated because of the presence of interference.
- M = Duplicate injection precision not met.
- N = Spiked sample recovery not within control limits.
- S = The reported value was determined by the Method of Standard Additions (MSA).
- W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.
- \* = Duplicate analysis not within control limits.
- + = Correlation coefficient for the MSA is less than 0.995.

### ABBREVIATIONS

- PB = Method or Preparation Blank.
- S = Matrix Spike.
- T = Matrix Spike Duplicate.
- R or D = Sample Replicate

### ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
4. Flame AA.
5. Graphite Furnace AA.

RFW 21-21L-033/O-01/97





## Case Narrative



Client: BECHTEL-NEVADA V1809  
LVL #: 0212L340

W.O. #: 60052-001-001-0001-00  
Date Received: 12-13-2002

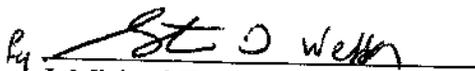
### GC/MS VOLATILE-TCLP

Four (4) water samples were collected on 12-12-2002.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCLP Volatile target compounds on 12-16,17-2002.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for analysis was met.
3. All surrogate recoveries were within EPA QC limits.
4. All matrix spike recoveries were within EPA QC limits.
5. All blank spike recoveries were within EPA QC limits.
6. Internal standard area and retention time criteria were met.
7. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

By   
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

12-19-02  
Date

son\group\data\bna\bechtel-nevada\0212-340.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

- U** - Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** - Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** - Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** - Interference.
- NQ** - Result qualitatively confirmed but not able to quantify.
- N** - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** - This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** - Additional qualifiers used as required are explained in the case narrative.

**Sample Data for each Sample**

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

330-TB3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER

Lab Sample ID: 0212L340-001

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: q121612

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/16/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

75-01-4-----	Vinyl Chloride	0.010	U
75-35-4-----	1,1-Dichloroethene	0.005	U
67-66-3-----	Chloroform	0.005	U
107-06-2-----	1,2-Dichloroethane	0.005	U
78-93-3-----	2-Butanone	0.010	U
56-23-5-----	Carbon Tetrachloride	0.005	U
79-01-6-----	Trichloroethene	0.005	U
71-43-2-----	Benzene	0.005	U
127-18-4-----	Tetrachloroethene	0.005	U
108-90-7-----	Chlorobenzene	0.005	U

FORM 1 V-1

12/88 Rev.

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

330-TB4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER Lab Sample ID: 0212L340-002

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: g121613

Level: (low/med) LOW Date Received: 12/13/02

% Moisture: not dec.        Date Analyzed: 12/16/02

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

75-01-4-----	Vinyl Chloride	0.010	U
75-35-4-----	1,1-Dichloroethene	0.005	U
67-66-3-----	Chloroform	0.005	U
107-06-2-----	1,2-Dichloroethane	0.005	U
78-93-3-----	2-Butanone	0.010	U
56-23-5-----	Carbon Tetrachloride	0.005	U
79-01-6-----	Trichloroethene	0.005	U
71-43-2-----	Benzene	0.005	U
127-18-4-----	Tetrachloroethene	0.005	U
108-90-7-----	Chlorobenzene	0.005	U

FORM 1 V-1

12/88 Rev.

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER

Lab Sample ID: 0212L340-003

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: g121614

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/16/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	MG/L
75-01-4	Vinyl Chloride	0.010	U
75-35-4	1,1-Dichloroethene	0.005	U
67-66-3	Chloroform	0.005	U
107-06-2	1,2-Dichloroethane	0.005	U
78-93-3	2-Butanone	0.010	U
56-23-5	Carbon Tetrachloride	0.005	U
79-01-6	Trichloroethene	0.005	U
71-43-2	Benzene	0.005	U
127-18-4	Tetrachloroethene	0.005	U
108-90-7	Chlorobenzene	0.005	U

FORM 1 V-1

12/88 Rev.

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER

Lab Sample ID: 0212L340-004

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: q121615

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/16/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO.                      COMPOUND                      (ug/L or ug/Kg) MG/L

75-01-4-----	Vinyl Chloride	0.010	U
75-35-4-----	1,1-Dichloroethene	0.005	U
67-66-3-----	Chloroform	0.005	U
107-06-2-----	1,2-Dichloroethane	0.005	U
78-93-3-----	2-Butanone	0.010	U
56-23-5-----	Carbon Tetrachloride	0.005	U
79-01-6-----	Trichloroethene	0.005	U
71-43-2-----	Benzene	0.005	U
127-18-4-----	Tetrachloroethene	0.005	U
108-90-7-----	Chlorobenzene	0.005	U

FORM 1 V-1

12/88 Rev.

## Case Narrative



## Analytical Report

**Client:** BECHTEL NEVADA V1809  
**LVL #:** 0212L340

**W.O.#:** 60052-001-001-0001-00  
**Date Received:** 12-13-02

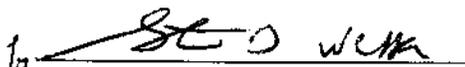
### SEMIVOLATILE

The set of samples consisted of two (2) water samples collected on 12-12-02.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3520 on 12-18-02 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for client specified TCLP Semivolatile target compounds on 12-20-02.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were not reported as per client request.
4. All surrogate recoveries were within EPA QC limits.
5. One (1) of twenty-four (24) blank spike recoveries was outside EPA QC limits.
6. Internal standard area and retention time criteria were met.
7. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

12-30-02  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY OF BNA DATA

### DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I = Interference.
- NQ = Result qualitatively confirmed but not able to quantify.
- A = Indicates that a TIC is a suspected aldol-condensation product.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.

## Sample Data for each Sample

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: (soil/water) WATER

Lab Sample ID: 0212L340-003

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: A122009

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_

Date Extracted: 12/18/02

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 12/20/02

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>MG/L</u>	Q
110-86-1	Pyridine	0.010	U
106-46-7	1,4-Dichlorobenzene	0.010	U
95-48-7	2-Methylphenol	0.010	U
106-44-5	3- and/or 4-Methylphenol	0.010	U
67-72-1	Hexachloroethane	0.010	U
98-95-3	Nitrobenzene	0.010	U
87-68-3	Hexachlorobutadiene	0.010	U
88-06-2	2,4,6-Trichlorophenol	0.010	U
95-95-4	2,4,5-Trichlorophenol	0.025	U
121-14-2	2,4-Dinitrotoluene	0.010	U
118-74-1	Hexachlorobenzene	0.010	U
87-86-5	Pentachlorophenol	0.025	U

FORM 1 SV-1

RFW (v3.3)

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: (soil/water) WATER

Lab Sample ID: 0212L340-004

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: A122010

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_

Date Extracted: 12/18/02

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 12/20/02

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) MG/L Q

110-86-1-----	Pyridine	0.010	U
106-46-7-----	1,4-Dichlorobenzene	0.010	U
95-48-7-----	2-Methylphenol	0.010	U
106-44-5-----	3- and/or 4-Methylphenol	0.010	U
67-72-1-----	Hexachloroethane	0.010	U
98-95-3-----	Nitrobenzene	0.010	U
87-68-3-----	Hexachlorobutadiene	0.010	U
88-06-2-----	2,4,6-Trichlorophenol	0.010	U
95-95-4-----	2,4,5-Trichlorophenol	0.025	U
121-14-2-----	2,4-Dinitrotoluene	0.010	U
118-74-1-----	Hexachlorobenzene	0.010	U
87-86-5-----	Pentachlorophenol	0.025	U

FORM 1 SV-1

RFW (v3.3)

## **Case Narrative**



## Analytical Report

Client: BECHTEL NEVADA V1809  
LVL#: 0212L340

W.O.#: 60052-001-001-0001-00  
Date Received: 12-13-2002

### GRO

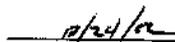
Two (2) water samples were collected on 12-12-2002.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline range organics (GRO) on 12-17-2002.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for analysis has been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recoveries were within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## **Sample Data**

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER

Lab Sample ID: 0212L340-003

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/17/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/L

86290-81-5-----Gasoline Range Organics (GRO)	30	U
--	----	---

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GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER

Lab Sample ID: 0212L340-004

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/17/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	CONCENTRATION UNITS:
		(ug/L or ug/Kg) <u>UG/L</u>
86290-81-5-----	Gasoline Range Organics (GRO)	30 U

12/88 Rev.

## **Case Narrative**



## Analytical Report

Client: BECHTEL NEVADA V1809  
LVL#: 0212L340

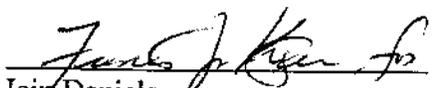
W.O.#: 60052-001-001-0001-00  
Date Received: 12-13-2002

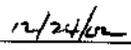
### DIESEL RANGE ORGANICS

Two (2) water samples were collected on 12-12-2002.

The samples and their associated QC samples were extracted on 12-16-2002 and analyzed according to Lionville Laboratory OPs on 12-18-2002. The extraction procedure was based on method 3520 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recoveries were within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. A



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## **Sample Data**

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER

Lab Sample ID: 0212L340-003

Sample wt/vol: 990 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/18/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND		
68334-30-5-----	Diesel Range Organics	303	U
00-00-0000-----	Motor Oil	303	U

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ORGANICS ANALYSIS SHEET

060204-T2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1809

Matrix: WATER

Lab Sample ID: 0212L340-004

Sample wt/vol: 990 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/18/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND	(ug/L or ug/Kg)	ug/L
68334-30-5-----	Diesel Range Organics	303	U
00-00-0000-----	Motor Oil	303	U

12/88 Rev.

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## **SAMPLE DELIVERY GROUP**

**V1810**

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January 9, 2003

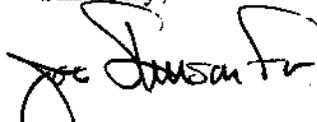
Mr. Ted Redding  
USDOE Zone 1  
Bldg. 652, Room 2  
M/S NTS 273  
Mercury, NV 89023

Dear Mr. Redding:

On December 13, 2002, two water samples, (SDG V1810) were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory. The samples were assigned Laboratory Report Identification Code 3847. Enclosed the Sample Data Package containing the results of the analyses of these samples.

If you have any questions please do not hesitate to call.

Sincerely,



Charles Phillips  
Vice President

**COVER PAGE**

Sanford Cohen & Associates  
Southeastern Environmental Laboratory  
1000 Monticello Court  
Montgomery, Alabama 36117

Laboratory Code: SCA      Subcontract Number: 30025

Laboratory Report Identification Code: 3847    SDG: V1810

Sample Matrix: Water

Site Sample Numbers	Laboratory Sample Number
	Gamma Spectrometry
060204-T1	NTS02-3847-01
060204-T2	NTS02-3847-02
Laboratory Control Sample (LC)	SCAQC-3847-LC1
Duplicate (LD)	SCAQC-3847-LD1
Preparation Blank (PB)	SCAQC-3847-PB

Comments: There were no problems encountered during sample receiving.

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the laboratory Manager or the Manager's designee, as verified by the following signature."

  
\_\_\_\_\_  
Signature

Joe Stinson  
Name

Laboratory Manager  
Title

1/9/03  
Date



**CASE NARRATIVE**  
**SDG V1810**  
**Laboratory Report Identification Number: 3847**

January 9, 2003

**I. Introduction**

On December 13, 2002, two water samples, (SDG V1810), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The chain-of-custody accompanying the sample requested that it be analyzed within seven days of receipt at the laboratory. The samples were analyzed in accordance with the Bechtel Nevada Services Subcontract Task Order Agreement Form, Exhibit B, Statement of Work and Specifications, Rev 1, 1/23/01.

**II. Analytical Methodology**

The radioanalytical results reported for each sample include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. Samples were analyzed in accordance with the following method.

Radionuclide	Method Number	Method Name	Counting Method
Gamma Emitting Radionuclides	EPA 901.1	Gamma Emitting Radionuclides	Gamma Spectrometry

**III. Analytical Results**

Deficiencies

None.

Matrix Interferences

There were no indications of matrix interference.

Dilutions

There were no dilutions.

Detection Limits

The required detection limits (RDL) were met for all analyses.

Reanalysis

There were no reanalysis.

Deviations from Protocols

There were no deviations from the written protocols and analytical methods.

Contacts with the CTR

There was no contact with the CTR regarding these samples.

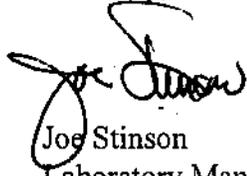
**IV. Quality Control**

Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-3847-LC1	Laboratory Control Sample
060204-T1	SCAQC-3847-LD1	Laboratory Duplicate Sample
Laboratory Type II Water	SCAQC-3847-PB	Preparation Blank

The analytical results of all quality control samples met the acceptance criteria specified in the SOW.

Sincerely,



Joe Stinson

Laboratory Manager

1/9/03  
Date

**Sanford Cohen & Associates**  
**Southeastern Environmental Laboratory**

**Radioanalytical Results**

Report Identification Number: V1810

Project Name: <u>Bechtel Nevada</u>	Chain-of-Custody Number:	Matrix: <u>Water</u>
Site Sample ID: <u>060204-T1</u>	Collection Date: <u>12/12/2002 8:20:00 A</u>	Date Received: <u>12/13/2002</u>
Other Sample ID:	Batch Number: <u>3847</u>	Laboratory Code: <u>SCA</u>

<u>Method Number</u>	<u>Radionuclide</u>	<u>Laboratory Sample ID</u>	<u>Activity (pCi/L)</u>	<u>2 <math>\sigma</math> TPU (pCi/L)</u>	<u>Total Error (pCi/L)</u>	<u>MDA (pCi/L)</u>
EPA 901.1	K-40	NTS02-3847-01	46.7	83.6	83.7	153
EPA 901.1	CO-60	NTS02-3847-01	-4.36	5.18	5.19	8.18
EPA 901.1	Y-88	NTS02-3847-01	2.90	6.96	6.97	11.2
EPA 901.1	RU-106	NTS02-3847-01	10.1	50.5	50.5	86.8
EPA 901.1	SB-125	NTS02-3847-01	-4.81	12.8	12.8	21.6
EPA 901.1	CS-134	NTS02-3847-01	-1.90	5.57	5.57	9.19
EPA 901.1	CS-137	NTS02-3847-01	-0.028	4.73	4.73	8.06
EPA 901.1	CE-144	NTS02-3847-01	26.9	258	259	56.9
EPA 901.1	PM-144	NTS02-3847-01	1.28	5.16	5.16	8.70
EPA 901.1	PM-146	NTS02-3847-01	-3.72	6.43	6.44	10.7
EPA 901.1	EU-152	NTS02-3847-01	10.7	11.5	11.5	20.4
EPA 901.1	EU-154	NTS02-3847-01	0.000	0.000	0.000	13.8
EPA 901.1	EU-155	NTS02-3847-01	-8.04	13.0	13.0	22.1
EPA 901.1	PB-212	NTS02-3847-01	-0.340	10.3	10.3	16.3
EPA 901.1	AC-228	NTS02-3847-01	-2.67	22.8	22.8	38.4
EPA 901.1	TH-234	NTS02-3847-01	-38.7	94.8	94.8	162
EPA 901.1	U-235	NTS02-3847-01	-3.05	8.71	8.71	13.7
EPA 901.1	U-238	NTS02-3847-01	-1030	1060	1070	1630
EPA 901.1	AM-241	NTS02-3847-01	-8.04	20.1	20.1	35.1

<u>Quality Control Samples</u>				
<u>Radionuclide</u>	<u>Laboratory Control (LC)</u>	<u>Laboratory Duplicate (LD)</u>	<u>Matrix Spike (MS)</u>	<u>Preparation Blank (PB)</u>
Gamma	SCAQC-3847-LC1	SCAQC-3847-LD1		SCAQC-3847-PB

**Sanford Cohen & Associates**  
**Southeastern Environmental Laboratory**

**Radioanalytical Results**

Report Identification Number: V1810

Project Name: <u>Bechtel Nevada</u>	Chain-of-Custody Number:	Matrix: <u>Water</u>
Site Sample ID: <u>060204-T2</u>	Collection Date: <u>12/12/2002 8:40:00 A</u>	Date Received: <u>12/13/2002</u>
Other Sample ID:	Batch Number: <u>3847</u>	Laboratory Code: <u>SCA</u>

<u>Method Number</u>	<u>Radionuclide</u>	<u>Laboratory Sample ID</u>	<u>Activity (pCi/L)</u>	<u>2 σ TPU (pCi/L)</u>	<u>Total Error (pCi/L)</u>	<u>MDA (pCi/L)</u>
EPA 901.1	K-40	NTS02-3847-02	197	94.6	96.6	83.0
EPA 901.1	CO-60	NTS02-3847-02	4.97	5.82	5.84	9.74
EPA 901.1	Y-88	NTS02-3847-02	1.46	5.98	5.98	10.8
EPA 901.1	RU-106	NTS02-3847-02	-3.36	48.1	48.1	81.4
EPA 901.1	SB-125	NTS02-3847-02	8.30	13.3	13.3	23.8
EPA 901.1	CS-134	NTS02-3847-02	-5.72	5.49	5.52	8.57
EPA 901.1	CS-137	NTS02-3847-02	-3.96	5.12	5.13	8.10
EPA 901.1	CE-144	NTS02-3847-02	-189	268	269	54.6
EPA 901.1	PM-144	NTS02-3847-02	0.834	5.08	5.08	8.38
EPA 901.1	PM-146	NTS02-3847-02	-0.940	6.22	6.22	10.7
EPA 901.1	EU-152	NTS02-3847-02	-1.30	11.5	11.5	19.6
EPA 901.1	EU-154	NTS02-3847-02	0.000	0.000	0.000	14.0
EPA 901.1	EU-155	NTS02-3847-02	-10.1	12.7	12.8	21.5
EPA 901.1	PB-212	NTS02-3847-02	-8.47	10.2	10.2	15.4
EPA 901.1	AC-228	NTS02-3847-02	-11.8	22.4	22.5	36.4
EPA 901.1	TH-234	NTS02-3847-02	-5.27	96.0	96.0	166
EPA 901.1	U-235	NTS02-3847-02	0.136	8.89	8.89	13.9
EPA 901.1	U-238	NTS02-3847-02	499	1000	1010	1770
EPA 901.1	AM-241	NTS02-3847-02	-37.8	21.2	21.5	32.3

<u>Quality Control Samples</u>			
<u>Radionuclide</u>	<u>Laboratory Control (LC)</u>	<u>Laboratory Duplicate (LD)</u>	<u>Preparation Blank (PB)</u>
Gamma	SCAQC-3847-LC1	SCAQC-3847-LD1	SCAQC-3847-PB

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## **SAMPLE DELIVERY GROUP**

**V1888**

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# PARAGON ANALYTICS, INC.

225 Commerce Drive ♦ Fort Collins, CO 80524 ♦ (800) 443-1511 ♦ (970) 490-1511 ♦ FAX (970) 490-1522

February 27, 2003

Mr. Ted Redding  
Bechtel Nevada  
US DOE Zone 1, Bldg 652,  
Rm 2.M/S NTS273  
Mercury, NV, 89023

RE: Paragon Workorder: 03-02-040  
Client Project Name: CAU 330  
Client Project Number: V1888

Dear Mr. Redding:

One water sample was received from Bechtel Nevada on February 11, 2003. The samples were scheduled for Tritium (pages 1-48) and Gross Alpha/Beta (pages 1-146) analyses. The results for these analyses are contained in the enclosed reports.

Thank you for your confidence in Paragon Analytics, Inc. Should you have any questions, please call.

Sincerely,

Paragon Analytics, Inc.  
Ken Campbell  
Project Manager

KDC/mc  
Enclosure: Report





# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Tritium

---

#### **Bechtel Nevada**

CAU 330 / V1888

PAI WO 0302040

1. This report consists of one water sample received by Paragon on 2/11/03.
2. This sample was prepared according to Paragon Analytics, Inc. procedures SOP700R7.
3. The sample was analyzed for the presence of tritium according to Paragon Analytics, Inc. procedure SOP704R5. The analysis was completed on 2/21/03.
4. The analysis result for this sample is reported in units of pCi/L. The sample was not filtered prior to analysis.
5. Due to current software limitations, the DER determinations in this report were calculated using the 2 sigma TPU. The SOW indicates that the 1 sigma TPU be used in the DER determination. However, the requested DER limit of less than 3 at the 1 sigma level (which is equivalent to 1.5 at the 2 sigma level) was achieved. Data quality is not affected.
6. The matrix spike for this batch was performed on Bechtel Nevada sample PAI ID 0301164-1, from PAI WO# 0301164. This matrix spike is shared with WO# 0302040, as they were both prepared in batch LS01572. Results for the matrix spike are in Section 2 of the following report.
7. For this analysis, "Window 2" is monitored for high energy beta contamination. Sample 060204-T (PAI ID 0302040-1), laboratory control sample LS01572LCS1, and reagent blank LS01572RB1 had a "Window 2" count rates above the upper control limit of 38.49, at 38.70, 38.54, and 39.15 respectively. Sample 060204-T (PAI ID 0302040-1) and LS01572RB1 had measured activity less than the achieved MDC, therefore data quality is not believed to be affected for these samples. Due to the spiked nature and elevated activity of LS01572LCS1, any bias is insignificant compared to sample activity. Data is reported without further qualification. Please refer to QASS 252620.
8. No further anomalous situations were noted during the preparation and analysis of this sample. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Clare Lenich  
Clare Lenich  
Radiochemistry Instrument Technician

2/24/03  
Date

K. Fill  
Radiochemistry Final Data Review

2-25-03  
Date

PARAGON ANALYTICS, INC.  
Radiochemistry Data Package

**3**

Section 3

**INDIVIDUAL  
SAMPLE RESULTS**



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Gross Alpha/Beta

---

### Bechtel Nevada

CAU 330 / V1888

PAI WO 0302040

1. This report consists of one water sample received by Paragon on 2/11/03.
2. This sample was prepared according to Paragon Analytics, Inc. procedure PAI SOP702R15.
3. The sample was analyzed for gross alpha and beta activity by gas flow proportional counting according to Paragon Analytics, Inc. procedure PAI SOP724R7. The analyses were completed on 2/20/03. Gross alpha results are referenced to  $^{241}\text{Am}$ . Gross beta results are referenced to  $^{90}\text{Sr/Y}$ .
4. The analysis results for this sample are reported in units of pCi/L. The sample was not filtered prior to analysis.
5. Due to current software limitations, the DER determinations in this report were calculated using the 2 sigma TPU. The SOW indicates that the 1 sigma TPU be used in the DER determination. However, the requested DER limit of less than 3 at the 1 sigma level (which is equivalent to 1.5 at the 2 sigma level) was achieved. Data quality is not affected.
6. No anomalous situations were encountered during the preparation or analysis of this sample. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Clare Lenich  
Clare Lenich  
Radiochemistry Instrument Technician

2/24/03  
Date

Benell Kelley  
Radiochemistry Final Data Review

2/26/03  
Date

PARAGON ANALYTICS, INC.  
Radiochemistry Data Package

Section 1

**SAMPLE RESULTS  
SUMMARY**

# Sample Results Summary

Client Name: Bechtel Nevada  
 Client Project Name: CAU 330  
 Client Project Number: V1888

Laboratory Name: Paragon Analytics, Inc.  
 PAI Work Order: 0302040

Page: 1 of 1

Reported on: Monday, February 24, 2003  
 15:26:45

Lab Sample ID	Client Sample ID	Test	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0302040-1	060204-T	RD_GAB	GrAlpha	1.52E+00 +/- 1.04E+00	1.66E+00	pCi/L	Water	AB00740	2/20/03	U
0302040-1	060204-T	RD_GAB	GrBeta	2.03E+01 +/- 3.25E+00	2.46E+00	pCi/L	Water	AB00740	2/20/03	

## Comments:

Data Package ID: ABW0302040-1

### Qualifiers/Flags:

- U - Result is less than the sample specific MDC.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.

### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

# Tritium Analysis By Liquid Scintillation

Method 906.0M

## Sample Results

Page: 1 of 1

Reported on: Monday, February 24, 2003  
16:31:24

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1888

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0302040

Field ID: 060204-T  
Lab ID: 0302040-1

Sample Matrix: Water

Date Prepared: 20-Feb-03

Prep SOP: PAI 700R7

Prep Batch: LS01572

Date Collected: 06-Feb-03

Date Analyzed: 21-Feb-03

Analytical SOP: PAI 704R5

Final Aliquot: 0.01000 L

Report Basis: As Received

Count Time (min.): 80

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
H-3	7.53E+01 +/- 2.31E+02	3.84E+02	pCi/L	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: H3L0302040-1

Paragon Analytics Inc.

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## **SAMPLE DELIVERY GROUP**

**V1912**

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25 March 2003

Mr. Theodore Redding  
Bechtel Nevada Corporation  
2621 Losee Road  
Mail Stop NTS273  
Las Vegas, NV 89030-4134

**RE: Subcontract No. 30028, Task Order No. 1**  
**Data Report for LVL Batch 0303L897**  
**SDG#: V1912 Chain: Project CAU 330**

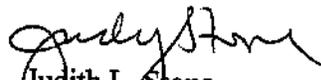
Dear Mr. Redding:

Enclosed please find the data report for 2 sludge samples and 2 water samples received 7 March 2003 for analysis for TCLP VOAs, TCLP SVOAs, PCBs, TCLP metals, and TPH GRO/DRO/ORO on a 14 day turnaround time. The invoice is enclosed. An EDD is not required. Data were faxed 20 and 21 March.

Please do not hesitate to contact me at (610) 280-3029 with any questions or at any time we may be of service.

Very truly yours,

Lionville Laboratory Incorporated

  
Judith L. Stone  
Senior Project Manager

Enclosure:

**PROJECT/CLIENT INFORMATION**  
 Project: CAU 330 BN Ord # 3502  
 Charge Number: 5B02B250  
 Project Manager: Jeffrey Smith  
 Phone: 702-295-7775 Fax: 702-295-7761 MS: A75306

**REPORT & TURNAROUND INFORMATION**  
 Send Report to: Marcus Dixon  
 Phone: 702-295-4001 Fax: 702-295-7761 MS: A75306  
 Turnaround:  Standard - 14 days IH, 28 days Non-rad Env, 45 Days Rad Env, (IH)  
 Rush Preliminary by:  1  2  7  14  28 (Radiological Env)

**SAMPLE INFORMATION**  
 Sampling Site: CAU 336  
 The samples submitted contain (check):  
 Hazardous (fist)  
 Radioactive (fist)  
 Unknown contaminants  
 If known, identify contaminants.  
 This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

**SAMPLE MANAGEMENT INFORMATION**  
 SDG: (IH) V1912 (Non-Rad Env) (Rad Env)  
 Samples submitted are associated with a signed Project SOW  Yes  No  
 Analyses entered here agree with the SOW  Yes  No  N/A  
 If not, identify the variation:  
 Subcontract Lab(s) used for this work: LIONVILLE

ID/DESCRIPTION	SAMPLING		CONTAINER #	EST. Vol	MATERIAL	QC			Pres - Analysis eg. HCl - VOCs
	DATE	TIME				MSD	MS	MD	
330-TB1	3/5/03	8:02	1	40ml	water				H <sub>2</sub> SO <sub>4</sub>
330-TB2	3/5/03	8:04	1	40ml	water				H <sub>2</sub> SO <sub>4</sub>
060204-T3	3/5/03	11:43	6	per method	sludge				
060204-T4	3/5/03	12:07	6	per method	sludge				
<del>LAST ITEM.</del>									

CUSTODY TRANSFER		Signature	Date/Time	Received by (print)	Signature	Date/Time
Sampled/Relinquished (print)	Marcus Dixon	Marcus Dixon	3/6/03 9:28	CA CASTAÑEDA	CA Castañeda	3/6/03 @ 09:38
	CA CASTAÑEDA	CA Castañeda	3/6/03 12:10	Paul Ex	7915-48349619	3/6/03 @ 13:00
	Paul Ex	Paul Ex	3-7-03 09:40	D. Smith	D. Smith	3-7-03 / 09:40

## Case Narrative



Client: BECHTEL-NEVADA V1912  
LVL #: 0303L897

W.O. #: 60052-001-001-0001-00  
Date Received: 03-07-2003

### GC/MS VOLATILE-TCLP

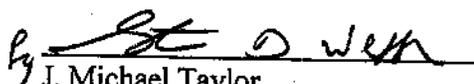
The set of samples consisted of two (2) water and two (2) leachate samples.

The leachate samples were generated on 03-11-2003 from sludge samples. All samples were collected on 03-05-2003.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCLP Volatile target compounds on 03-12-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for analysis was met.
3. The leachate samples were analyzed at a 5-fold dilution due to the sample matrix.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. Internal standard area and retention time criteria were met.
8. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

03-18-03  
Date

son\group\data\voa\bechtel-nevada\0303\897.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

- U** = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** = Interference.
- NQ** = Result qualitatively confirmed but not able to quantify.
- N** = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** = Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY OF VOA DATA

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP, Z = Indicates Spiked Compound.

**Sample Data for each Sample**

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

330-TB7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: WATER

Lab Sample ID: 0303L897-001

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: x031209

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture: not dec.       

Date Analyzed: 03/12/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>MG/L</u>	
75-01-4	Vinyl Chloride	0.010	U
75-35-4	1,1-Dichloroethene	0.005	U
67-66-3	Chloroform	0.005	U
107-06-2	1,2-Dichloroethane	0.005	U
78-93-3	2-Butanone	0.010	U
56-23-5	Carbon Tetrachloride	0.005	U
79-01-6	Trichloroethene	0.005	U
71-43-2	Benzene	0.005	U
127-18-4	Tetrachloroethene	0.005	U
108-90-7	Chlorobenzene	0.005	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

330-TBS

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: WATER Lab Sample ID: 0303L897-002

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: x031208

Level: (low/med) LOW Date Received: 03/07/03

% Moisture: not dec.        Date Analyzed: 03/12/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>MG/L</u>	
75-01-4	Vinyl Chloride	0.010	U
75-35-4	1,1-Dichloroethane	0.005	U
67-66-3	Chloroform	0.005	U
107-06-2	1,2-Dichloroethane	0.005	U
78-93-3	2-Butanone	0.010	U
56-23-5	Carbon Tetrachloride	0.005	U
79-01-6	Trichloroethene	0.005	U
71-43-2	Benzene	0.005	U
127-18-4	Tetrachloroethene	0.005	U
108-90-7	Chlorobenzene	0.005	U

FORM 1 V-1

12/88 Rev.

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: WATER

Lab Sample ID: 03031897-005

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: x031210

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 03/12/03

Column: (pack/cap) CAP

Dilution Factor: 5.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>MG/L</u>	
75-01-4	Vinyl Chloride	0.050	U
75-35-4	1,1-Dichloroethene	0.025	U
67-66-3	Chloroform	0.025	U
107-06-2	1,2-Dichloroethane	0.025	U
78-93-3	2-Butanone	0.050	U
56-23-5	Carbon Tetrachloride	0.025	U
79-01-6	Trichloroethene	0.025	U
71-43-2	Benzene	0.025	U
127-18-4	Tetrachloroethene	0.025	U
108-90-7	Chlorobenzene	0.025	U

FORM 1 V-1

12/88 Rev.



# Case Narrative



## Analytical Report

Client : BECHTEL NEVADA V1912  
LVL# : 0303L897

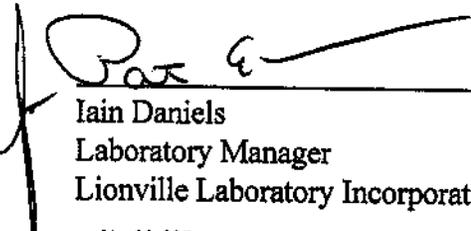
W.O.# : 60052-001-001-0001-00  
Date Received : 03-07-03

### SW846 METALS

1. This narrative covers the analyses of 2 TCLP leachate samples.
2. The samples were prepared and analyzed in accordance with SW-846 protocol and reported with a CLP deliverable. All samples were reported with six fold dilutions due to sample matrix.
3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.
4. All analyses were performed within the required holding times.
5. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
6. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits.
7. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
8. All preparation/method blanks were within method criteria. Refer to form 3.
9. All ICP Interference Check Standards were within control limits. Refer to form 4.
10. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.
11. All serial dilution percent differences were within SW-846 control limits. Refer to form 9.
12. The TCLP extract from sample 060204-T3 was selected for the matrix spike (MS) for this analytical batch. The MS recoveries for all analytes in the TCLP extract were above 50% per method criteria.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

13. All sample IDs were changed to accommodate the EPA naming convention which allows a maximum of 6 characters on all CLP Forms. Refer to the comments section of form 1 for the original ID.
14. Recoveries on the Laboratory Summary Report and CLP forms will vary depending on the number of significant figures used in the recovery calculation.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated  
gmb\m03-897

03-19-03  
Date

## METHOD REFERENCES AND DATA QUALIFIERS

### DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

### Q QUALIFIERS

- E = The reported value is estimated because of the presence of interference.
- M = Duplicate injection precision not met.
- N = Spiked sample recovery not within control limits.
- S = The reported value was determined by the Method of Standard Additions (MSA).
- W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.
- \* = Duplicate analysis not within control limits.
- + = Correlation coefficient for the MSA is less than 0.995.

### ABBREVIATIONS

- PB = Method or Preparation Blank.
- S = Matrix Spike.
- T = Matrix Spike Duplicate.
- R or D = Sample Replicate

### ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, approximately 0.3 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Flame AA.
4. Graphite Furnace AA.

RFW 21-21L-033/O-01/97





## **Case Narrative**



**Analytical Report**

**Client:** BECHTEL NEVADA V1912  
**LVL #:** 0303L897

**W.O. #:** 60052-001-001-0001-00  
**Date Received:** 03-07-03

**GRO**

The set of samples consisted of two (2) solid samples collected on 03-05-03.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline range organics (GRO) on 03-12-03.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. All required holding times for analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

Date 3/18/03

pef\Rgroup\data\GRO\03-897.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## Sample Data

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: SOLID

Lab Sample ID: 0303L897-003

Sample wt/vol: 5.02 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture: not dec. 42

Date Analyzed: 03/12/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----Gasoline Range Organics (GRO)	51	U
--	----	---

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: SOLID

Lab Sample ID: 0303L897-004

Sample wt/vol: 5.68 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture: not dec. 51

Date Analyzed: 03/12/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG
86290-81-5-----	Gasoline Range Organics (GRO)	54 U

12/88 Rev.

## Case Narrative



## Analytical Report

**Client:** BECHTEL-NEVADA V1912  
**LVL #:** 0303L897

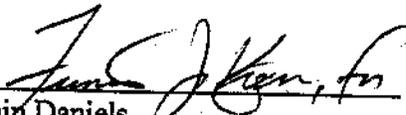
**W.O. #:** 60052-001-001-0001-00  
**Date Received:** 03-07-03

### DIESEL RANGE ORGANICS

The set of samples consisted of two (2) sludge samples collected on 03-05-03.

The samples and their associated QC samples were extracted on 03-10-03 and analyzed according to Lionville Laboratory OPs on 03-11,12-03. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated  
pefr:\trou\data\dro\bechtel\03L-897.doc

3/17/03  
Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## Sample Data

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: SOLID

Lab Sample ID: 0303L897-003

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture: not dec. 42

Date Analyzed: 03/12/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	71	
00-00-0000-----	Motor Oil	120	

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: SOLID

Lab Sample ID: 0303L897-004

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture: not dec. 51

Date Analyzed: 03/12/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	58	
00-00-0000-----	Motor Oil	98	

12/88 Rev.

## **CASE NARRATIVE**



## Analytical Report

Client: BECHTEL-NEVADA V1912  
LVL #: 0303L897

W.O. #: 60052-001-001-0001-00  
Date Received: 03-07-2003

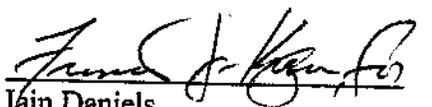
### PCB

Two (2) solid samples were collected on 03-05-2003.

The samples and their associated QC samples were extracted on 03-10-2003 and analyzed according to Lionville Laboratory OPs on 03-19-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. Samples and their associated QC samples received a Sulfuric Acid cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. One (1) of twelve (12) surrogate recoveries was outside acceptance criteria. However, EPA CLP surrogate recovery criteria were met (i.e., no more than one outlier per sample).
6. The blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

3/25/03  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

**SAMPLE DATA FOR EACH SAMPLE**

1D  
 PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: SOLID Lab Sample ID: 0303L897-003

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BLKLACHJ.02

Level: (low/med) LOW Date Received: 03/07/03

% Moisture: not dec. 42 dec. Date Extracted: 03/10/03

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 03/19/03

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>	
12674-11-2-----	Aroclor-1016	58	U
11104-28-2-----	Aroclor-1221	120	U
11141-16-5-----	Aroclor-1232	58	U
53469-21-9-----	Aroclor-1242	58	U
12672-29-6-----	Aroclor-1248	58	U
11097-69-1-----	Aroclor-1254	58	U
11096-82-5-----	Aroclor-1260	58	U

FORM 1 PEST

12/88 Rev.

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: SOLID Lab Sample ID: 0303L897-004

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BLKLACHJ.02

Level: (low/med) LOW Date Received: 03/07/03

% Moisture: not dec. 51 dec. Date Extracted: 03/10/03

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 03/19/03

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>	
12674-11-2-----	Aroclor-1016	69	U
11104-28-2-----	Aroclor-1221	140	U
11141-16-5-----	Aroclor-1232	69	U
53469-21-9-----	Aroclor-1242	69	U
12672-29-6-----	Aroclor-1248	69	U
11097-69-1-----	Aroclor-1254	69	U
11096-82-5-----	Aroclor-1260	69	U

FORM 1 PEST

12/88 Rev.

## Case Narrative



Client: BECHTEL-NEVADA V1912  
LVL #: 0303L897

W.O. #: 60052-001-001-0001-00  
Date Received: 03-07-2003

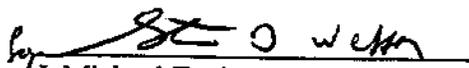
### SEMIVOLATILE-TCLP

Two (2) leachate samples were generated on 03-11-2003 from sludge samples collected on 03-05-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3520 on 03-12-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on Method 8270C for TCLP Semivolatile target compounds on 03-19,20-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for extraction and analysis was met.
3. Samples were extracted at 5-fold dilution (200mL has been used instead of 1000mL) due to leachate sample matrix.
4. One (1) of forty-two (42) surrogate recoveries was outside EPA QC limits. However, EPA CLP surrogate recovery criteria were met (i.e., no more than one outlier per fraction {acid and base neutral} and no recoveries less than 10%).
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. Internal standard area and retention time criteria were met.
8. Manual integrations are performed according to OP 21-06A-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
J. Michael Taylor  
President

03-25-03  
Date

Lionville Laboratory Incorporated

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY OF BNA DATA

### DATA QUALIFIERS

- U - Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J - Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D - Identifies all compounds identified in an analysis at a secondary dilution factor.
- I - Interference.
- NQ - Result qualitatively confirmed but not able to quantify.
- A - Indicates that a TIC is a suspected aldol-condensation product.
- N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X - This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y - Additional qualifiers used as required are explained in the case narrative.

## Sample Data for each Sample

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: (soil/water) WATER

Lab Sample ID: 0303L897-007

Sample wt/vol: 200 (g/mL) ML

Lab File ID: A031916

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture:        decanted: (Y/N)    

Date Extracted: 03/12/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 03/19/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

CAS NO.	COMPOUND	Q
110-86-1-----	Pyridine	0.050 U
106-46-7-----	1,4-Dichlorobenzene	0.050 U
95-48-7-----	2-Methylphenol	0.050 U
106-44-5-----	3- and/or 4-Methylphenol	0.050 U
67-72-1-----	Hexachloroethane	0.050 U
98-95-3-----	Nitrobenzene	0.050 U
87-68-3-----	Hexachlorobutadiene	0.050 U
88-06-2-----	2,4,6-Trichlorophenol	0.050 U
95-95-4-----	2,4,5-Trichlorophenol	0.12 U
121-14-2-----	2,4-Dinitrotoluene	0.050 U
118-74-1-----	Hexachlorobenzene	0.050 U
87-86-5-----	Pentachlorophenol	0.12 U

FORM 1 SV-1

RFW (v3.3)

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1912

Matrix: (soil/water) WATER

Lab Sample ID: 0303L897-008

Sample wt/vol: 200 (g/mL) ML

Lab File ID: A032006

Level: (low/med) LOW

Date Received: 03/07/03

% Moisture:        decanted: (Y/N)   

Date Extracted: 03/12/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 03/20/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N

pH: 7.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

CAS NO.	COMPOUND	Q
110-86-1-----	Pyridine	0.050 U
106-46-7-----	1,4-Dichlorobenzene	0.050 U
95-48-7-----	2-Methylphenol	0.050 U
106-44-5-----	3- and/or 4-Methylphenol	0.050 U
67-72-1-----	Hexachloroethane	0.050 U
98-95-3-----	Nitrobenzene	0.050 U
87-68-3-----	Hexachlorobutadiene	0.050 U
88-06-2-----	2,4,6-Trichlorophenol	0.050 U
95-95-4-----	2,4,5-Trichlorophenol	0.12 U
121-14-2-----	2,4-Dinitrotoluene	0.050 U
118-74-1-----	Hexachlorobenzene	0.050 U
87-86-5-----	Pentachlorophenol	0.12 U

FORM 1 SV-1

RFW (v3.3)

## **SAMPLE DELIVERY GROUP**

**1913**

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# PARAGON ANALYTICS, INC.

225 Commerce Drive ♦ Fort Collins, CO 80524 ♦ (800) 443-1511 ♦ (970) 490-1511 ♦ FAX (970) 490-1522

April 1, 2003

Mr. Ted Redding  
Bechtel Nevada  
US DOE Zone 1, Bldg. 652,  
RM 2, M/S NTS273  
Mercury, NV 89023

RE: Paragon Workorder: 03-03-017  
Client Project Name: CAU 350  
Client Project Number: V1913

Dear Mr. Redding:

Two sludge samples were received from Bechtel Nevada on March 7, 2003. The samples were scheduled for the following analyses:

Tritium	pages 1-47
Gross Alpha/Beta	pages 1-149
Gamma Spectroscopy	pages 1-124

The results for these analyses are contained in the enclosed reports.

Thank you for your confidence in Paragon Analytics, Inc. Should you have any questions, please call.

Sincerely,

Paragon Analytics, Inc.  
Ken Campbell  
Project Manager

KDC/mc  
Enclosure: Report





# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Tritium

---

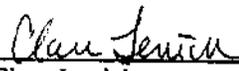
#### Bechtel Nevada

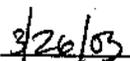
CAU 330 / V1913

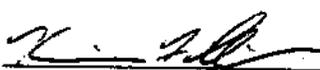
PAI WO 0303017

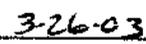
1. This report consists of 2 sludge samples received by Paragon on 3/7/03.
2. These samples were prepared according to Paragon Analytics, Inc. procedures SOP700R7.
3. The samples were analyzed for the presence of tritium according to Paragon Analytics, Inc. procedure SOP704R5. The analyses were completed on 3/12/03.
4. The analysis results for these samples are reported on an 'as received' basis in units of pCi/gram.
5. Sample from this work order were received as a sludge, with a liquid and solid phase. Due to an oversight, the liquid phase was decanted, and the tritium analysis was performed on this fraction of the sample. The client requested the samples be analyzed and reported on an 'as received' basis including the liquid phase. The moisture content was determined including the liquid phase, and was used to calculate the equivalent analysis volume. Please refer to QASS 256651 for sample calculations.
6. Due to current software limitations, the DER determinations in this report were calculated using the 2 sigma TPU. The SOW indicates that the 1 sigma TPU be used in the DER determination. However, the requested DER limit of less than 3 at the 1 sigma level (which is equivalent to 1.5 at the 2 sigma level) was achieved. Data quality is not affected.
7. No further anomalous situations were noted during the preparation and analysis of these samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Clare Lenich  
Radiochemistry Instrument Technician

  
Date

  
Radiochemistry Final Data Review

  
Date

PARAGON ANALYTICS, INC.  
Radiochemistry Data Package

3

Section 3

**INDIVIDUAL  
SAMPLE RESULTS**

000009

# Tritium Analysis By Liquid Scintillation

Method 906.0M

## Sample Results

Page: 1 of 2

Reported on: Tuesday, March 25, 2003  
15:11:03

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: V1913

PAI Work Order: 0303017

Field ID: 060204-T3

Sample Matrix: Sludge

Date Collected: 05-Mar-03

Final Aliquot: 1.744 g

Lab ID: 0303017-1

Date Prepared: 11-Mar-03

Date Analyzed: 12-Mar-03

Report Basis: As Received

Prep SOP: PAI 700R7

Analytical SOP: PAI 704R5

Count Time (min.): 30

Prep Batch: LS01596

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
H-3	-4.27E-01 +/- 2.13E+00	3.64E+00	pCi/g	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: H3S0303017-1

Paragon Analytics Inc.

000010

# Tritium Analysis By Liquid Scintillation

Method 906.0M

## Sample Results

Page: 2 of 2

Reported on: Tuesday, March 25, 2003  
15:11:03

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: V1913

PAI Work Order: 0303017

Field ID: 060204-T4

Sample Matrix: Sludge

Date Collected: 05-Mar-03

Final Aliquot: 1.655 g

Lab ID: 0303017-2

Date Prepared: 11-Mar-03

Date Analyzed: 12-Mar-03

Report Basis: As Received

Prep SOP: PAI 700R7

Analytical SOP: PAI 704R5

Count Time (min.): 30

Prep Batch: LS01596

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
H-3	9.54E-02 +/- 2.26E+00	3.83E+00	pCi/g	U

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: H3S0303017-1

Paragon Analytics Inc.

000012



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative Gamma Spectroscopy

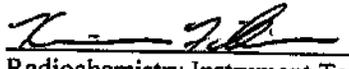
### Bechtel Nevada

CAU 330 / V1913

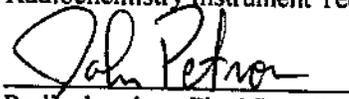
Paragon Work Order 0303017

1. This report consists of analysis results for two sludge samples received by Paragon on 3/7/03. The analysis results for these samples are reported on an 'as received' basis in units of pCi/gram.
2. These samples were prepared according to Paragon Analytics, Inc. procedure PAI SOP739R5.
3. The samples were analyzed for the presence of gamma emitting radionuclides according to Paragon Analytics, Inc. procedure PAI SOP713R7. The analyses were completed on 3/14/03.
4. The samples were analyzed using Seeker Version 2.2, which is a product of Vertechs Software Solutions, Inc.
5. Sample volumes were insufficient to allow preparation of a duplicate. A duplicate analysis of sample 060204-T3 (PAI ID 0303017-1) was performed in lieu of a preparation duplicate.
6. Due to current software limitations, the DER determinations in this report were calculated using the 2 sigma TPU. The SOW indicates that the 1 sigma TPU be used in the DER determination. However, the requested DER limit of less than 3 at the 1 sigma level (which is equivalent to 1.5 at the 2 sigma level) was achieved. Data quality is not affected.
7. Activity concentrations above the  $2\sigma$  TPU are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above critical level (generally the most abundant, interference-free photopeak), or the minimum library peak tolerance of 75% must be attained. These data have been flagged with a "TI" qualifier.
8. No problems were encountered with either the client samples or the associated quality control samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Radiochemistry Instrument Technician

3-17-03  
Date

  
Radiochemistry Final Data Review

3/23/03  
Date

PARAGON ANALYTICS, INC.  
Radiochemistry Data Package



Section 3

**INDIVIDUAL  
SAMPLE RESULTS**

000010

# Gamma Spectroscopy Results

## Method PAI 713R7

### Sample Results

Page: 1 of 4

Reported on: Monday, March 17, 2003  
13:58:47

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: V1913

PAI Work Order: 0303017

Field ID: 060204-T3

Lab ID: 0303017-1

Sample Matrix: Sludge

Date Prepared: 10-Mar-03

Prep SOP: PAI 739R5

Prep Batch: GS01922

Date Collected: 05-Mar-03

Date Analyzed: 14-Mar-03

Analytical SOP: PAI 713R7

Spectrum Code: 030257D03A

Final Aliquot: 507.3 g

Report Basis: As Received

Count Time (min.): 30

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	8.63E-01 +/- 2.73E-01	4.76E-01	pCi/g	
Am-241	-2.12E-01 +/- 4.20E-01	7.46E-01	pCi/g	U
Ce-144	4.44E-01 +/- 3.43E-01	5.30E-01	pCi/g	U
Co-60	-5.50E-02 +/- 6.52E-02	1.37E-01	pCi/g	U
Cs-134	-5.51E-03 +/- 5.49E-02	1.00E-01	pCi/g	U
Cs-137	1.39E+00 +/- 2.78E-01	1.05E-01	pCi/g	
Eu-152	4.16E-01 +/- 2.78E-01	3.38E-01	pCi/g	TI
Eu-154	2.58E-02 +/- 2.78E-01	5.19E-01	pCi/g	U
Eu-155	7.77E-02 +/- 2.00E-01	3.38E-01	pCi/g	U
K-40	1.64E+01 +/- 3.39E+00	1.30E+00	pCi/g	
Pb-212	-9.87E-01 +/- 2.23E-01	1.71E-01	pCi/g	
Pm-144	-4.19E-02 +/- 6.24E-02	1.19E-01	pCi/g	U
Pm-146	2.96E-02 +/- 8.18E-02	1.40E-01	pCi/g	U
Ru-106	-9.97E-02 +/- 5.02E-01	9.37E-01	pCi/g	U
Sb-125	-5.85E-02 +/- 1.66E-01	3.03E-01	pCi/g	U
Th-234	1.85E+00 +/- 1.42E+00	2.25E+00	pCi/g	U
U-235	-1.11E-02 +/- 3.09E-01	5.39E-01	pCi/g	U
Y-88	4.35E-03 +/- 6.79E-02	1.24E-01	pCi/g	U

Data Package ID: GSS0303017-1

Paragon Analytics Inc.

000011

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 2 of 4

Reported on: Monday, March 17, 2003  
13:58:47

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: V1913

PAI Work Order: 0303017

Field ID: 060204-T3

Sample Matrix: Sludge

Date Collected: 05-Mar-03

Final Aliquot: 507.3 g

Lab ID: 0303017-1

Date Prepared: 10-Mar-03

Date Analyzed: 14-Mar-03

Report Basis: As Received

Prep SOP: PAI 739R5

Analytical SOP: PAI 713R7

Count Time (min.): 30

Prep Batch: GS01922

Spectrum Code: 030257D03A

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
----------------	--------------------	-----	-----------------	---------------

### Comments:

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC or less than the associated TPU.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- SQ - Spectral quality prevents accurate quantitation.
- SI - Nuclide identification and/or quantitation is tentative.
- TI - Nuclide identification is tentative.
- R - Nuclide has exceeded 8 half-lives.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 708)

Data Package ID: GSS0303017-1

Paragon Analytics Inc.

000312

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 3 of 4

Reported on: Monday, March 17, 2003  
13:58:47

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1913

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0303017

Field ID: 060204-T4

Lab ID: 0303017-2

Sample Matrix: Sludge

Date Prepared: 10-Mar-03

Prep SOP: PAI 739R5

Prep Batch: GS01922

Date Collected: 05-Mar-03

Date Analyzed: 14-Mar-03

Analytical SOP: PAI 713R7

Spectrum Code: 030402D08A

Final Aliquot: 501.2 g

Report Basis: As Received

Count Time (min.): 30

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	7.59E-01 +/- 2.52E-01	3.46E-01	pCi/g	
Am-241	-2.22E-03 +/- 8.31E-02	1.62E-01	pCi/g	U
Ce-144	7.20E-02 +/- 2.72E-01	4.66E-01	pCi/g	U
Co-60	-1.78E-02 +/- 4.90E-02	1.03E-01	pCi/g	U
Cs-134	-1.27E-02 +/- 4.78E-02	8.99E-02	pCi/g	U
Cs-137	1.10E+00 +/- 2.29E-01	9.18E-02	pCi/g	
Eu-152	2.95E-02 +/- 3.06E-01	5.74E-01	pCi/g	U
Eu-154	-2.08E-01 +/- 2.87E-01	5.98E-01	pCi/g	U
Eu-155	4.34E-02 +/- 1.36E-01	2.31E-01	pCi/g	U
K-40	1.24E+01 +/- 2.69E+00	8.94E-01	pCi/g	
Pb-212	8.60E-01 +/- 1.99E-01	1.49E-01	pCi/g	
Pm-144	-3.42E-02 +/- 5.53E-02	1.07E-01	pCi/g	U
Pm-146	1.51E-02 +/- 6.43E-02	1.13E-01	pCi/g	U
Ru-106	-4.58E-01 +/- 4.87E-01	9.77E-01	pCi/g	U
Sb-125	1.40E-01 +/- 1.22E-01	2.11E-01	pCi/g	U
Th-234	2.69E-01 +/- 7.77E-01	1.31E+00	pCi/g	U
U-235	-2.66E-01 +/- 2.81E-01	5.17E-01	pCi/g	U
Y-88	1.91E-02 +/- 5.48E-02	9.73E-02	pCi/g	U

Data Package ID: GSS0303017-1

Paragon Analytics Inc.

000015

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 4 of 4

Reported on: Monday, March 17, 2003  
13:58:48

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: V1913

PAI Work Order: 0303017

Field ID: 060204-T4

Lab ID: 0303017-2

Sample Matrix: Sludge

Date Prepared: 10-Mar-03

Prep SOP: PAI 739R5

Prep Batch: GS01922

Date Collected: 05-Mar-03

Date Analyzed: 14-Mar-03

Analytical SOP: PAI 713R7

Spectrum Code: 030402D08A

Final Aliquot: 501.2 g

Report Basis: As Received

Count Time (min.): 30

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
----------------	--------------------	-----	-----------------	---------------

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide Identification and/or quantitation is tentative.

TI - Nuclide Identification is tentative.

R - Nuclide has exceeded 8 half-lives.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 708)

Data Package ID: GSS0303017-1

Paragon Analytics Inc.

000016



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative

### Gross Alpha/Beta

---

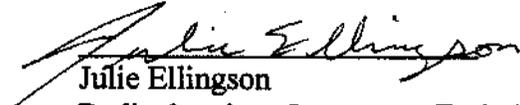
#### Bechtel Nevada

CAU 330 / V1913

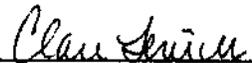
PAI WO 0303017

1. This report consists of two sludge samples received by Paragon on 03/07/03.
2. These samples were prepared according to Paragon Analytics, Inc. procedure PAI SOP702R15.
3. The samples were analyzed for gross alpha and beta activity by gas flow proportional counting according to Paragon Analytics, Inc. procedure PAI SOP724R7. The analyses were completed on 03/25/03. Gross alpha results are referenced to  $^{241}\text{Am}$ . Gross beta results are referenced to  $^{90}\text{Sr/Y}$ .
4. The analysis results for these samples are reported on an 'as received' weight basis in units of pCi/gram. The samples were weighed out on a dry weight basis and were converted to an 'as received' weight basis by using the percent moisture. Please refer to QASS 256650.
5. These samples were flamed, as prescribed in EPA Methods 900.0 and 9310 for samples which demonstrate hygroscopicity. This could reduce the beta activity if the samples contained  $^{137}\text{Cs}$ , or other beta emitters, that may be volatile under the conditions associated with flaming.
6. Due to current software limitations, the DER determinations in this report were calculated using the 2 sigma TPU. The SOW indicates that the 1 sigma TPU be used in the DER determination. However, the requested DER limit of less than 3 at the 1 sigma level (which is equivalent to 1.5 at the 2 sigma level) was achieved. Data quality is not affected.
7. No anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Julie Ellingson  
Radiochemistry Instrument Technician

3/26/03  
Date

  
Clara Krueger  
Radiochemistry Final Data Review

3/26/03  
Date

PARAGON ANALYTICS, INC.  
Radiochemistry Data Package

3

Section 3

**INDIVIDUAL  
SAMPLE RESULTS**

000010

# Gross Alpha/Beta Analysis

Method PAI SOP 724R7

## Sample Results

Page: 1 of 2

Reported on: Wednesday, March 26, 2003  
12:38:33

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: V1913

PAI Work Order: 0303017

Field ID: 060204-T3

Sample Matrix: Sludge

Date Collected: 05-Mar-03

Final Aliquot: 0.8900 g

Date Prepared: 17-Mar-03

Date Analyzed: 25-Mar-03

Report Basis: As Received

Lab ID: 0303017-1

Prep SOP: PAI 702R15

Analytical SOP: PAI 724R7

Count Time (min.): 60

Prep Batch: AB00769

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
GrAlpha	3.35E+00 +/- 9.88E-01	8.41E-01	pCi/g	LT
GrBeta	4.93E+00 +/- 1.14E+00	1.21E+00	pCi/g	LT

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ABS0303017-1

Paragon Analytics Inc.

000011

# Gross Alpha/Beta Analysis

Method PAI SOP 724R7

## Sample Results

Page: 2 of 2

Reported on: Wednesday, March 26, 2003  
12:38:33

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Laboratory Name: Paragon Analytics, Inc.

Client Project Number: V1913

PAI Work Order: 0303017

Field ID: 060204-T4

Sample Matrix: Sludge

Date Collected: 05-Mar-03

Final Aliquot: 0.9700 g

Lab ID: 0303017-2

Date Prepared: 17-Mar-03

Date Analyzed: 25-Mar-03

Report Basis: As Received

Prep SOP: PAI 702R15

Analytical SOP: PAI 724R7

Count Time (min.): 60

Prep Batch: AB00769

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
GrAlpha	2.78E+00 +/- 8.69E-01	7.03E-01	pCi/g	LT
GrBeta	5.00E+00 +/- 1.09E+00	1.06E+00	pCi/g	LT

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: ABS0303017-1

Paragon Analytics Inc.

000013

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## **SAMPLE DELIVERY GROUP**

**V1958**

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14 May 2003

Mr. Theodore Redding  
Bechtel Nevada Corporation  
2621 Losee Road  
Mail Stop NTS273  
Las Vegas, NV 89030-4134

**RE: Subcontract No. 30028, Task Order No. 1**  
**Data Report for LVL Batch 0304L254**  
**SDG#: V1958 Chain: CAU 330**

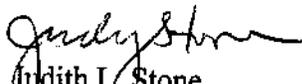
Dear Mr. Redding:

Enclosed please find the data report for 3 soil samples received 23 April 2003 for analysis for TPH DRO on a 28 day turnaround time. The invoice is enclosed. An EDD is not required.

Please do not hesitate to contact me at (610) 280-3029 with any questions or at any time we may be of service.

Very truly yours,

Lionville Laboratory Incorporated

  
Judith L. Stone  
Senior Project Manager

Enclosure:

0304254



ANALYTICAL LABORATORY  
**SERVICES REQUEST & CHAIN OF CUSTODY RECORD**

<b>PROJECT/CLIENT INFORMATION</b>		<b>REPORT &amp; TURNAROUND INFORMATION</b>	
Project: CA1 336	BN Ord #: 8502	Send Report to: Marcus Divo	M/S: 05336
Charge Number: 5302 B D 5 0	Phone: 702-245-4001	Fac: 702-245-7761	M/S: 05336
Project Manager: Jeffrey Smith	Turnaround: <input checked="" type="checkbox"/> Standard - 14 days IH, 28 days Non-rad Env, 45 Days Rad Env, (IH) <input type="checkbox"/> Rush Preliminary by: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 7 <input type="checkbox"/> 14 <input type="checkbox"/> 28 (Radiological Env)		
Phone: 702-245-7775	Fac: 702-245-7761	M/S: 05336	

**SAMPLE INFORMATION**

Sampling Site: CA1 330  
 The samples submitted contain (check):  
 Hazardous (list)  
 Radioactive (list)  
 Unknown contamination.  
 If known, identify contaminants.  
 This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

**SAMPLE MANAGEMENT INFORMATION**

SDG: (IH) V1958 (Non-Rad Env) (Rad Env)  
 Samples submitted are associated with a signed Project SOW  Yes  No  
 Analyses entered here agree with the SOW  Yes  No  N/A  
 If not, identify the variation:  
 Subcontract Lab(s) used for this work: LIQUVILLE

ID/DESCRIPTION	SAMPLING DATE	TIME	MATRIX	CONTAINER #	Est. Vol	QC			Pres - Analysis eg. HCl - VOCs
						MSD	MS	MSD	
060204 - P1	4/21/03	10:17	soil	1	250ml				X
060204 - P0	4/21/03	10:24	soil	1	250ml				X
060204 - P2	4/21/03	11:20	soil	1	250ml				X
LAST ITEM									

CUSTODY TRANSFER Sampled/Relinquished (print)	Signature	Date/Time	Received by (print)	Signature	Date/Time
CA CASTANEDA	CA Castaneda	4/21/03 17:00	Fred Ex	792873963213	4/22/03 @ 1300
Fred Ex	CA Castaneda	4/23/03 @ 09:25	VICTOR HELMAN	792873963213	4/23/03 @ 09:25

## **CASE NARRATIVE**



## Analytical Report

Client: BECHTEL-NEVADA V1958  
LVL #: 0304L254

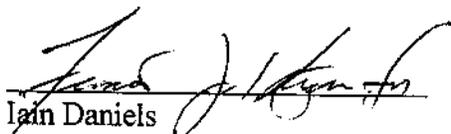
W.O. #: 60052-001-001-0001-00  
Date Received: 04-23-03

### DIESEL RANGE ORGANICS

The set of samples consisted of three (3) soil samples collected on 04-21-03.

The samples and their associated QC samples were extracted on 04-24-03 and analyzed according to Lionville Laboratory OPs on 05-09-03. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

pef\fr:\troup\data\dro\bechtel\04L-254.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP = Indicates Spiked Compound.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-P1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1958

Matrix: SOIL

Lab Sample ID: 0304L254-001

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/23/03

% Moisture: not dec. 5

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) mg/kg

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	12.7	U
00-00-0000-----	Motor Oil	12.7	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-PO

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1958

Matrix: SOIL Lab Sample ID: 0304L254-002

Sample wt/vol: 25.0 (g/mL) G Lab File ID: BLKLACHJ

Level: (low/med) LOW Date Received: 04/23/03

% Moisture: not dec. 5 Date Analyzed: 05/09/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) mg/kg

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	12.7	U
00-00-0000-----	Motor Oil	12.7	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-P2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1958

Matrix: SOIL

Lab Sample ID: 0304L254-003

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/23/03

% Moisture: not dec. 5

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.6	U
00-00-0000-----	Motor Oil	12.6	U

12/88 Rev.

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## **SAMPLE DELIVERY GROUP**

**V1962**

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21 May 2003

Mr. Theodore Redding  
Bechtel Nevada Corporation  
2621 Losee Road  
Mail Stop NTS273  
Las Vegas, NV 89030-4134

**RE: Subcontract No. 30028, Task Order No. 1**  
**Data Report for LVL Batch 0304L269**  
**SDG#: V1962 Chain: Project CAU 330**

Dear Mr. Redding:

Enclosed please find the data report for 2 soil samples and 2 water samples received 24 April 2003 for analysis for VOAs, SVOAs, PCBs, TPH GRO/DRO and metals on a 28 day turnaround time. The invoice is enclosed. An EDD is not required.

Please note that the pay items for VOAs and SVOAs were revised after sample receipt; all were requested as "without TICs" per your instructions. Copies of the emails are enclosed.

Please do not hesitate to contact me at (610) 280-3029 with any questions or at any time we may be of service.

Very truly yours,

Lionville Laboratory Incorporated

  
Judith L. Stone  
Senior Project Manager

Enclosure:



**ANALYTICAL LABORATORY  
SERVICES REQUEST & CHAIN OF CUSTODY RECORD**

<b>PROJECT/CLIENT INFORMATION</b>		<b>REPORT &amp; TURNAROUND INFORMATION</b>	
Project: <u>CAU 330</u>	BN Orig #: <u>BS02</u>	Send Report to: <u>Marcos Dixon</u>	<b>SAMPLE INFORMATION</b>
Charge Number: <u>5 B02 B D50</u>	Phone: <u>702-295-4001</u> Fax: <u>702-295-7761</u> MIS: <u>MTS 306</u>	Turnaround: <input checked="" type="checkbox"/> Standard 14 days 14, 28 days Non-rad Env, 45 Days Rad Env, (1H) <input type="checkbox"/> Rush Preliminary by: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 7 <input type="checkbox"/> 14 <input type="checkbox"/> 28 (Radiological Env)	Sampling Site: <u>CAU 330</u> The samples submitted contain (check): <input type="checkbox"/> Hazardous (list) - <input type="checkbox"/> Radioactive (list) - <input type="checkbox"/> Unknown contamination. If known, identify contaminants. This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

<b>SAMPLE MANAGEMENT INFORMATION</b>		<b>Pay Item, Analysis, Method</b>	
SDG: <u>(IH) V1962</u> (Non-Rad Env) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Rad Env)	Samples submitted are associated with a signed Project SOW <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Analyses entered here agree with the SOW <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
If not, identify the variation: _____			
Subcontract Lab(s) used for this work: <u>LONVILLE</u>			

ID/DESCRIPTION	SAMPLING DATE	TIME	MATRIX	CONTAINER #	Est. Vol	QC			Pres - Analysis eg. HCl - VOCs
						MSD	MS	MD	
330 - TB9	4/22/03	7:00	Water	1	40mL				H <sub>2</sub> SO <sub>4</sub>
330 - TB10	4/22/03	7:00	Water	1	40mL				H <sub>2</sub> SO <sub>4</sub>
060204-T5	4/22/03	10:45	Soil	6	per method				
060204-T6	4/22/03	11:00	Soil	6	per method				
<del>Last Item</del>									

<b>CUSTODY TRANSFER</b>		<b>Received by (print)</b>		<b>Date/Time</b>	
Sampled/Relinquished (print)	Signature	Date/Time	Received by (print)	Signature	Date/Time
Mike Elton	<i>M. P. Zed</i>	4/22/03 10:01	CASTAÑEDA	CA Castañeda	4/22/03 10:01
CASTAÑEDA	CA Castañeda	4/22/03 13:00	Fred E	791300335294	4/22/03 13:00

# Case Narrative



## Analytical Report

Client : BECHTEL NEVADA V1962  
LVL# : 0304L269

W.O.# : 60052-001-001-0001-00  
Date Received : 04-24-03

### SW846 METALS

1. This narrative covers the analyses of 2 soil samples.
2. The samples were prepared and analyzed in accordance with SW-846 protocol and reported with a CLP deliverable.
3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.
4. All analyses were performed within the required holding times.
5. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
6. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits.
7. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
8. All preparation/method blanks were within method criteria. Refer to form 3.
9. All ICP Interference Check Standards were within control limits. Refer to form 4.
10. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.
11. All sample IDs were changed to accommodate the EPA naming convention which allows a maximum of 6 characters on all CLP Forms. Refer to the comments section of form 1 for the original ID.
12. All matrix spike, duplicate and serial dilution analyses were performed on BECHTEL NEVADA V1964, LVL batch# 0304L282 within the same digestion batch. Please refer to this package for the associated QC forms.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

13. Recoveries on the Laboratory Summary Report and CLP forms will vary depending on the number of significant figures used in the recovery calculation.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated  
gmb/m04-269

05-16-03  
Date

## METHOD REFERENCES AND DATA QUALIFIERS

### DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

### Q QUALIFIERS

- E = The reported value is estimated because of the presence of interference.
- M = Duplicate injection precision not met.
- N = Spiked sample recovery not within control limits.
- S = The reported value was determined by the Method of Standard Additions (MSA).
- W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.
- \* = Duplicate analysis not within control limits.
- + = Correlation coefficient for the MSA is less than 0.995.

### ABBREVIATIONS

- PB = Method or Preparation Blank.
- S = Matrix Spike.
- T = Matrix Spike Duplicate.
- R or D = Sample Replicate

### ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, approximately 0.3 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Flame AA.
4. Graphite Furnace AA.

RFW 21-21L-033/O-01/97





## Case Narrative



Client: BECHTEL-NEVADA V1962  
LVL #: 0304L269

W.O. #: 60052-001-001-0001-00  
Date Received: 04-24-2003

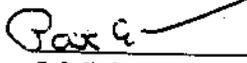
### GC/MS VOLATILE

Two (2) water and two (2) soil samples were collected on 04-22-2003.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCL Volatile target compounds on 05-01-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for analysis was met.
3. Non-target compounds were not reported as per client request.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blanks contained the common laboratory contaminants Methylene Chloride and/or Acetone at levels less than 2x the CRQL. The method blank 02LVG098-MB1 also contained the target compound 2-Butanone at a level less than the CRQL.
8. Internal standard area criteria were not met for sample 060204-T6 and 060204-T6 MSD. The analysis of associated matrix spike sample fulfills the reanalysis requirements.
9. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
J. Michael Taylor  
President

Lionville Laboratory Incorporated

son\group\data\bna\bectel-nevada\0304-269.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

05-20-03  
Date

## GLOSSARY

### DATA QUALIFIERS

- U** = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** = Interference.
- NQ** = Result qualitatively confirmed but not able to quantify.
- A** = Indicates that a TIC is a suspected aldol-condensation product.
- N** = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** = Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP, Z = Indicates Spiked Compound.

**Sample Data for each Sample**

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

330-TB9

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER Lab Sample ID: Q304L269-001

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: Q050112

Level: (low/med) LOW Date Received: 04/24/03

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/01/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>	
74-87-3	-----Chloromethane	10	U
74-83-9	-----Bromomethane	10	U
75-01-4	-----Vinyl Chloride	10	U
75-00-3	-----Chloroethane	10	U
75-09-2	-----Methylene Chloride	5	U
67-64-1	-----Acetone	10	B
75-15-0	-----Carbon Disulfide	5	U
75-35-4	-----1,1-Dichloroethene	5	U
75-34-3	-----1,1-Dichloroethane	5	U
540-59-0	-----1,2-Dichloroethene (total)	5	U
67-66-3	-----Chloroform	5	U
107-06-2	-----1,2-Dichloroethane	5	U
78-93-3	-----2-Butanone	3	J
71-55-6	-----1,1,1-Trichloroethane	5	U
56-23-5	-----Carbon Tetrachloride	5	U
75-27-4	-----Bromodichloromethane	5	U
78-87-5	-----1,2-Dichloropropane	5	U
10061-01-5	-----cis-1,3-Dichloropropene	5	U
79-01-6	-----Trichloroethene	5	U
124-48-1	-----Dibromochloromethane	5	U
79-00-5	-----1,1,2-Trichloroethane	5	U
71-43-2	-----Benzene	5	U
10061-02-6	-----Trans-1,3-Dichloropropene	5	U
75-25-2	-----Bromoform	5	U
108-10-1	-----4-Methyl-2-pentanone	10	U
591-78-6	-----2-Hexanone	10	U
127-18-4	-----Tetrachloroethene	5	U
79-34-5	-----1,1,2,2-Tetrachloroethane	5	U
108-88-3	-----Toluene	5	U
108-90-7	-----Chlorobenzene	5	U
100-41-4	-----Ethylbenzene	5	U
100-42-5	-----Styrene	5	U
1330-20-7	-----Xylene (total)	5	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

330-TB10

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER Lab Sample ID: Q304L269-002

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: Q050113

Level: (low/med) LOW Date Received: 04/24/03

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 05/01/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	11	B
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	4	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

060204-T5

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) SOIL Lab Sample ID: 0304L269-003

Sample wt/vol: 4.60 (g/mL) G Lab File ID: q050114

Level: (low/med) LOW Date Received: 04/24/03

% Moisture: not dec. 9 Date Analyzed: 05/01/03

Column: (pack/cap) CAP Dilution Factor: 1.09

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/Kg</u>	
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	16	B
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	1	JB
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

060204-T6

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) SOIL Lab Sample ID: 0304L269-004

Sample wt/vol: 4.60 (g/mL) G Lab File ID: 0050115

Level: (low/med) LOW Date Received: 04/24/03

% Moisture: not dec. 8 Date Analyzed: 05/01/03

Column: (pack/cap) CAP Dilution Factor: 1.09

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg) <u>ug/Kg</u>	
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	21	B
67-64-1	Acetone	5	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	2	JB
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

## Case Narrative



Client: BECHTEL-NEVADA V1962  
LVL #: 0304L269

W.O. #: 60052-001-001-0001-00  
Date Received: 04-24-2003

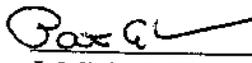
### SEMIVOLATILE

Two (2) soil samples were collected on 04-22-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 04-25-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 04-30-2003 and 05-02,05-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were not reported as per client request.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. One (1) of eleven (11) blank spike recoveries was outside EPA QC limits.
7. Internal standard area criteria were not met for sample 060204-T5; however, the GC/MS instrument was inspected for possible malfunction and was judged to be functioning properly and all surrogate recoveries were within QC limits; consequently, the sample was not reanalyzed.
8. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
\_\_\_\_\_  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

05-13-03  
Date

son\group\data\bn\bechtel-nevada-0304-269.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY

### DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I = Interference.
- NQ = Result qualitatively confirmed but not able to quantify.
- A = Indicates that a TIC is a suspected aldol-condensation product.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP, Z = Indicates Spiked Compound.

mmz\10-94\gloss.bna



**Sample Data for each Sample**

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T5

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L269-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050214

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: 9 decanted: (Y/N)

Date Extracted: 04/25/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 05/02/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N

pH: 7.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO.

COMPOUND

Q

108-95-2-----	Phenol	370	U
111-44-4-----	bis(2-Chloroethyl) ether	370	U
95-57-8-----	2-Chlorophenol	370	U
541-73-1-----	1,3-Dichlorobenzene	370	U
106-46-7-----	1,4-Dichlorobenzene	370	U
95-50-1-----	1,2-Dichlorobenzene	370	U
95-48-7-----	2-Methylphenol	370	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	370	U
106-44-5-----	4-Methylphenol	370	U
621-64-7-----	N-Nitroso-di-n-propylamine	370	U
67-72-1-----	Hexachloroethane	370	U
98-95-3-----	Nitrobenzene	370	U
78-59-1-----	Isophorone	370	U
88-75-5-----	2-Nitrophenol	370	U
105-67-9-----	2,4-Dimethylphenol	370	U
111-91-1-----	bis(2-Chloroethoxy) methane	370	U
120-83-2-----	2,4-Dichlorophenol	370	U
120-82-1-----	1,2,4-Trichlorobenzene	370	U
91-20-3-----	Naphthalene	370	U
106-47-8-----	4-Chloroaniline	370	U
87-68-3-----	Hexachlorobutadiene	370	U
59-50-7-----	4-Chloro-3-methylphenol	370	U
91-57-6-----	2-Methylnaphthalene	370	U
77-47-4-----	Hexachlorocyclopentadiene	370	U
88-06-2-----	2,4,6-Trichlorophenol	370	U
95-95-4-----	2,4,5-Trichlorophenol	920	U
91-58-7-----	2-Chloronaphthalene	370	U
88-74-4-----	2-Nitroaniline	920	U
131-11-3-----	Dimethylphthalate	370	U
208-96-8-----	Acenaphthylene	370	U
606-20-2-----	2,6-Dinitrotoluene	370	U
99-09-2-----	3-Nitroaniline	920	U
83-32-9-----	Acenaphthene	370	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T5

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L269-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050214

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: 9 decanted: (Y/N) \_\_

Date Extracted: 04/25/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 05/02/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

51-28-5	2,4-Dinitrophenol	920	U
100-02-7	4-Nitrophenol	920	U
132-64-9	Dibenzofuran	370	U
121-14-2	2,4-Dinitrotoluene	370	U
84-66-2	Diethylphthalate	370	U
7005-72-3	4-Chlorophenyl-phenylether	370	U
86-73-7	Fluorene	370	U
100-01-6	4-Nitroaniline	920	U
534-52-1	4,6-Dinitro-2-methylphenol	920	U
86-30-6	N-Nitrosodiphenylamine (1)	370	U
101-55-3	4-Bromophenyl-phenylether	370	U
118-74-1	Hexachlorobenzene	370	U
87-86-5	Pentachlorophenol	920	U
85-01-8	Phenanthrene	370	U
120-12-7	Anthracene	370	U
86-74-8	Carbazole	370	U
84-74-2	Di-n-butylphthalate	370	U
206-44-0	Fluoranthene	370	U
129-00-0	Pyrene	370	U
85-68-7	Butylbenzylphthalate	370	U
91-94-1	3,3'-Dichlorobenzidine	370	U
56-55-3	Benzo (a) anthracene	370	U
218-01-9	Chrysene	370	U
117-81-7	bis(2-Ethylhexyl)phthalate	370	U
117-84-0	Di-n-octyl phthalate	370	U
205-99-2	Benzo (b) fluoranthene	370	U
207-08-9	Benzo (k) fluoranthene	370	U
50-32-8	Benzo (a) pyrene	370	U
193-39-5	Indeno (1,2,3-cd) pyrene	370	U
53-70-3	Dibenz (a,h) anthracene	370	U
191-24-2	Benzo (g,h,i) perylene	370	U

(1) - Cannot be separated from Diphenylamine

FORM 1 SV-2

RFW (v3.3)

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T6

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L269-004

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050215

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: 8 decanted: (Y/N)

Date Extracted: 04/25/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 05/02/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

108-95-2	Phenol	360	U
111-44-4	bis(2-Chloroethyl) ether	360	U
95-57-8	2-Chlorophenol	360	U
541-73-1	1,3-Dichlorobenzene	360	U
106-46-7	1,4-Dichlorobenzene	360	U
95-50-1	1,2-Dichlorobenzene	360	U
95-48-7	2-Methylphenol	360	U
108-60-1	2,2'-oxybis(1-Chloropropane)	360	U
106-44-5	4-Methylphenol	360	U
621-64-7	N-Nitroso-di-n-propylamine	360	U
67-72-1	Hexachloroethane	360	U
98-95-3	Nitrobenzene	360	U
78-59-1	Isophorone	360	U
88-75-5	2-Nitrophenol	360	U
105-67-9	2,4-Dimethylphenol	360	U
111-91-1	bis(2-Chloroethoxy) methane	360	U
120-83-2	2,4-Dichlorophenol	360	U
120-82-1	1,2,4-Trichlorobenzene	360	U
91-20-3	Naphthalene	360	U
106-47-8	4-Chloroaniline	360	U
87-68-3	Hexachlorobutadiene	360	U
59-50-7	4-Chloro-3-methylphenol	360	U
91-57-6	2-Methylnaphthalene	360	U
77-47-4	Hexachlorocyclopentadiene	360	U
88-06-2	2,4,6-Trichlorophenol	360	U
95-95-4	2,4,5-Trichlorophenol	900	U
91-58-7	2-Chloronaphthalene	360	U
88-74-4	2-Nitroaniline	900	U
131-11-3	Dimethylphthalate	360	U
208-96-8	Acenaphthylene	360	U
606-20-2	2,6-Dinitrotoluene	360	U
99-09-2	3-Nitroaniline	900	U
83-32-9	Acenaphthene	360	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T6

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L269-004

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050215

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: 8 decanted: (Y/N)

Date Extracted: 04/25/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 05/02/03

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

51-28-5-----	2,4-Dinitrophenol	900	U
100-02-7-----	4-Nitrophenol	900	U
132-64-9-----	Dibenzofuran	360	U
121-14-2-----	2,4-Dinitrotoluene	360	U
84-66-2-----	Diethylphthalate	360	U
7005-72-3-----	4-Chlorophenyl-phenylether	360	U
86-73-7-----	Fluorene	360	U
100-01-6-----	4-Nitroaniline	900	U
534-52-1-----	4,6-Dinitro-2-methylphenol	900	U
86-30-6-----	N-Nitrosodiphenylamine (1)	360	U
101-55-3-----	4-Bromophenyl-phenylether	360	U
118-74-1-----	Hexachlorobenzene	360	U
87-86-5-----	Pentachlorophenol	900	U
85-01-8-----	Phenanthrene	360	U
120-12-7-----	Anthracene	360	U
86-74-8-----	Carbazole	360	U
84-74-2-----	Di-n-butylphthalate	360	U
206-44-0-----	Fluoranthene	360	U
129-00-0-----	Pyrene	360	U
85-68-7-----	Butylbenzylphthalate	360	U
91-94-1-----	3,3'-Dichlorobenzidine	360	U
56-55-3-----	Benzo(a)anthracene	360	U
218-01-9-----	Chrysene	360	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	27	J
117-84-0-----	Di-n-octyl phthalate	360	U
205-99-2-----	Benzo(b)fluoranthene	360	U
207-08-9-----	Benzo(k)fluoranthene	360	U
50-32-8-----	Benzo(a)pyrene	360	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	360	U
53-70-3-----	Dibenz(a,h)anthracene	360	U
191-24-2-----	Benzo(g,h,i)perylene	360	U

(1) - Cannot be separated from Diphenylamine

FORM 1 SV-2

RFW (v3.3)

## **CASE NARRATIVE**



## Analytical Report

Client: BECHTEL-NEVADA V1962  
LVL #: 0304L269

W.O. #: 60052-001-001-0001-00  
Date Received: 04-24-2003

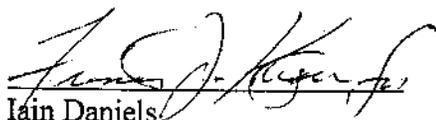
### PCB

Two (2) soil samples were collected on 04-22-2003.

The samples and their associated QC samples were extracted on 04-25-2003 and analyzed according to Lionville Laboratory OPs on 05-01,03-2003. The extraction procedure was based on method 3550 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. Samples and their associated QC samples received a Sulfuric Acid and Sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. Three (3) of fourteen (14) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels

Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.

**SAMPLE DATA FOR EACH SAMPLE**

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T5

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: SOIL

Lab Sample ID: 0304L269-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: BLKLACHJ.02

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: not dec. 9 dec.

Date Extracted: 04/25/03

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 05/01/03

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.00

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

12674-11-2-----	Aroclor-1016	37	U
11104-28-2-----	Aroclor-1221	74	U
11141-16-5-----	Aroclor-1232	37	U
53469-21-9-----	Aroclor-1242	37	U
12672-29-6-----	Aroclor-1248	37	U
11097-69-1-----	Aroclor-1254	37	U
11096-82-5-----	Aroclor-1260	37	U

FORM 1 PEST

12/88 Rev.

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T6

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: SOIL

Lab Sample ID: 0304L269-004

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: BLKLACHJ.02

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: not dec. 8 dec.

Date Extracted: 04/25/03

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 05/01/03

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.00

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		
12674-11-2-----	Aroclor-1016	36	U
11104-28-2-----	Aroclor-1221	72	U
11141-16-5-----	Aroclor-1232	36	U
53469-21-9-----	Aroclor-1242	36	U
12672-29-6-----	Aroclor-1248	36	U
11097-69-1-----	Aroclor-1254	36	U
11096-82-5-----	Aroclor-1260	36	U

FORM 1 PEST

12/88 Rev.

## CASE NARRATIVE



## Analytical Report

**Client:** BECHTEL-NEVADA V1962  
**LVL #:** 0304L269

**W.O. #:** 60052-001-001-0001-00  
**Date Received:** 04-24-03

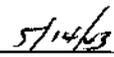
### DIESEL RANGE ORGANICS

The set of samples consisted of two (2) soil samples collected on 04-22-03.

The samples and their associated QC samples were extracted on 04-29-03 and analyzed according to Lionville Laboratory OPs on 05-09-03. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.

**SAMPLE DATA FOR EACH SAMPLE**

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T5

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: SOIL

Lab Sample ID: 0304L269-003

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: not dec. 9

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	13.2	U
00-00-0000-----	Motor Oil	13.2	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T6

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: SOIL

Lab Sample ID: 0304L269-004

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: not dec. 8

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	13.0	U
00-00-0000-----	Motor Oil	13.0	U

12/88 Rev.

## **CASE NARRATIVE**



**Analytical Report**

**Client:** BECHTEL NEVADA V1962  
**LVL #:** 0304L269

**W.O. #:** 60052-001-001-0001-00  
**Date Received:** 04-24-03

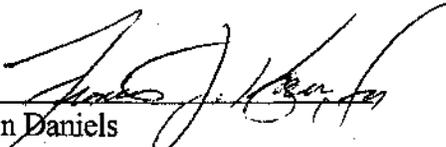
**GRO**

The set of samples consisted of two (2) soil samples collected on 04-22-03.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline range organics (GRO) on 05-06-03.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. All required holding times for analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

5/14/03  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.

**SAMPLE DATA FOR EACH SAMPLE**

## GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T5

Lab Name: Lionville Labs, Inc. Work Order: 60052001001Client: BECHTEL NEVADA V1962Matrix: SOILLab Sample ID: 0304L269-003Sample wt/vol: 5.06 (g/mL) GLab File ID: BLKLACHJLevel: (low/med) LOWDate Received: 04/24/03% Moisture: not dec. 9Date Analyzed: 05/06/03Column: (pack/cap) CAPDilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>
86290-81-5-----	Gasoline Range Organics (GRO)	33
		U

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T6

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1962

Matrix: SOIL

Lab Sample ID: 0304L269-004

Sample wt/vol: 5.14 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/24/03

% Moisture: not dec. 8

Date Analyzed: 05/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG
86290-81-5-----	Gasoline Range Organics (GRO)	33
		U

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## **SAMPLE DELIVERY GROUP**

**V1963**

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May 22, 2003

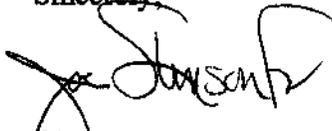
Mr. Ted Redding  
USDOE Zone 1  
Bldg. 652, Room 2  
M/S NTS 273  
Mercury, NV 89023

Dear Mr. Redding:

On April 24, 2003, two soil samples, (SDG V1963) were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory. The samples were assigned Laboratory Report Identification Code 4272. Enclosed the Sample Data Package containing the results of the analyses of these samples.

If you have any questions please do not hesitate to call.

Sincerely,



Charles Phillips  
Vice President

**COVER PAGE**

Sanford Cohen & Associates  
Southeastern Environmental Laboratory  
1000 Monticello Court  
Montgomery, Alabama 36117

Laboratory Code: SCA      Subcontract Number: 30025

Laboratory Report Identification Code: 4272    SDG: V1963

Sample Matrix: Soil

Site Sample Numbers	Laboratory Sample Number
	Gamma Spectrometry
060204-T5	NTS03-4272-01
060204-T6	NTS03-4272-02

Comments: There were no problems encountered during sample receiving.

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the laboratory Manager or the Manager's designee, as verified by the following signature."

  
\_\_\_\_\_  
Signature

Joe Stinson  
Name

Laboratory Manager  
Title

5/22/03  
Date



**CASE NARRATIVE**  
**SDG V1963**  
**Laboratory Report Identification Number: 4272**

May 22, 2003

**I. Introduction**

On April 24, 2003, two soil samples, (SDG V1963), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The chain-of-custody accompanying the sample requested that it be analyzed within seven days of receipt at the laboratory. The samples were analyzed in accordance with the Bechtel Nevada Services Subcontract Task Order Agreement Form, Exhibit B, Statement of Work and Specifications, Rev 1, 1/23/01.

**II. Analytical Methodology**

The radioanalytical results reported for each sample include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. Samples were analyzed in accordance with the following method.

Radionuclide	Method Number	Method Name	Counting Method
Gamma Emitting Radionuclides	EPA 901.1	Gamma Emitting Radionuclides	Gamma Spectrometry

**III. Analytical Results**

Deficiencies

None.

Matrix Interferences

There were no indications of matrix interference.

Dilutions

There were no dilutions.

Detection Limits

The required detection limits (RDL) were met for all analyses.

Reanalysis

There were no reanalysis.

Deviations from Protocols

There were no deviations from the written protocols and analytical methods.

Contacts with the CTR

There was no contact with the CTR regarding these samples.

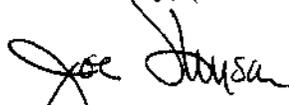
**IV. Quality Control**

Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-4214-LC1	Laboratory Control Sample
12-202115 (5 cm)	SCAQC-4214-LD1	Laboratory Duplicate Sample
Laboratory Type II Water	SCAQC-4214-PB	Preparation Blank

The analytical results of all quality control samples met the acceptance criteria specified in the SOW.

Sincerely,



Joe Stinson  
Laboratory Manager

5/22/03  
Date

**Sanford Cohen & Associates**  
**Southeastern Environmental Laboratory**

**Radioanalytical Results**

Report Identification Number: V1963

Project Name: <u>Bechtel Nevada</u>	Chain-of-Custody Number: <u>NONE</u>	Matrix: <u>Soil</u>
Site Sample ID: <u>060204-T5</u>		
Other Sample ID:	Collection Date: <u>4/22/2003 10:45:00 A</u>	Date Received: <u>4/24/2003</u>
	Batch Number: <u>4272</u>	Laboratory Code: <u>SCA</u>

<u>Method Number</u>	<u>Radionuclide</u>	<u>Laboratory Sample ID</u>	<u>Activity (pCi/g)</u>	<u>2 <math>\sigma</math> TPU (pCi/g)</u>	<u>Total Error (pCi/g)</u>	<u>MDA (pCi/g)</u>
EPA 901.1	K-40	NTS03-4272-01	24.9	2.35	3.42	0.261
EPA 901.1	CO-60	NTS03-4272-01	0.019	0.024	0.024	0.032
EPA 901.1	Y-88	NTS03-4272-01	-0.005	0.015	0.015	0.025
EPA 901.1	RU-106	NTS03-4272-01	0.084	0.164	0.164	0.278
EPA 901.1	SB-125	NTS03-4272-01	0.019	0.045	0.045	0.078
EPA 901.1	CS-134	NTS03-4272-01	0.005	0.018	0.018	0.027
EPA 901.1	CS-137	NTS03-4272-01	-0.022	0.018	0.018	0.029
EPA 901.1	CE-144	NTS03-4272-01	0.501	1.86	1.86	0.221
EPA 901.1	PM-144	NTS03-4272-01	0.005	0.017	0.017	0.027
EPA 901.1	PM-146	NTS03-4272-01	0.017	0.021	0.021	0.037
EPA 901.1	EU-152	NTS03-4272-01	0.025	0.045	0.045	0.076
EPA 901.1	EU-154	NTS03-4272-01	0.000	0.000	0.000	0.053
EPA 901.1	EU-155	NTS03-4272-01	0.518	0.108	0.120	0.120
EPA 901.1	PB-212	NTS03-4272-01	1.85	0.405	0.437	0.051
EPA 901.1	AC-228	NTS03-4272-01	1.83	0.231	0.283	0.109
EPA 901.1	TH-234	NTS03-4272-01	2.83	0.602	0.665	0.513
EPA 901.1	U-235	NTS03-4272-01	0.157	0.047	0.050	0.040
EPA 901.1	U-238	NTS03-4272-01	3.92	3.40	3.42	6.10
EPA 901.1	AM-241	NTS03-4272-01	-0.095	0.119	0.119	0.181

<u>Quality Control Samples</u>			
<u>Radionuclide</u>	<u>Laboratory Control (LC)</u>	<u>Laboratory Duplicate (LD)</u>	<u>Matrix Spike (MS)</u>
Gamma	SCAQC-4214-LC1	SCAQC-4214-LD1	Preparation Blank (PB) SCAQC-4214-PB

**Sanford Cohen & Associates**  
**Southeastern Environmental Laboratory**

**Radioanalytical Results**

Report Identification Number: V1963

Project Name: <u>Bechtel Nevada</u>	Chain-of-Custody Number: <u>NONE</u>	Matrix: <u>Soil</u>
Site Sample ID: <u>060204-T6</u>		
Other Sample ID:	Collection Date: <u>4/22/2003 11:00:00 A</u>	Date Received: <u>4/24/2003</u>
	Batch Number: <u>4272</u>	Laboratory Code: <u>SCA</u>

<u>Method Number</u>	<u>Radionuclide</u>	<u>Laboratory Sample ID</u>	<u>Activity (pCi/g)</u>	<u>2 <math>\sigma</math> TPU (pCi/g)</u>	<u>Total Error (pCi/g)</u>	<u>MDA (pCi/g)</u>
EPA 901.1	K-40	NTS03-4272-02	28.6	2.68	3.92	0.298
EPA 901.1	CO-60	NTS03-4272-02	0.004	0.025	0.025	0.036
EPA 901.1	Y-88	NTS03-4272-02	0.010	0.015	0.015	0.029
EPA 901.1	RU-106	NTS03-4272-02	-0.107	0.178	0.178	0.300
EPA 901.1	SB-125	NTS03-4272-02	0.062	0.052	0.053	0.091
EPA 901.1	CS-134	NTS03-4272-02	-0.004	0.020	0.020	0.030
EPA 901.1	CS-137	NTS03-4272-02	-0.026	0.020	0.020	0.033
EPA 901.1	CE-144	NTS03-4272-02	0.313	2.13	2.13	0.242
EPA 901.1	PM-144	NTS03-4272-02	-0.009	0.019	0.019	0.032
EPA 901.1	PM-146	NTS03-4272-02	0.029	0.024	0.024	0.041
EPA 901.1	EU-152	NTS03-4272-02	0.001	0.053	0.053	0.087
EPA 901.1	EU-154	NTS03-4272-02	0.000	0.000	0.000	0.062
EPA 901.1	EU-155	NTS03-4272-02	0.350	0.128	0.133	0.104
EPA 901.1	PB-212	NTS03-4272-02	1.82	0.536	0.566	0.055
EPA 901.1	AC-228	NTS03-4272-02	1.71	0.264	0.314	0.120
EPA 901.1	TH-234	NTS03-4272-02	2.56	0.594	0.646	0.558
EPA 901.1	U-235	NTS03-4272-02	0.193	0.057	0.060	0.043
EPA 901.1	U-238	NTS03-4272-02	4.36	3.59	3.62	6.41
EPA 901.1	AM-241	NTS03-4272-02	0.049	0.113	0.114	0.170

<b>Quality Control Samples</b>				
<u>Radionuclide</u>	<u>Laboratory Control (LC)</u>	<u>Laboratory Duplicate (LD)</u>	<u>Matrix Spike (MS)</u>	<u>Preparation Blank (PB)</u>
Gamma	SCAQC-4214-LC1	SCAQC-4214-LD1		SCAQC-4214-PB

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## **SAMPLE DELIVERY GROUP**

**V1964**

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16 May 2003

Mr. Theodore Redding  
Bechtel Nevada Corporation  
2621 Losee Road  
Mail Stop NTS273  
Las Vegas, NV 89030-4134

**RE: Subcontract No. 30028, Task Order No. 1**  
**Data Report for LVL Batch 0304L282**  
**SDG#: V1964 Chain: CAU 330**

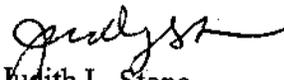
Dear Mr. Redding:

Enclosed please find the data report for 4 soil samples and 2 water samples received 25 April 2003 for analysis for TPH GRO/DRO, metals, VOAs, SVOAs and PCBs on a 28 day turnaround time. The invoice is enclosed. An EDD is not required.

Please do not hesitate to contact me at (610) 280-3029 with any questions or at any time we may be of service.

Very truly yours,

Lionville Laboratory Incorporated

  
Judith L. Stone  
Senior Project Manager

Enclosure:



# Case Narrative



## Analytical Report

Client : BECHTEL NEVADA V1964  
LVL# : 0304L282

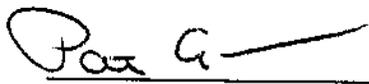
W.O.# : 60052-001-001-0001-00  
Date Received : 04-25-03

### SW846 METALS

1. This narrative covers the analyses of 2 soil samples.
2. The samples were prepared and analyzed in accordance with SW-846 protocol and reported with a CLP deliverable.
3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.
4. All analyses were performed within the required holding times.
5. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
6. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits.
7. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
8. All preparation/method blanks were within method criteria. Refer to form 3.
9. All ICP Interference Check Standards were within control limits. Refer to form 4.
10. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.
11. All serial dilution percent differences were within SW-846 control limits. Refer to form 9.
12. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to form 5A.
13. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to form 6.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

14. All sample IDs were changed to accommodate the EPA naming convention which allows a maximum of 6 characters on all CLP Forms. Refer to the comments section of form 1 for the original ID.
15. Recoveries on the Laboratory Summary Report and CLP forms will vary depending on the number of significant figures used in the recovery calculation.



Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

gmb\m04-282

05-16-03

Date



## METHOD REFERENCES AND DATA QUALIFIERS

### DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

### Q QUALIFIERS

- E = The reported value is estimated because of the presence of interference.
- M = Duplicate injection precision not met.
- N = Spiked sample recovery not within control limits.
- S = The reported value was determined by the Method of Standard Additions (MSA).
- W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.
- \* = Duplicate analysis not within control limits.
- + = Correlation coefficient for the MSA is less than 0.995.

### ABBREVIATIONS

- PB = Method or Preparation Blank.
- S = Matrix Spike.
- T = Matrix Spike Duplicate.
- R or D = Sample Replicate

### ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, approximately 0.3 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Flame AA.
4. Graphite Furnace AA.

RFW 21-21L-033/O-01/97





## Case Narrative



Client: BECHTEL-NEVADA V1964  
LVL #: 0304L282

W.O. #: 60052-001-001-0001-00  
Date Received: 04-25-2003

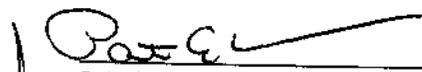
### GC/MS VOLATILE

Two (2) water and two (2) soil samples were collected on 04-23-2003.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCL Volatile target compounds on 05-02,05,06-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for analysis was met.
3. Non-target compounds were not reported as per client request.
4. All surrogate recoveries were within EPA QC limits.
5. Matrix spike analyses are associated with LVL # 0304L269.
6. All blank spike recoveries were within EPA QC limits.
7. The method blanks contained the common laboratory contaminants Methylene Chloride and/or Acetone at levels less than 3x the CRQL. The method blank 02LVG102-MB1 also contained the target compound 2-Butanone at a level less than the CRQL.
8. Internal standard area and retention time criteria were met.
9. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
\_\_\_\_\_  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

05-13-03  
Date

son\group\data\bna\bechtel-nevada\0304-282.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY

### DATA QUALIFIERS

- U** = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** = Interference.
- NQ** = Result qualitatively confirmed but not able to quantify.
- A** = Indicates that a TIC is a suspected aldol-condensation product.
- N** = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** = Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP, Z = Indicates Spiked Compound.

mmz\10-94\gloss.bna



**Sample Data for each Sample**

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

330-TB11

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: WATER

Lab Sample ID: 0304L282-001

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: G050219

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 05/02/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/L

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	JB
67-64-1	Acetone	11	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	4	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropane	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

330-TB12

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: WATER

Lab Sample ID: 0304L282-002

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: q050220

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec.       

Date Analyzed: 05/02/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	JB
67-64-1	Acetone	10	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	3	J
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-003

Sample wt/vol: 4.90 (g/mL) G

Lab File ID: 050610

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 7

Date Analyzed: 05/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.02

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/Kg

74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	21	B
67-64-1	Acetone	3	J
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethane	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethane (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropane	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-Dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Xylene (total)	6	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T8RE

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-004

Sample wt/vol: 4.70 (g/mL) G

Lab File ID: q050521

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 10

Date Analyzed: 05/05/03

Column: (pack/cap) CAP

Dilution Factor: 1.06

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/Kg

74-87-3	-----Chloromethane	12	U
74-83-9	-----Bromomethane	12	U
75-01-4	-----Vinyl Chloride	12	U
75-00-3	-----Chloroethane	12	U
75-09-2	-----Methylene Chloride	45	B
67-64-1	-----Acetone	4	JB
75-15-0	-----Carbon Disulfide	6	U
75-35-4	-----1,1-Dichloroethene	6	U
75-34-3	-----1,1-Dichloroethane	6	U
540-59-0	-----1,2-Dichloroethene (total)	6	U
67-66-3	-----Chloroform	6	U
107-06-2	-----1,2-Dichloroethane	6	U
78-93-3	-----2-Butanone	12	U
71-55-6	-----1,1,1-Trichloroethane	6	U
56-23-5	-----Carbon Tetrachloride	6	U
75-27-4	-----Bromodichloromethane	6	U
78-87-5	-----1,2-Dichloropropane	6	U
10061-01-5	-----cis-1,3-Dichloropropene	6	U
79-01-6	-----Trichloroethene	6	U
124-48-1	-----Dibromochloromethane	6	U
79-00-5	-----1,1,2-Trichloroethane	6	U
71-43-2	-----Benzene	6	U
10061-02-6	-----Trans-1,3-Dichloropropene	6	U
75-25-2	-----Bromoform	6	U
108-10-1	-----4-Methyl-2-pentanone	12	U
591-78-6	-----2-Hexanone	12	U
127-18-4	-----Tetrachloroethene	6	U
79-34-5	-----1,1,2,2-Tetrachloroethane	6	U
108-88-3	-----Toluene	6	U
108-90-7	-----Chlorobenzene	6	U
100-41-4	-----Ethylbenzene	6	U
100-42-5	-----Styrene	6	U
1330-20-7	-----Xylene (total)	6	U

## Case Narrative



Client: BECHTEL-NEVADA V1964  
LVL #: 0304L282

W.O. #: 60052-001-001-0001-00  
Date Received: 04-25-2003

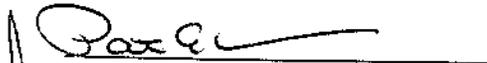
### SEMIVOLATILE

Two (2) soil samples were collected on 04-23-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 04-28-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 05-06-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were not reported as per client request.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.
8. Internal standard area and retention time criteria were met.
9. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

05-13-03  
Date

son\group\data\bna\bechtel-nevada-0304-282.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY

### DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I = Interference.
- NQ = Result qualitatively confirmed but not able to quantify.
- A = Indicates that a TIC is a suspected aldol-condensation product.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.

mmz\10-94\gloss.bna



## GLOSSARY

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP, Z = Indicates Spiked Compound.

mmz\10-94\gloss.bna



**Sample Data for each Sample**

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L282-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050607

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: 7 decanted: (Y/N) \_\_

Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 05/06/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N

pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

108-95-2-----	Phenol	360	U
111-44-4-----	bis(2-Chloroethyl) ether	360	U
95-57-8-----	2-Chlorophenol	360	U
541-73-1-----	1,3-Dichlorobenzene	360	U
106-46-7-----	1,4-Dichlorobenzene	360	U
95-50-1-----	1,2-Dichlorobenzene	360	U
95-48-7-----	2-Methylphenol	360	U
108-60-1-----	2,2'-oxybis(i-Chloropropane)	360	U
106-44-5-----	4-Methylphenol	360	U
621-64-7-----	N-Nitroso-di-n-propylamine	360	U
67-72-1-----	Hexachloroethane	360	U
98-95-3-----	Nitrobenzene	360	U
78-59-1-----	Isophorone	360	U
88-75-5-----	2-Nitrophenol	360	U
105-67-9-----	2,4-Dimethylphenol	360	U
111-91-1-----	bis(2-Chloroethoxy) methane	360	U
120-83-2-----	2,4-Dichlorophenol	360	U
120-82-1-----	1,2,4-Trichlorobenzene	360	U
91-20-3-----	Naphthalene	360	U
106-47-8-----	4-Chloroaniline	360	U
87-68-3-----	Hexachlorobutadiene	360	U
59-50-7-----	4-Chloro-3-methylphenol	360	U
91-57-6-----	2-Methylnaphthalene	360	U
77-47-4-----	Hexachlorocyclopentadiene	360	U
88-06-2-----	2,4,6-Trichlorophenol	360	U
95-95-4-----	2,4,5-Trichlorophenol	900	U
91-58-7-----	2-Chloronaphthalene	360	U
88-74-4-----	2-Nitroaniline	900	U
131-11-3-----	Dimethylphthalate	360	U
208-96-8-----	Acenaphthylene	360	U
606-20-2-----	2,6-Dinitrotoluene	360	U
99-09-2-----	3-Nitroaniline	900	U
83-32-9-----	Acenaphthene	360	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L282-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050607

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: 7 decanted: (Y/N)

Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 05/06/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

51-28-5-----	2,4-Dinitrophenol	900	U
100-02-7-----	4-Nitrophenol	900	U
132-64-9-----	Dibenzofuran	360	U
121-14-2-----	2,4-Dinitrotoluene	360	U
84-66-2-----	Diethylphthalate	26	J
7005-72-3-----	4-Chlorophenyl-phenylether	360	U
86-73-7-----	Fluorene	360	U
100-01-6-----	4-Nitroaniline	900	U
534-52-1-----	4,6-Dinitro-2-methylphenol	900	U
86-30-6-----	N-Nitrosodiphenylamine (1)	360	U
101-55-3-----	4-Bromophenyl-phenylether	360	U
118-74-1-----	Hexachlorobenzene	360	U
87-86-5-----	Pentachlorophenol	900	U
85-01-8-----	Phenanthrene	360	U
120-12-7-----	Anthracene	360	U
86-74-8-----	Carbazole	360	U
84-74-2-----	Di-n-butylphthalate	360	U
206-44-0-----	Fluoranthene	360	U
129-00-0-----	Pyrene	360	U
85-68-7-----	Butylbenzylphthalate	360	U
91-94-1-----	3,3'-Dichlorobenzidine	360	U
56-55-3-----	Benzo(a)anthracene	360	U
218-01-9-----	Chrysene	360	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	19	J
117-84-0-----	Di-n-octyl phthalate	360	U
205-99-2-----	Benzo(b)fluoranthene	360	U
207-08-9-----	Benzo(k)fluoranthene	360	U
50-32-8-----	Benzo(a)pyrene	360	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	360	U
53-70-3-----	Dibenz(a,h)anthracene	360	U
191-24-2-----	Benzo(g,h,i)perylene	360	U

(1) - Cannot be separated from Diphenylamine

FORM 1 SV-2

RFW (v3.3)

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T8

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L282-004

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050610

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: 10 decanted: (Y/N) \_\_\_

Date Extracted: 04/28/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 05/06/03

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N

pH: 7.0

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

108-95-2-----	Phenol	370	U
111-44-4-----	bis(2-Chloroethyl) ether	370	U
95-57-8-----	2-Chlorophenol	370	U
541-73-1-----	1,3-Dichlorobenzene	370	U
106-46-7-----	1,4-Dichlorobenzene	370	U
95-50-1-----	1,2-Dichlorobenzene	370	U
95-48-7-----	2-Methylphenol	370	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	370	U
106-44-5-----	4-Methylphenol	370	U
621-64-7-----	N-Nitroso-di-n-propylamine	370	U
67-72-1-----	Hexachloroethane	370	U
98-95-3-----	Nitrobenzene	370	U
78-59-1-----	Isophorone	370	U
88-75-5-----	2-Nitrophenol	370	U
105-67-9-----	2,4-Dimethylphenol	370	U
111-91-1-----	bis(2-Chloroethoxy)methane	370	U
120-83-2-----	2,4-Dichlorophenol	370	U
120-82-1-----	1,2,4-Trichlorobenzene	370	U
91-20-3-----	Naphthalene	370	U
106-47-8-----	4-Chloroaniline	370	U
87-68-3-----	Hexachlorobutadiene	370	U
59-50-7-----	4-Chloro-3-methylphenol	370	U
91-57-6-----	2-Methylnaphthalene	370	U
77-47-4-----	Hexachlorocyclopentadiene	370	U
88-06-2-----	2,4,6-Trichlorophenol	370	U
95-95-4-----	2,4,5-Trichlorophenol	920	U
91-58-7-----	2-Chloronaphthalene	370	U
88-74-4-----	2-Nitroaniline	920	U
131-11-3-----	Dimethylphthalate	370	U
208-96-8-----	Acenaphthylene	370	U
606-20-2-----	2,6-Dinitrotoluene	370	U
99-09-2-----	3-Nitroaniline	920	U
83-32-9-----	Acenaphthene	370	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

060204-T8

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: (soil/water) SOIL

Lab Sample ID: 0304L282-004

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: C050610

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: 10 decanted: (Y/N)

Date Extracted: 04/28/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 05/06/03

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N

pH: 7.0

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

51-28-5-----	2,4-Dinitrophenol	920	U
100-02-7-----	4-Nitrophenol	920	U
132-64-9-----	Dibenzofuran	370	U
121-14-2-----	2,4-Dinitrotoluene	370	U
84-66-2-----	Diethylphthalate	370	U
7005-72-3-----	4-Chlorophenyl-phenylether	370	U
86-73-7-----	Fluorene	370	U
100-01-6-----	4-Nitroaniline	920	U
534-52-1-----	4,6-Dinitro-2-methylphenol	920	U
86-30-6-----	N-Nitrosodiphenylamine (1)	370	U
101-55-3-----	4-Bromophenyl-phenylether	370	U
118-74-1-----	Hexachlorobenzene	370	U
87-86-5-----	Pentachlorophenol	920	U
85-01-8-----	Phenanthrene	370	U
120-12-7-----	Anthracene	370	U
86-74-8-----	Carbazole	370	U
84-74-2-----	Di-n-butylphthalate	370	U
206-44-0-----	Fluoranthene	370	U
129-00-0-----	Pyrene	370	U
85-68-7-----	Butylbenzylphthalate	370	U
91-94-1-----	3,3'-Dichlorobenzidine	370	U
56-55-3-----	Benzo(a)anthracene	370	U
218-01-9-----	Chrysene	370	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	370	U
117-84-0-----	Di-n-octyl phthalate	61	J
205-99-2-----	Benzo(b)fluoranthene	370	U
207-08-9-----	Benzo(k)fluoranthene	370	U
50-32-8-----	Benzo(a)pyrene	370	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	370	U
53-70-3-----	Dibenz(a,h)anthracene	370	U
191-24-2-----	Benzo(g,h,i)perylene	370	U

(1) - Cannot be separated from Diphenylamine

FORM 1 SV-2

RFW (v3.3)

## **CASE NARRATIVE**



Analytical Report

Client: BECHTEL NEVADA V1964  
LVL#: 0304L282

W.O.#: 60052-001-001-0001-00  
Date Received: 04-25-03

PCB

The set of samples consisted of two (2) soil samples collected on 04-23-03.

The samples and their associated QC samples were extracted on 05-06-03 and analyzed on 05-13-03 according to Lionville Laboratory OPs. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received Sulfuric Acid and Sulfur cleanups.
4. The method blank was below the reporting limits for all target compounds.
5. Two (2) of twelve (12) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. One (1) of four (4) matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated  
pefv:\group\data\pest\bechtel\04L-282.pcb

5/14/03  
Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.

**SAMPLE DATA FOR EACH SAMPLE**

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL Lab Sample ID: 0304L282-003  
 Sample wt/vol: 30.0 (g/mL) G Lab File ID: BLKLACHJ.02  
 Level: (low/med) LOW Date Received: 04/25/03  
 % Moisture: not dec. 7 dec. Date Extracted: 05/06/03  
 Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 05/13/03  
 GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	<u>UG/KG</u>
12674-11-2-----	Aroclor-1016	36	U
11104-28-2-----	Aroclor-1221	72	U
11141-16-5-----	Aroclor-1232	36	U
53469-21-9-----	Aroclor-1242	36	U
12672-29-6-----	Aroclor-1248	36	U
11097-69-1-----	Aroclor-1254	36	U
11096-82-5-----	Aroclor-1260	36	U

FORM 1 PEST

12/88 Rev.

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T8

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL Lab Sample ID: 0304L282-004

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BLKLACHJ.02

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: not dec. 10 dec. Date Extracted: 05/06/03

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 05/13/03

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

12674-11-2-----	Aroclor-1016	37	U
11104-28-2-----	Aroclor-1221	74	U
11141-16-5-----	Aroclor-1232	37	U
53469-21-9-----	Aroclor-1242	37	U
12672-29-6-----	Aroclor-1248	37	U
11097-69-1-----	Aroclor-1254	37	U
11096-82-5-----	Aroclor-1260	37	U

FORM 1 PEST

12/88 Rev.

## **CASE NARRATIVE**



## Analytical Report

Client: BECHTEL-NEVADA V1964  
LVL #: 0304L282

W.O. #: 60052-001-001-0001-00  
Date Received: 04-25-03

### DIESEL RANGE ORGANICS

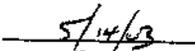
The set of samples consisted of four (4) soil samples collected on 04-23-03.

The samples and their associated QC samples were extracted on 04-29-03 and analyzed according to Lionville Laboratory OPs on 05-09-03. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

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Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.

**SAMPLE DATA FOR EACH SAMPLE**

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-003

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 7

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----Diesel Range Organics	12.9	U
00-00-0000-----Motor Oil	12.9	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T8

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-004

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 10

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	13.3	U
00-00-0000-----	Motor Oil	13.3	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T9

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-005

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 6

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.8	U
00-00-0000-----	Motor Oil	12.8	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

060204-T10

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-006

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 7

Date Analyzed: 05/09/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	12.9	U
00-00-0000-----	Motor Oil	12.9	U

12/88 Rev.

## **CASE NARRATIVE**



Analytical Report

Client: BECHTEL NEVADA V1964  
LVL #: 0304L282

W.O. #: 60052-001-001-0001-00  
Date Received: 04-25-03

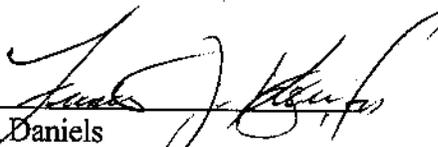
GRO

The set of samples consisted of four (4) soil samples collected on 04-23-03.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline range organics (GRO) on 05-06-03.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. All required holding times for analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. All blank spike recoveries were within acceptance criteria.
6. All initial calibrations associated with this data set were within acceptance criteria.
7. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

5/14/03  
Date

pef\Rrgroup\data\gro\bechtel\04L-282.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.

**SAMPLE DATA FOR EACH SAMPLE**

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-003

Sample wt/vol: 5.07 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 7

Date Analyzed: 05/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----Gasoline Range Organics (GRO)	33	U
--	----	---

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T8

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 03041282-004

Sample wt/vol: 5.15 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 10

Date Analyzed: 05/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS:
86290-81-5-----	Gasoline Range Organics (GRO)	33 U

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T9

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-005

Sample wt/vol: 5.21 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 6

Date Analyzed: 05/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----Gasoline Range Organics (GRO)	30	U
--	----	---

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

060204-T10

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1964

Matrix: SOIL

Lab Sample ID: 0304L282-006

Sample wt/vol: 5.19 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 04/25/03

% Moisture: not dec. 7

Date Analyzed: 05/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----	Gasoline Range Organics (GRO)	30	U
-----------------	-------------------------------	----	---

12/88 Rev.

## **SAMPLE DELIVERY GROUP**

**V1965**

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May 23, 2003

Mr. Ted Redding  
USDOE Zone 1  
Bldg. 652, Room 2  
M/S NTS 273  
Mercury, NV 89023

Dear Mr. Redding:

On April 25, 2003, two soil samples, (SDG V1965) were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory. The samples were assigned Laboratory Report Identification Code 4277. Enclosed the Sample Data Package containing the results of the analyses of these samples.

If you have any questions please do not hesitate to call.

Sincerely,



Charles Phillips  
Vice President

**COVER PAGE**

Sanford Cohen & Associates  
Southeastern Environmental Laboratory  
1000 Monticello Court  
Montgomery, Alabama 36117

Laboratory Code: SCA      Subcontract Number: 30025

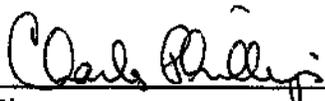
Laboratory Report Identification Code: 4277    SDG: V1965

Sample Matrix: Soil

Site Sample Numbers	Laboratory Sample Number
	Gamma Spectrometry
060204-T7	NTS03-4277-01
060204-T8	NTS03-4277-02

Comments: There were no problems encountered during sample receiving.

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the laboratory Manager or the Manager's designee, as verified by the following signature."

  
\_\_\_\_\_  
Signature

  
\_\_\_\_\_  
Joe Stinson  
Name

\_\_\_\_\_  
Laboratory Manager  
Title

\_\_\_\_\_  
5/23/03  
Date



**CASE NARRATIVE**  
**SDG V1965**  
**Laboratory Report Identification Number: 4277**

May 23, 2003

**I. Introduction**

On April 25, 2003, two soil samples, (SDG V1965), were received for analysis at the Sanford Cohen and Associates (SC&A) Southeastern Environmental Laboratory, located in Montgomery, Alabama. The samples were analyzed in accordance with the Bechtel Nevada Services Subcontract Task Order Agreement Form, Exhibit B, Statement of Work and Specifications, Rev 1, 1/23/01.

**II. Analytical Methodology**

The radioanalytical results reported for each sample include the site and laboratory sample identification numbers, collection date, method of analysis, and the quality control samples that were analyzed concurrently. Samples were analyzed in accordance with the following method.

Radionuclide	Method Number	Method Name	Counting Method
Gamma Emitting Radionuclides	EPA 901.1	Gamma Emitting Radionuclides	Gamma Spectrometry

**III. Analytical Results**

Deficiencies

None.

Matrix Interferences

There were no indications of matrix interference.

Dilutions

There were no dilutions.

Detection Limits

The required detection limits (RDL) were met for all analyses.

Reanalysis

There were no reanalysis.

Deviations from Protocols

There were no deviations from the written protocols and analytical methods.

Contacts with the CTR

There was no contact with the CTR regarding these samples.

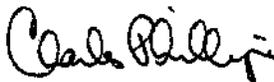
**IV. Quality Control**

Site Samples Used for Quality Control Samples:

Site Sample Number	Laboratory Sample Number	Type of Quality Control Analysis Sample
Laboratory Type II Water	SCAQC-4277-LC1	Laboratory Control Sample
060204-T7	SCAQC-4277-LD1	Laboratory Duplicate Sample
Laboratory Type II Water	SCAQC-4277-PB	Preparation Blank

The analytical results of all quality control samples met the acceptance criteria specified in the SOW.

Sincerely,



Joe Stinson  
Laboratory Manager

5/23/03  
Date

**Sanford Cohen & Associates**  
**Southeastern Environmental Laboratory**

**Radioanalytical Results**

Report Identification Number: V1965

Project Name: <u>Bechtel Nevada</u>	Chain-of-Custody Number: <u>NONE</u>	Matrix: <u>Soil</u>
Site Sample ID: <u>060204-T7</u>		
Other Sample ID:	Collection Date: <u>4/23/2003 10:15:00 A</u>	Date Received: <u>4/25/2003</u>
	Batch Number: <u>4277</u>	Laboratory Code: <u>SCA</u>

<u>Method Number</u>	<u>Radionuclide</u>	<u>Laboratory Sample ID</u>	<u>Activity (pCi/g)</u>	<u>2 <math>\sigma</math> TPU (pCi/g)</u>	<u>Total Error (pCi/g)</u>	<u>MDA (pCi/g)</u>
EPA 901.1	K-40	NTS03-4277-01	26.0	2.44	3.57	0.259
EPA 901.1	CO-60	NTS03-4277-01	-0.004	0.024	0.024	0.033
EPA 901.1	Y-88	NTS03-4277-01	0.003	0.016	0.016	0.029
EPA 901.1	RU-106	NTS03-4277-01	0.004	0.162	0.162	0.269
EPA 901.1	SB-125	NTS03-4277-01	0.026	0.046	0.046	0.079
EPA 901.1	CS-134	NTS03-4277-01	0.005	0.018	0.018	0.027
EPA 901.1	CS-137	NTS03-4277-01	-0.018	0.017	0.017	0.028
EPA 901.1	CE-144	NTS03-4277-01	1.72	1.87	1.88	0.215
EPA 901.1	PM-144	NTS03-4277-01	-0.011	0.017	0.017	0.026
EPA 901.1	PM-146	NTS03-4277-01	0.024	0.021	0.021	0.038
EPA 901.1	EU-152	NTS03-4277-01	-0.009	0.047	0.047	0.079
EPA 901.1	EU-154	NTS03-4277-01	0.000	0.000	0.000	0.057
EPA 901.1	EU-155	NTS03-4277-01	0.280	0.108	0.111	0.102
EPA 901.1	PB-212	NTS03-4277-01	1.76	0.433	0.467	0.048
EPA 901.1	AC-228	NTS03-4277-01	1.83	0.243	0.304	0.110
EPA 901.1	TH-234	NTS03-4277-01	1.31	0.481	0.499	0.534
EPA 901.1	U-235	NTS03-4277-01	0.155	0.047	0.050	0.040
EPA 901.1	U-238	NTS03-4277-01	2.83	3.28	3.29	5.84
EPA 901.1	AM-241	NTS03-4277-01	0.043	0.128	0.128	0.187

<u>Quality Control Samples</u>				
<u>Radionuclide</u>	<u>Laboratory Control (LC)</u>	<u>Laboratory Duplicate (LD)</u>	<u>Matrix Spike (MS)</u>	<u>Preparation Blank (PB)</u>
Gamma	SCAQC-4277-LC1	SCAQC-4277-LD1		SCAQC-4277-PB

**Sanford Cohen & Associates**  
**Southeastern Environmental Laboratory**

**Radioanalytical Results**

Report Identification Number: V1965

Project Name: <u>Bechtel Nevada</u>	Chain-of-Custody Number: <u>NONE</u>	Matrix: <u>Soil</u>
Site Sample ID: <u>060204-T8</u>		
Other Sample ID:	Collection Date: <u>4/23/2003 10:30:00 A</u>	Date Received: <u>4/25/2003</u>
	Batch Number: <u>4277</u>	Laboratory Code: <u>SCA</u>

<u>Method Number</u>	<u>Radionuclide</u>	<u>Laboratory Sample ID</u>	<u>Activity (pCi/g)</u>	<u>2 <math>\sigma</math> TPU (pCi/g)</u>	<u>Total Error (pCi/g)</u>	<u>MDA (pCi/g)</u>
EPA 901.1	K-40	NTS03-4277-02	24.7	2.33	3.39	0.247
EPA 901.1	CO-60	NTS03-4277-02	-0.008	0.024	0.024	0.032
EPA 901.1	Y-88	NTS03-4277-02	-0.002	0.015	0.015	0.027
EPA 901.1	RU-106	NTS03-4277-02	-0.164	0.160	0.161	0.263
EPA 901.1	SB-125	NTS03-4277-02	0.016	0.047	0.047	0.079
EPA 901.1	CS-134	NTS03-4277-02	-0.001	0.018	0.018	0.027
EPA 901.1	CS-137	NTS03-4277-02	-0.006	0.019	0.019	0.032
EPA 901.1	CE-144	NTS03-4277-02	-0.718	2.01	2.01	0.234
EPA 901.1	PM-144	NTS03-4277-02	-0.006	0.018	0.018	0.028
EPA 901.1	PM-146	NTS03-4277-02	0.012	0.023	0.023	0.039
EPA 901.1	EU-152	NTS03-4277-02	0.012	0.051	0.051	0.082
EPA 901.1	EU-154	NTS03-4277-02	0.000	0.000	0.000	0.057
EPA 901.1	EU-155	NTS03-4277-02	0.546	0.105	0.119	0.124
EPA 901.1	PB-212	NTS03-4277-02	1.74	0.512	0.540	0.051
EPA 901.1	AC-228	NTS03-4277-02	1.74	0.248	0.303	0.116
EPA 901.1	TH-234	NTS03-4277-02	1.22	0.444	0.461	0.517
EPA 901.1	U-235	NTS03-4277-02	0.196	0.052	0.056	0.041
EPA 901.1	U-238	NTS03-4277-02	1.68	3.40	3.40	5.89
EPA 901.1	AM-241	NTS03-4277-02	-0.043	0.109	0.109	0.160

<u>Quality Control Samples</u>				
<u>Radionuclide</u>	<u>Laboratory Control (LC)</u>	<u>Laboratory Duplicate (LD)</u>	<u>Matrix Spike (MS)</u>	<u>Preparation Blank (PB)</u>
Gamma	SCAQC-4277-LC1	SCAQC-4277-LD1		SCAQC-4277-PB

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## **SAMPLE DELIVERY GROUP**

**V1755**

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# NEL LABORATORIES

## Corporate Headquarters /

### Reno Laboratory

4750 Longley Lane, Suite 106  
Reno, NV 89502  
Phone: 775.348.2522  
Fax: 775.348.2546

### Las Vegas Laboratory

4208 Arcata Way, Suite A  
Las Vegas, NV 89030  
Phone: 702.657.1010  
Fax: 702.657.1577

Marcos Dixon  
Bechtel Nevada  
P.O. Box 98521, M/S NTS273  
Las Vegas, NV 89193-8521  
TEL: (702) 295-4001

RE Project: CAU330

Order No.: L0210409

Dear Marcos Dixon:

NEL Laboratories, Las Vegas received 3 samples on 10/28/02 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications unless noted in the Case Narrative.

If you have any questions regarding these tests results, please feel free to call.

  
\_\_\_\_\_  
Rod T. Miller  
Laboratory Director

10/31/02  
Date

#### Certifications:

Arizona	AZ0518
California	2002
Idaho	Certified
Montana	Certified
Nevada	NV052
New Mexico	Certified

Albuquerque  
866.360.5726

Boise  
800.200.2952

Las Vegas  
888.368.3282

Phoenix  
888.238.2514

Reno  
800.368.5221

Sacramento  
800.368.5221

**NEL Laboratories, Las Vegas**

Date: 31-Oct-02

**CLIENT:** Bechtel Nevada  
**Project:** CAU330  
**Lab Order:** L0210409

**CASE NARRATIVE**

---

Attached are the analytical results for samples in support of the above referenced project.

The samples submitted for this project were not sampled by NEL. Should you have any questions or comments, please feel free to contact our Client Services Department.

Analytical Comments: None.



# NEL LABORATORIES

**CLIENT:** Bechtel Nevada  
**PROJECT ID:** CAU330  
**PROJECT #:** B502  
**MATRIX:** SOLID (TCLP)

**CLIENT ID:** 330L-0-1  
**DATE SAMPLED:** 10/28/02  
**NEL SAMPLE ID:** L0210409-001A

---

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Reporting Limit</u>	<u>DF</u>	<u>Method</u>	<u>Prep Date</u>	<u>Analyzed</u>	<u>Analyst</u>
Lead	0.77	mg/L	0.050	1	SW 6010B-Tot	10/30/02	10/30/02	VVG-LV

ND - Not Detected at the Reporting Limit

DF - Dilution Factor

**Date:** 31-Oct-02

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

E - Value above quantitation range

# NEL LABORATORIES

CLIENT: Bechtel Nevada  
PROJECT ID: CAU330  
PROJECT #: B502  
MATRIX: SOLID (TCLP)

CLIENT ID: 330L-0-0  
DATE SAMPLED: 10/28/02  
NEL SAMPLE ID: L0210409-002A

---

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Reporting Limit</u>	<u>DF</u>	<u>Method</u>	<u>Prep Date</u>	<u>Analyzed</u>	<u>Analyst</u>
Lead	1.2	mg/L	0.050	1	SW 6010B-Tot	10/30/02	10/30/02	VVG-LV

ND - Not Detected at the Reporting Limit

DF - Dilution Factor

Date: 31-Oct-02

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

E - Value above quantitation range

# NEL LABORATORIES

CLIENT: Bechtel Nevada  
PROJECT ID: CAU330  
PROJECT #: B502  
MATRIX: SOLID (TCLP)

CLIENT ID: 330L-0-2  
DATE SAMPLED: 10/28/02  
NEL SAMPLE ID: L0210409-003A

---

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Reporting Limit</u>	<u>DF</u>	<u>Method</u>	<u>Prep Date</u>	<u>Analyzed</u>	<u>Analyst</u>
Lead	0.62	mg/L	0.050	1	SW 6010B-Tot	10/30/02	10/30/02	VVG-LV

ND - Not Detected at the Reporting Limit

DF - Dilution Factor

Date: 31-Oct-02

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

E - Value above quantitation range

## **SAMPLE DELIVERY GROUP**

**1916**

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28 March 2003

Mr. Theodore Redding  
Bechtel Nevada Corporation  
2621 Losee Road  
Mail Stop NTS273  
Las Vegas, NV 89030-4134

**RE: Subcontract No. 30028, Task Order No. 1**  
**Data Report for LVL Batch 0303L928**  
**SDG#: V1916 Chain: Project CAU 330**

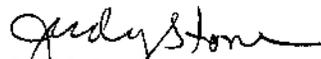
Dear Mr. Redding:

Enclosed please find the data report for 18 soil samples received 12 March 2003 for analysis for TPH DRO/ORO on a 28 day turnaround time. The invoice is enclosed. An EDD is not required.

Please do not hesitate to contact me at (610) 280-3029 with any questions or at any time we may be of service.

Very truly yours,

Lionville Laboratory Incorporated

  
Judith L. Stone  
Senior Project Manager

Enclosure:





## **CASE NARRATIVE**



## Analytical Report

Client: BECHTEL-NEVADA V1916  
LVL #: 0303L928

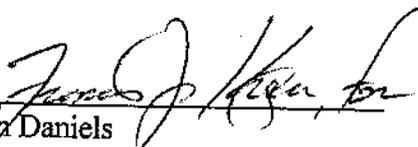
W.O. #: 60052-001-001-0001-00  
Date Received: 03-12-03

### DIESEL RANGE ORGANICS

The set of samples consisted of eighteen (18) soil samples collected on 03-10-03.

The samples and their associated QC samples were extracted on 03-13-03 and analyzed according to Lionville Laboratory OPs on 03-15,23-24. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. All required holding times for extraction and analysis have been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. All matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

3/27/03  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

**SAMPLE DATA FOR EACH SAMPLE**

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-001

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/15/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	12.4	U
00-00-0000-----	Motor Oil	12.4	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-002

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/15/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.4	U
00-00-0000-----	Motor Oil	12.4	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL Lab Sample ID: 0303L928-003

Sample wt/vol: 25.0 (g/mL) G Lab File ID: BLKLACHJ

Level: (low/med) LOW Date Received: 03/12/03

% Moisture: not dec. 2 Date Analyzed: 03/15/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	12.2	U
00-00-0000-----	Motor Oil	12.2	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-004

Sample wt/vol: .25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 5

Date Analyzed: 03/15/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.6	U
00-00-0000-----	Motor Oil	14	

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-0

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-005

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 5

Date Analyzed: 03/15/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	12.7	U
00-00-0000-----	Motor Oil	12.7	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-5

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-006

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/15/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.4	U
00-00-0000-----	Motor Oil	12.4	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-6

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-007

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/15/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.

COMPOUND

CONCENTRATION UNITS:

(ug/L or ug/Kg) mg/kg

CAS NO.	COMPOUND	CONCENTRATION UNITS:
68334-30-5-----	Diesel Range Organics	12.3 U
00-00-0000-----	Motor Oil	12.3 U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-008

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/24/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg)	mg/kg
68334-30-5-----	Diesel Range Organics	12.3	U
00-00-0000-----	Motor Oil	12.3	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-00

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-009

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 2

Date Analyzed: 03/24/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.3	U
00-00-0000-----	Motor Oil	16	

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-8

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-010

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 4

Date Analyzed: 03/24/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.5	U
00-00-0000-----	Motor Oil	16	

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-9

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-011

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 4

Date Analyzed: 03/24/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.5	U
00-00-0000-----	Motor Oil	12.5	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-10

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-012

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.4	U
00-00-0000-----	Motor Oil	12.4	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-11

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-013

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 5

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.6	U
00-00-0000-----	Motor Oil	13	

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-12

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-014

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.3	U
00-00-0000-----	Motor Oil	12.3	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-13

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-015

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 1

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:  
(ug/L or ug/Kg) mg/kg

CAS NO.	COMPOUND		
68334-30-5-----	Diesel Range Organics_____	12.2	U
00-00-0000-----	Motor Oil_____	12.2	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-14

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-016

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 2

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>mg/kg</u>	
68334-30-5-----	Diesel Range Organics	12.2	U
00-00-0000-----	Motor Oil	12.2	U

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ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-15

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-017

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 3

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.3	U
00-00-0000-----	Motor Oil	12.3	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

229906-16

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1916

Matrix: SOIL

Lab Sample ID: 0303L928-018

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/12/03

% Moisture: not dec. 2

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.3	U
00-00-0000-----	Motor Oil	18	

12/88 Rev.

## **SAMPLE DELIVERY GROUP**

**V1926**

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26 March 2003

Mr. Theodore Redding  
Bechtel Nevada Corporation  
2621 Losee Road  
Mail Stop NTS273  
Las Vegas, NV 89030-4134

**RE: Subcontract No. 30028, Task Order No. 1**  
**Data Report for LVL Batch 0303L968**  
**SDG#: V1926 Chain: Project CAU 330**

Dear Mr. Redding:

Enclosed please find the data report for 10 soil samples received 18 March 2003 for analysis for TPH GRO and TPH DRO/ORO on a 7 day turnaround time. The invoice is enclosed. An EDD is not required. Data were faxed 25 March.

Please do not hesitate to contact me at (610) 280-3029 with any questions or at any time we may be of service.

Very truly yours,

Lionville Laboratory Incorporated

  
Judith L. Stone  
Senior Project Manager

Enclosure:



## **CASE NARRATIVE**



## Analytical Report

Client: BECHTEL-NEVADA V1926  
LVL #: 0303L968

W.O. #: 60052-001-001-0001-00  
Date Received: 03-18-2003

### DIESEL RANGE ORGANICS

Seven (7) soil samples were collected on 03-12-2003.

The samples and their associated QC samples were extracted on 03-18-2003 and analyzed according to Lionville Laboratory OPs on 03-22,23-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. The matrix spike recoveries were within EPA QC limits.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels

Laboratory Manager  
Lionville Laboratory Incorporated

3/26/03  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

**SAMPLE DATA FOR EACH SAMPLE**

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

230102-1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-001

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 3

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.4	U
00-00-0000-----	Motor Oil	12.4	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

230102-2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-002

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 5

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.6	U
00-00-0000-----	Motor Oil	12.6	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

230102-3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL Lab Sample ID: 0303L968-003

Sample wt/vol: 25.0 (g/mL) G Lab File ID: BLKLACHJ

Level: (low/med) LOW Date Received: 03/18/03

% Moisture: not dec. 5 Date Analyzed: 03/22/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) mg/kg

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
68334-30-5-----	Diesel Range Organics	12.6	U
00-00-0000-----	Motor Oil	12.6	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

230102-4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-004

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 5

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.6	U
00-00-0000-----	Motor Oil	12.6	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

230102-5

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-005

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 4

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.5	U
00-00-0000-----	Motor Oil	12.5	U

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

230102-6

Lab Name: Lionville Labs, Inc. Work Order: 50052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-006

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 5

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	17	
00-00-0000-----	Motor Oil	20	

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

230102-7

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-007

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 6

Date Analyzed: 03/23/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) ug/kg

68334-30-5-----	Diesel Range Organics	12.7	U
00-00-0000-----	Motor Oil	14	

12/88 Rev.

## **CASE NARRATIVE**



## Analytical Report

**Client:** BECHTEL-NEVADA V1926  
**LVL #:** 0303L968

**W.O. #:** 60052-001-001-0001-00  
**Date Received:** 03-18-2003

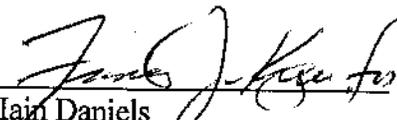
### GRO

Three (3) soil samples were collected on 03-12-2003.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline range organics (GRO) on 03-22-2003.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. Samples were analyzed within required holding time.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. The matrix spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

3/26/03  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

R:/SHARE/GCVOLATILE/GCVOLATILEGLOS.DOC

**SAMPLE DATA FOR EACH SAMPLE**

GC VOLATILES SHEET

CLIENT SAMPLE NO.

230102-1G

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-008

Sample wt/vol: 4.86 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 3

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----	Gasoline Range Organics (GRO)	33	U
-----------------	-------------------------------	----	---

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

230102-2G

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-009

Sample wt/vol: 5.25 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 4

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----Gasoline Range Organics (GRO)	30	U
--	----	---

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

230102-3G

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1926

Matrix: SOIL

Lab Sample ID: 0303L968-010

Sample wt/vol: 4.83 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 03/18/03

% Moisture: not dec. 4

Date Analyzed: 03/22/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS:
86290-81-5-----	Gasoline Range Organics (GRO)	33 U

12/88 Rev.

## **SAMPLE DELIVERY GROUP**

**V1805**

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## **Case Narrative**



## Analytical Report

**Client:** BECHTEL NEVADA V1805  
**LVL#:** 0212L341

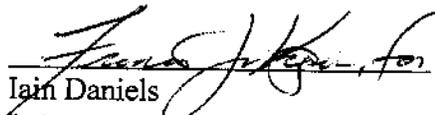
**W.O.#:** 60052-001-001-0001-00  
**Date Received:** 12-13-2002

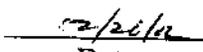
### DIESEL RANGE ORGANICS

The set of samples consisted of one (1) oil and one (1) water samples collected on 12-11-2002.

The samples and their associated QC samples were extracted on 12-11-2002 and analyzed on 12-18,21,27-2002 according to Lionville Laboratory OPs. The extraction procedures were based on method 3520 and 3580a (waste dilution-1g into 10mL); and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The method blank was below the reporting limits for all target compounds.
4. All obtainable surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. Both samples required instrument dilution due to high concentration of target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF DIESEL RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.



# SERVICES REQUEST & CHAIN OF CUSTODY RECORD

### PROJECT CLIENT INFORMATION

Project: CAU 330 BN Ord #: B502  
 Charge Number: 5802BD50  
 Project Manager: Jeffrey Smith  
 Phone: 702-295-1175 Fax: 702-295-7764  
 MS: LJS 306

### REPORT & TURNAROUND INFORMATION

Send Report to: Marcus Dixon  
 Phone: 702-295-4301 Fax: 702-295-7761 MS: LJS 306  
 Turnaround:  Standard - 14 days IH, 28 days Non-rad Env, 45 Days Rad Env, (IH)  
 Rush Preliminary by:  1  2  7  14  28 (Radiological Env)

### SAMPLE INFORMATION

Sampling Site: CAU 330  
 The samples submitted contain (check):  
 Radioactive (Rad)  
 Hazardous (Haz)  
 Unknown contamination  
 If known, identify contaminants.  
 This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

### SAMPLE MANAGEMENT INFORMATION

SDG: (IH) V1805 (Non-Rad Env) (Rad Env)  
 Samples submitted are associated with a signed Project SOW  Yes  No  N/A  
 Analyses entered here agree with the SOW  Yes  No  N/A  
 If not, identify the variation:  
 Subcontract Lab(s) used for this work: Lionville

### Pay Item, Analysis, Method

Pay Item	Analysis	Method	1.28	5.123	4.26	2.17	1.31	3.1	5.102
VOCs	TCLP Metals	600, 1710 ext 131							
	TCLP SVOCs	827D ext 131							
	TCLP VOCs	826D ext 131							
	PCBs	8282							
	Flash point	1210							

ID/DESCRIPTION	SAMPLING DATE	TIME	MATRIX	CONTAINER #	Est Vol	QC			Pres - Analysis eg. HCl - VOCs
						MSD	MS	MS	
330-TB1	12/11/02	9:51	water	40 mL					H <sub>2</sub> SO <sub>4</sub>
330-TB2	12/11/02	9:53	water	40 mL					H <sub>2</sub> SO <sub>4</sub>
2.32505-1	12/11/02	13:14	Li-c. site	per method					
2.32505-2	12/11/02	13:02	water	per method					
<del>Ignited</del>									

### CUSTODY TRANSFER

Sampled/Relinquished (print)	Signature	Date/Time	Received by (print)	Signature	Date/Time
Marcus Dixon	Marcus Dixon	12/11/02 15:06	CA CASTAÑEDA	CA Castañeda	12/11/02 @ 15:15
CA CASTAÑEDA	CA Castañeda	12/11/02 13:00	Fed. Po. Subj. #	791994023194	12/11/02 @ 13:00
FEDER	CA Castañeda	12-13-02	Carlos Hernandez	Carlos Hernandez	12-13-02 09:20

## **Sample Data**

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: OIL

Lab Sample ID: 0212L341-003

Sample wt/vol: 1.00 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec. 100

Date Analyzed: 12/21/02

Column: (pack/cap) CAP

Dilution Factor: 10.0

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	120000
00-00-0000-----	Motor Oil	700000

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: WATER

Lab Sample ID: 0212L341-004

Sample wt/vol: 100 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/21/02

Column: (pack/cap) CAP

Dilution Factor: 10.0

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) ug/L

68334-30-5-----	Diesel Range Organics	0.16E+08	
00-00-0000-----	Motor Oil		E

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-2DL

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: WATER

Lab Sample ID: 0212L341-004 DL

Sample wt/vol: 100 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/23/02

Column: (pack/cap) CAP

Dilution Factor: 100

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) ug/L

68334-30-5-----Diesel Range Organics	NA	
00-00-0000-----Motor Oil	0.16E+09	

12/88 Rev.

## Case Narrative



LIONVILLE LABORATORY INC.

Client: BECHTEL NEVADA V1805  
LVL#: 0212L341

W.O.#: 60052-001-001-0001-00  
Date Received: 12-13-2002

### GC/MS VOLATILE-TCLP

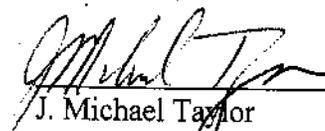
The set of samples consisted on one (1) leachate and three (3) water samples collected on 12-11-2002.

The leachate sample was generated on 12-18-2002 from an oil sample.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCLP Volatile target compounds on 12-16,17,18-2002.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for analysis was met.
3. The leachate samples were analyzed at five-fold dilution due to the leachate matrix. Sample 232505-2 contained 2 layers, oil and aqueous. The water layer was prepared, diluted 100-fold due to high levels of target compounds and reported as per client instruction.
4. All surrogate recoveries were within EPA QC limits.
5. Matrix spike analyses are associated with LVL # 0212L340.
6. All blank spike recoveries were within EPA QC limits.
7. Internal standard area and retention time criteria were met.
8. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
\_\_\_\_\_  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

12/27/02  
Date

son\group\data\bnal\bechtel-nevada\0212-341.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

s.

06

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I = Interference.
- NQ = Result qualitatively confirmed but not able to quantify.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY OF VOA DATA

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP, Z = Indicates Spiked Compound.

**Sample Data for each Sample**

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

330-TB1

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER

Lab Sample ID: 0212L341-001

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: q121616

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 12/16/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) MG/L

75-01-4	Vinyl Chloride	0.010	U
75-35-4	1,1-Dichloroethene	0.005	U
67-66-3	Chloroform	0.005	U
107-06-2	1,2-Dichloroethane	0.005	U
78-93-3	2-Butanone	0.010	U
56-23-5	Carbon Tetrachloride	0.005	U
79-01-6	Trichloroethene	0.005	U
71-43-2	Benzene	0.005	U
127-18-4	Tetrachloroethene	0.005	U
108-90-7	Chlorobenzene	0.005	U

FORM 1 V-1

1/87 Rev.

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

330-TB2

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvl Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER Lab Sample ID: 0212L341-002

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: q121617

Level: (low/med) LOW Date Received: 12/13/02

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 12/16/02

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

75-01-4-----	Vinyl Chloride	0.010	U
75-35-4-----	1,1-Dichloroethene	0.005	U
67-66-3-----	Chloroform	0.005	U
107-06-2-----	1,2-Dichloroethane	0.005	U
78-93-3-----	2-Butanone	0.010	U
56-23-5-----	Carbon Tetrachloride	0.005	U
79-01-6-----	Trichloroethene	0.005	U
71-43-2-----	Benzene	0.005	U
127-18-4-----	Tetrachloroethene	0.005	U
108-90-7-----	Chlorobenzene	0.005	U

FORM 1 V-1

1/87 Rev.

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

232505-2

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER

Lab Sample ID: 0212L341-004

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: g121710

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 12/17/02

Column: (pack/cap) CAP

Dilution Factor: 100

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

75-01-4-----	Vinyl Chloride	1.0	U
75-35-4-----	1,1-Dichloroethene	0.50	U
67-66-3-----	Chloroform	0.50	U
107-06-2-----	1,2-Dichloroethane	0.50	U
78-93-3-----	2-Butanone	2.8	
56-23-5-----	Carbon Tetrachloride	0.50	U
79-01-6-----	Trichloroethene	0.50	U
71-43-2-----	Benzene	0.50	U
127-18-4-----	Tetrachloroethene	0.50	U
108-90-7-----	Chlorobenzene	0.50	U

FORM 1 V-1

1/87 Rev.

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

232505-1

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER

Lab Sample ID: 0212L341-005

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: g121808

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec. \_\_\_\_\_

Date Analyzed: 12/18/02

Column: (pack/cap) CAP

Dilution Factor: 5.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

75-01-4-----	Vinyl Chloride	0.050	U
75-35-4-----	1,1-Dichloroethene	0.025	U
67-66-3-----	Chloroform	0.025	U
107-06-2-----	1,2-Dichloroethane	0.025	U
78-93-3-----	2-Butanone	0.042	J
56-23-5-----	Carbon Tetrachloride	0.025	U
79-01-6-----	Trichloroethene	0.025	U
71-43-2-----	Benzene	0.025	U
127-18-4-----	Tetrachloroethene	0.025	U
108-90-7-----	Chlorobenzene	0.025	U

FORM 1 V-1

1/87 Rev.

## Case Narrative



## Analytical Report

Client: BECHTEL NEVADA V1805  
LVL #: 0212L341

W.O.#: 60052-001-001-0001-00  
Date Received: 12-13-02

### SEMIVOLATILE

The set of samples consisted of one (1) water sample and one (1) filtrate sample generated on 12-18-02 from a water sample. Both samples were collected on 12-11-02.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3520 on 12-18-02 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for client specified TCLP Semivolatile target compounds on 12-20-02.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were not reported as per client request.
4. Sample 232505-2 was diluted 5-fold due to high levels of non-target compounds. The final extracted volume was 20 mLs.
4. All obtainable surrogate recoveries were within EPA QC limits.
5. One (1) of twenty-four (24) blank spike recoveries was outside EPA QC limits.
6. Internal standard area and retention time criteria were met.
7. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
8. The filtrate blank associated with sample 232505-1 was inadvertently not extracted for Semivolatiles. Since no target compounds in this sample are above regulatory limits, there is minimal impact on the data.

  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

12-31-02  
Date

pefr\group\data\bnal\bechtel nevada\0212-341.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY OF BNA DATA

### DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I = Interference.
- NQ = Result qualitatively confirmed but not able to quantify.
- A = Indicates that a TIC is a suspected aldol-condensation product.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y = Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY OF BNA DATA

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP, Z** = Indicates Spiked Compound.

## TECHNICAL FLAGS FOR MANUAL INTEGRATION

Manual quantitation modifications or integrations are performed routinely to improve the data quality for a variety of technical reasons. Documentation of these modifications should be clear and concise. The following "flags" are used to indicate the technical reasons for quantitation modifications:

- MP - Missed Peak: manually added peak not found by automatic quantitation program.
- PA - Peak Assignment: quantitation report was changed to reflect correct peak assignment.
- RI - Routine Integration: routine integrations are performed for some analytes that are consistently integrated improperly by the automatic integration programs. Examples are the dichlorobenzene isomers on the VOA packed column and benzo(b)fluoranthene/benzo(k)fluoranthene which are poorly resolved on the BNA column.
- SP - Split Peak: the automatic integration improperly split the peak; a manual integration was performed to get the correct area.
- CB - Coelution/Background: peak was manually integrated to eliminate contribution from coeluting compounds, background signal, or other interference.
- PI - Proper Integration: a peak with poor or inconsistent integration (e.g., excessive tail) was properly integrated manually.

**Sample Data for each Sample**

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

232505-2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: (soil/water) WATER

Lab Sample ID: 0212L341-004

Sample wt/vol: 200 (g/mL) ML

Lab File ID: A122011

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture:      decanted: (Y/N)     

Date Extracted: 12/18/02

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 12/20/02

Injection Volume: 2.0 (uL)

Dilution Factor: 100

GPC Cleanup: (Y/N) N

pH: 7.0

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) MG/L

Q

110-86-1-----	Pyridine	5.0	U
106-46-7-----	1,4-Dichlorobenzene	5.0	U
95-48-7-----	2-Methylphenol	5.0	U
106-44-5-----	3- and/or 4-Methylphenol	5.0	U
67-72-1-----	Hexachloroethane	5.0	U
98-95-3-----	Nitrobenzene	5.0	U
87-68-3-----	Hexachlorobutadiene	5.0	U
88-06-2-----	2,4,6-Trichlorophenol	5.0	U
95-95-4-----	2,4,5-Trichlorophenol	12	U
121-14-2-----	2,4-Dinitrotoluene	5.0	U
118-74-1-----	Hexachlorobenzene	5.0	U
87-86-5-----	Pentachlorophenol	12	U

FORM 1 SV-1

RFW (v3.3)

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

232505-1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: (soil/water) WATER

Lab Sample ID: 0212L341-006

Sample wt/vol: 100 (g/mL) ML

Lab File ID: A122012

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: \_\_\_\_\_ decanted: (Y/N) \_\_\_\_\_

Date Extracted: 12/18/02

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 12/20/02

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:  
(ug/L or ug/Kg) MG/L

CAS NO.	COMPOUND	Q
110-86-1	Pyridine	0.10 U
106-46-7	1,4-Dichlorobenzene	0.10 U
95-48-7	2-Methylphenol	0.008 J
106-44-5	3- and/or 4-Methylphenol	0.016 J
67-72-1	Hexachloroethane	0.10 U
98-95-3	Nitrobenzene	0.10 U
87-68-3	Hexachlorobutadiene	0.10 U
88-06-2	2,4,6-Trichlorophenol	0.10 U
95-95-4	2,4,5-Trichlorophenol	0.25 U
121-14-2	2,4-Dinitrotoluene	0.10 U
118-74-1	Hexachlorobenzene	0.10 U
87-86-5	Pentachlorophenol	0.25 U

FORM 1 SV-1

RFW (v3.3)

## **Case Narrative**



## Analytical Report

Client: BECHTEL NEVADA V1805  
LVL#: 0212L341

W.O.#: 60052-001-001-0001-00  
Date Received: 12-13-2002

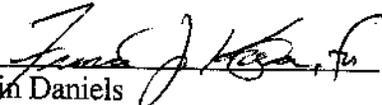
### GRO

One (1) water and one (1) oil samples were collected on 12-11-2002.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline range organics (GRO) on 12-17-2002.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVLI's sample acceptance policy.
2. The required holding time for analysis has been met.
3. Sample 232505-2 required a 5-fold instrument dilution due to the high concentration of target analytes. Sample 232505-1 also required a medium level analysis due to the chromatographic anomalies, high concentration of target and non-target analytes. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
4. The method blanks were below the reporting limits for all target compounds.
5. Four (4) of ten (10) obtainable surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

son\rgroup\data\GRO\12-341.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. A



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## Sample Data

GC VOLATILES SHEET

CLIENT SAMPLE NO.

232505-1RE

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: OIL

Lab Sample ID: 0212L341-003

Sample wt/vol: 4.98 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) MED

Date Received: 12/13/02

% Moisture: not dec. 100

Date Analyzed: 12/17/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----Gasoline Range Organics (GRO)_	93000	
---	-------	--

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

232505-2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: WATER

Lab Sample ID: 0212L341-004

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/17/02

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/L</u>
---------	----------	---

86290-81-5-----Gasoline Range Organics (GRO)_		E
---	--	---

12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

232505-2DL

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: WATER

Lab Sample ID: 0212L341-004 DL

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 12/13/02

% Moisture: not dec.       

Date Analyzed: 12/17/02

Column: (pack/cap) CAP

Dilution Factor: 5.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/L

86290-81-5-----	Gasoline Range Organics (GRO)	9300	
-----------------	-------------------------------	------	--

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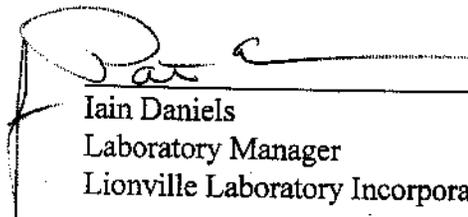
## Analytical Report

**Client:** BECHTEL NEVADA V1805  
**LVL#:** 0212L341

**W.O.#:** 60052-001-001-0001-00  
**Date Received:** 12-13-02

### INORGANIC NARRATIVE

1. This narrative covers the analysis of 1 oil sample and 1 water sample.
2. The samples were prepared and analyzed in accordance with the method indicated on the attached glossary.
3. Sample holding times as required by the method and/or contract were met.
4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.
5. The Laboratory Control Sample (LCS) was within the laboratory control limits.
6. The replicate analysis for sample 232505-1 was within the 20% Relative Percent Difference (RPD) control limit.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

12-30-02  
Date

njpl12-341

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. A

**Inorganic Data Summary Report  
Physical Testing Observation**

**Client:** BECTHEL NEVADA V1805  
**LVL#:** 0212L341

**W.O.#:** 60052-001-001-0001-00  
**Date Received:** 12-13-02

**Analyte:**

Flash Point

**Observation:**

No Flash Point observed for sample 232505-2.

The sample was heated to approximately 200°F.

njp012-341.pt2

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 12/24/02

CLIENT: BECHTEL NEVADA V1805  
WORK ORDER: 60052-001-001-0001-00

LVL LOT #: 0212L341

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	232505-1	Flash Point	54.4	DEG F	40.0	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 12/24/02

CLIENT: BECHTEL NEVADA V1905  
WORK ORDER: 60052-001-001-0001-00

LVL LOT #: 0212L341

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR (REP)
-003REP	232505-1	Flash Point	54.4	63.4	15.3	1.0

# Case Narrative



Analytical Report

Client : BECHTEL NEVADA V1805  
LVL# : 0212L341

W.O.# : 60052-001-001-0001-00  
Date Received : 12-13-02

SW846 METALS

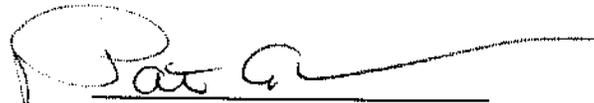
1. This narrative covers the analyses of 1 water sample and 1 TCLP leachate sample.
2. The samples were prepared and analyzed in accordance with SW-846 protocol and reported with a CLP deliverable. An aliquot of the total sample was preserved prior to digestion. All samples were prepared with a dilution due to sample matrix.

The total samples and the TCLP leachate samples have been reported on separate sets of forms.

3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.
4. All analyses were performed within the required holding times.
5. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
6. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits.
7. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
8. All preparation/method blanks were within method criteria. Refer to form 3.
9. All ICP Interference Check Standards were within control limits. Refer to form 4.
10. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.
11. All serial dilution percent differences were within SW-846 control limits. Refer to form 9.
12. The TCLP extract from sample 232505-1 was selected for the matrix spike (MS) for this analytical batch. The MS recoveries for all analytes in the TCLP extract were above 50% per method criteria.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

13. All sample IDs were changed to accommodate the EPA naming convention which allows a maximum of 6 characters on all CLP Forms. Refer to the comments section of form 1 for the original ID.
14. Recoveries on the Laboratory Summary Report and CLP forms will vary depending on the number of significant figures used in the recovery calculation.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated  
alm/m12-341

12-30-02  
Date

## METHOD REFERENCES AND DATA QUALIFIERS

### DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

### Q QUALIFIERS

- E = The reported value is estimated because of the presence of interference.
- M = Duplicate injection precision not met.
- N = Spiked sample recovery not within control limits.
- S = The reported value was determined by the Method of Standard Additions (MSA).
- W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.
- \* = Duplicate analysis not within control limits.
- + = Correlation coefficient for the MSA is less than 0.995.

### ABBREVIATIONS

- PB = Method or Preparation Blank.
- S = Matrix Spike.
- T = Matrix Spike Duplicate.
- R or D = Sample Replicate

### ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
4. Flame AA.
5. Graphite Furnace AA.





## **Case Narrative**



## Analytical Report

Client: BECHTEL NEVADA V1805  
LVL#: 0212L341

W.O.#: 60052-001-001-0001-00  
Date Received: 12-13-2002

### PCB

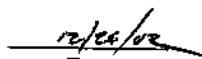
The set of samples consisted of one (1) oil and one (1) water samples collected on 12-11-2002.

The samples and their associated QC samples were extracted on 12-16,17-2002 and analyzed on 12-18,20-2002 according to Lionville Laboratory OPs. The extraction procedures were based on method 3520 and 3580a (waste dilution-1g into 10mL); and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVLI's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The samples and their associated QC samples received a Sulfuric acid and Sulfur cleanup.
4. The method blanks were below the reporting limits for all target compounds.
5. Four (4) of fourteen (14) obtainable surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
John Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

  
Date

son\tr\group\data\pest\bechtel\12L-341.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## Sample Data

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-1

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: OIL Lab Sample ID: 0212L341-003

Sample wt/vol: 1.00 (g/mL) G Lab File ID: BLK08330.01

Level: (low/med) LOW Date Received: 12/13/02

% Moisture: not dec. 100 dec. Date Extracted: 12/17/02

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/20/02

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

12674-11-2-----	Aroclor-1016	1000	U
11104-28-2-----	Aroclor-1221	2000	U
11141-16-5-----	Aroclor-1232	1000	U
53469-21-9-----	Aroclor-1242	1000	U
12672-29-6-----	Aroclor-1248	1000	U
11097-69-1-----	Aroclor-1254	1000	U
11096-82-5-----	Aroclor-1260	1000	U

FORM 1 PEST

12/88 Rev.

1D  
 PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-2

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1805

Matrix: WATER Lab Sample ID: 0212L341-004

Sample wt/vol: 350 (g/mL) ML Lab File ID: BLK08330.01

Level: (low/med) LOW Date Received: 12/13/02

% Moisture: not dec.        dec. Date Extracted: 12/16/02

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 12/18/02

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		
12674-11-2-----	Aroclor-1016	11	U
11104-28-2-----	Aroclor-1221	23	U
11141-16-5-----	Aroclor-1232	11	U
53469-21-9-----	Aroclor-1242	11	U
12672-29-6-----	Aroclor-1248	11	U
11097-69-1-----	Aroclor-1254	11	U
11096-82-5-----	Aroclor-1260	11	U

FORM 1 PEST

12/88 Rev.

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## **SAMPLE DELIVERY GROUP**

**V1806**

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# PARAGON ANALYTICS, INC.

225 Commerce Drive ♦ Fort Collins, CO 80524 ♦ (800) 443-1511 ♦ (970) 490-1511 ♦ FAX (970) 490-1522

January 13, 2003

Mr. Ted Redding  
Bechtel Nevada  
US DOE Zone 1, Bldg. 652, Rm 2, M/S NTS273  
Mercury, NV, 89023

RE: Paragon Workorder: 02-12-064  
Client Project Name: CAU 330  
Client Project Number: V1806

Dear Mr. Redding:

One solid and one liquid sample was received from Bechtel Nevada on December 13, 2002. The samples were scheduled for Gamma Spectroscopy (pages 1-158) analysis. The results for this analysis are contained in the enclosed reports.

Thank you for your confidence in Paragon Analytics, Inc. Should you have any questions, please call.

Sincerely,

Paragon Analytics, Inc.  
Ken Campbell  
Project Manager

KDC/hc  
Enclosure: Report





# Paragon Analytics, Inc.

## Radiochemistry Case Narrative Gamma Spectroscopy

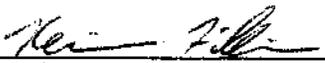
### Bechtel Nevada

CAU 330 / V1806

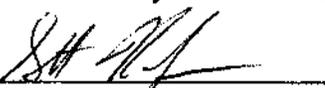
Paragon Work Order 0212064

1. This report consists of analysis results for one solid sample and one liquid sample received by Paragon on 12/13/02. The analysis results for these samples are reported on an 'as received' basis in units of pCi/gram.
2. These samples were prepared according to Paragon Analytics, Inc. procedure PAI SOP739R5.
3. The samples were analyzed for the presence of gamma emitting radionuclides according to Paragon Analytics, Inc. procedure PAI SOP713R7. The analyses were completed on 12/31/02.
4. The samples were analyzed using Seeker Version 2.2, which is a product of Vertechs Software Solutions, Inc.
5. Sample volumes were insufficient to allow preparation of duplicates. Duplicate analyses of samples 232505-1 and 232505-2 (PAI ID 0212064-1 and -2) were performed in lieu of preparation duplicates.
6. Due to current software limitations, the DER determinations in this report were calculated using the 2 sigma TPU. The SOW indicates that the 1 sigma TPU be used in the DER determination. However, the requested DER limit of less than 3 at the 1 sigma level (which is equivalent to 1.5 at the 2 sigma level) was achieved. Data quality is not affected.
7. The efficiencies used in the activity calculations for these samples were obtained using a NIST traceable mixed gamma source spiked into 500g of sand. Due to differences between the calibration standard and the samples, the analytical results may be biased.
8. There are cases where the magnitude of the negative activity is greater than the 2 sigma TPU. The analyst's review of the data does not indicate a problem with the instrument data or the subsequent reporting systems. The data quality is not believed to be affected and the results are submitted without qualification. Under typical conditions, where background level sample data is normally distributed and analyzed by paired observations, this event is likely to occur at least 2.5% of the time.
9. No problems were encountered with either the client samples or the associated quality control samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Radiochemistry Instrument Technician

1-7-03  
Date

  
Radiochemistry Final Data Review

1/10/03  
Date

PARAGON ANALYTICS, INC.  
Radiochemistry Data Package

3

Section 3

**INDIVIDUAL  
SAMPLE RESULTS**

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 1 of 4

Reported on: Tuesday, January 07, 2003  
10:59:36

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1806

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0212064

File ID: 232505-1

Lab ID: 0212064-1

Sample Matrix: Solid

Date Prepared: 30-Dec-02

Prep SOP: PAI 739R5

Prep Batch: GS01837

Date Collected: 11-Dec-02

Date Analyzed: 31-Dec-02

Analytical SOP: PAI 713R7

Spectrum Code: 021300D01A

Final Aliquot: 332.3 g

Report Basis: As Received

Count Time (min.): 30

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	6.55E-02 +/- 1.76E-01	3.03E-01	pCi/g	U
Am-241	-5.65E-02 +/- 1.70E-01	3.10E-01	pCi/g	U
Ce-144	8.77E-02 +/- 1.92E-01	3.26E-01	pCi/g	U
Co-60	-6.04E-03 +/- 3.78E-02	7.18E-02	pCi/g	U
Cs-134	-4.15E-02 +/- 4.90E-02	9.05E-02	pCi/g	U
Cs-137	2.34E-02 +/- 4.61E-02	7.79E-02	pCi/g	U
Eu-152	6.65E-02 +/- 1.64E-01	2.89E-01	pCi/g	U
Eu-154	8.86E-02 +/- 1.98E-01	3.41E-01	pCi/g	U
Eu-155	-7.92E-02 +/- 1.17E-01	2.16E-01	pCi/g	U
K-40	-4.22E-02 +/- 5.47E-01	9.88E-01	pCi/g	U
Pb-212	-1.75E-02 +/- 5.47E-02	9.98E-02	pCi/g	U
Pm-144	2.59E-02 +/- 3.97E-02	6.60E-02	pCi/g	U
Pm-146	2.98E-02 +/- 4.68E-02	7.79E-02	pCi/g	U
Ru-106	2.03E-02 +/- 3.97E-01	7.04E-01	pCi/g	U
Sb-125	-5.24E-03 +/- 8.45E-02	1.54E-01	pCi/g	U
Th-234	4.29E-02 +/- 7.41E-01	1.28E+00	pCi/g	U
U-235	9.26E-03 +/- 2.03E-01	3.56E-01	pCi/g	U
Y-88	1.25E-02 +/- 5.05E-02	8.84E-02	pCi/g	U

Data Package ID: GSS0212064-1

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 2 of 4

Reported on: Tuesday, January 07, 2003  
10:59:36

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1806

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0212064

Field ID: 232505-1  
Lab ID: 0212064-1

Sample Matrix: Solid  
Date Prepared: 30-Dec-02  
Prep SOP: PAI 739R5  
Prep Batch: GS01837

Date Collected: 11-Dec-02  
Date Analyzed: 31-Dec-02  
Analytical SOP: PAI 713R7  
Spectrum Code: 021300D01A

Final Aliquot: 332.3 g  
Report Basis: As Received  
Count Time (min.): 30  
Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
----------------	--------------------	-----	-----------------	---------------

### Comments:

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC or less than the associated TPU.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- SQ - Spectral quality prevents accurate quantitation.
- SI - Nuclide identification and/or quantitation is tentative.
- TI - Nuclide identification is tentative.
- R - Nuclide has exceeded 8 half-lives.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSS0212064-1

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 3 of 4

Reported on: Tuesday, January 07, 2003  
10:59:37

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1806

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0212064

Field ID: 232505-2

Lab ID: 0212064-2

Sample Matrix: Liquid

Date Prepared: 30-Dec-02

Prep SOP: PAI 739R5

Prep Batch: GS01838

Date Collected: 11-Dec-02

Date Analyzed: 31-Dec-02

Analytical SOP: PAI 713R7

Spectrum Code: 021423D07A

Final Allquot: 323.2 g

Report Basis: As Received

Count Time (min.): 30

Library: GAM-A-001.L1

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	-1.46E-01 +/- 1.85E-01	4.65E-01	pCi/g	U
Am-241	-3.85E-03 +/- 6.01E-02	1.16E-01	pCi/g	U
Ce-144	2.14E-02 +/- 1.68E-01	3.18E-01	pCi/g	U
Co-60	-7.78E-03 +/- 5.87E-02	1.33E-01	pCi/g	U
Cs-134	6.08E-03 +/- 6.08E-02	1.14E-01	pCi/g	U
Cs-137	-7.40E-03 +/- 5.74E-02	1.17E-01	pCi/g	U
Eu-152	-1.74E-01 +/- 3.08E-01	7.59E-01	pCi/g	U
Eu-154	1.01E-01 +/- 3.19E-01	6.05E-01	pCi/g	U
Eu-155	3.16E-02 +/- 9.14E-02	1.63E-01	pCi/g	U
K-40	-1.94E-02 +/- 5.99E-01	1.31E+00	pCi/g	U
Pb-212	-6.84E-02 +/- 7.95E-02	1.64E-01	pCi/g	U
Pm-144	-6.90E-03 +/- 7.44E-02	1.43E-01	pCi/g	U
Pm-146	-8.25E-03 +/- 5.75E-02	1.17E-01	pCi/g	U
Ru-106	1.90E-01 +/- 4.57E-01	8.28E-01	pCi/g	U
Sb-125	2.69E-02 +/- 1.30E-01	2.43E-01	pCi/g	U
Th-234	1.63E-01 +/- 4.98E-01	8.69E-01	pCi/g	U
U-235	-1.55E-01 +/- 1.86E-01	4.00E-01	pCi/g	U
Y-88	-3.24E-02 +/- 5.99E-02	1.42E-01	pCi/g	U

Data Package ID: GSS0212064-1

# Gamma Spectroscopy Results

## Method PAI 713R7

### Sample Results

Page: 4 of 4

Reported on: Tuesday, January 07, 2003  
10:59:37

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1806

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0212064

Field ID: 232505-2  
Lab ID: 0212064-2

Sample Matrix: Liquid  
Date Prepared: 30-Dec-02  
Prep SOP: PAI 739R5  
Prep Batch: GS01838

Date Collected: 11-Dec-02  
Date Analyzed: 31-Dec-02  
Analytical SOP: PAI 713R7  
Spectrum Code: 021423D07A

Final Allquot: 323.2 g  
Report Basis: As Received  
Count Time (min.): 30  
Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
----------------	--------------------	-----	-----------------	---------------

#### Comments:

##### Qualifiers/Flags:

- U - Result is less than the sample specific MDC or less than the associated TPU.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- SQ - Spectral quality prevents accurate quantitation.
- SI - Nuclide identification and/or quantitation is tentative.
- TI - Nuclide identification is tentative.
- R - Nuclide has exceeded 8 half-lives.

##### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSS0212064-1

## **SAMPLE DELIVERY GROUP**

**V1879**

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# ANALYTICAL LABORATORY SERVICES REQUEST & CHAIN OF CUSTODY RECORD

**PROJECT/CLIENT INFORMATION**  
 Project: CAU 330 BN Org #: 8502  
 Charge Number: 5302 BD 50  
 Project Manager: Jeffrey Smith  
 Phone: 702-295-7761 M/S: NT3306  
 Fax: 702-295-7761

**REPORT & TURNAROUND INFORMATION**  
 Send Report to: Marcus Dixon  
 Phone: 702-295-4001 Fax: 702-295-7761 M/S: MT3306  
 Turnaround:  Standard - 14 days IH, 28 days Non-rad Env, 45 Days Rad Env, (IH)  Rush Preliminary by:  1  2  7  14  28 (Radiological Env)

**SAMPLE INFORMATION**  
 Sampling Site: CAU 330  
 The samples submitted contain (check):  
 Hazardous (list) -  
 Radioactive (list) -  
 Unknown contamination.  
 If known, identify contaminants. This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

**SAMPLE MANAGEMENT INFORMATION**  
 SDG: (IH) V1879 (Non-Rad Env) (Rad Env)  
 Samples submitted are associated with a signed Project SOW  Yes  No  
 Analyses entered here agree with the SOW  Yes  No  N/A  
 If not, identify the variation:  
 Subcontract Lab(s) used for this work: LIOAVILLE

ID/DESCRIPTION	SAMPLING DATE	TIME	MATRIX	CONTAINER #	Est Vol	QC			Pres - Analysis eg. HCl - VOCs
						MSD	MS	MS	
330-TB5	1/29/03	12:10	wafer	1	40 mL				H <sub>2</sub> O <sub>4</sub>
330-TB6	1/29/03	12:13	wafer	1	40 mL				H <sub>2</sub> O <sub>4</sub>
232505-3	1/29/03	15:00	soil	6	per method				
232505-4	1/29/03	15:20	soil	6	per method				
<del>LAST ITEM</del>									

CUSTODY TRANSFER	Sampled/Relinquished (print)	Signature	Date/Time	Received by (print)	Signature	Date/Time
CA CASTAÑEDA	CA Castañeda	CA Castañeda	01/30/03 @ 1300	Feed Ex	791286842352	1-30-03 1300
Feed Ex	CA Castañeda	CA Castañeda	12/30/03/0733			

## Case Narrative



Client: BECHTEL-NEVADA V1879

LVL #: 0301L631

W.O. #: 60052-001-001-0001-00

Date Received: 01-31-2003

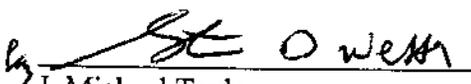
### GC/MS VOLATILE

Two (2) water and two (2) soil samples were collected on 01-29-2003.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8260B for TCL Volatile target compounds on 02-05,06-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for analysis was met.
3. Non-target compounds were detected in the samples.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blanks contained the common laboratory contaminant Methylene Chloride at levels less than 3x the CRQL.
8. Internal standard area criteria were not met for sample 232505-4. The analysis of associated matrix spike samples fulfills the reanalysis requirement.
9. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
J. Michael Taylor

President

Lionville Laboratory Incorporated

son\group\data\bna\bechtel-nevada\0301-631.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

02-18-03

Date

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

- U** = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J** = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D** = Identifies all compounds identified in an analysis at a secondary dilution factor.
- I** = Interference.
- NQ** = Result qualitatively confirmed but not able to quantify.
- N** = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X** = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y** = Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY OF VOA DATA

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP, Z** = Indicates Spiked Compound.

## Sample Data for each Sample

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

330-TB5

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER Lab Sample ID: 0301L631-001

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: x020520

Level: (low/med) LOW Date Received: 01/31/03

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 02/05/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/L

74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	9	B
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

330-TB6

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) WATER Lab Sample ID: 0301L631-002

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: x020521

Level: (low/med) LOW Date Received: 01/31/03

% Moisture: not dec. \_\_\_\_\_ Date Analyzed: 02/05/03

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/L</u>	
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	9	B
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	5	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

232505-3

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_

SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) SOIL

Lab Sample ID: 0301L631-003

Sample wt/vol: 5.30 (g/mL) G

Lab File ID: x020622

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: not dec. 1

Date Analyzed: 02/06/03

Column: (pack/cap) CAP

Dilution Factor: 0.943

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/Kg

74-87-3	-----Chloromethane	10	U
74-83-9	-----Bromomethane	10	U
75-01-4	-----Vinyl Chloride	10	U
75-00-3	-----Chloroethane	10	U
75-09-2	-----Methylene Chloride	19	B
67-64-1	-----Acetone	10	U
75-15-0	-----Carbon Disulfide	5	U
75-35-4	-----1,1-Dichloroethene	5	U
75-34-3	-----1,1-Dichloroethane	5	U
540-59-0	-----1,2-Dichloroethene (total)	5	U
67-66-3	-----Chloroform	5	U
107-06-2	-----1,2-Dichloroethane	5	U
78-93-3	-----2-Butanone	10	U
71-55-6	-----1,1,1-Trichloroethane	5	U
56-23-5	-----Carbon Tetrachloride	5	U
75-27-4	-----Bromodichloromethane	5	U
78-87-5	-----1,2-Dichloropropane	5	U
10061-01-5	-----cis-1,3-Dichloropropene	5	U
79-01-6	-----Trichloroethene	5	U
124-48-1	-----Dibromochloromethane	5	U
79-00-5	-----1,1,2-Trichloroethane	5	U
71-43-2	-----Benzene	5	U
10061-02-6	-----Trans-1,3-Dichloropropene	5	U
75-25-2	-----Bromoform	5	U
108-10-1	-----4-Methyl-2-pentanone	10	U
591-78-6	-----2-Hexanone	10	U
127-18-4	-----Tetrachloroethene	5	U
79-34-5	-----1,1,2,2-Tetrachloroethane	5	U
108-88-3	-----Toluene	5	U
108-90-7	-----Chlorobenzene	5	U
100-41-4	-----Ethylbenzene	5	U
100-42-5	-----Styrene	5	U
1330-20-7	-----Xylene (total)	5	U

1A  
VOLATILE ORGANICS ANALYSIS SHEET

EPA SAMPLE NO.

232505-4

Lab Name: Lionville Labs, Inc. Contract: 60052001001

Lab Code: Lionvi Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: \_\_\_\_\_

Matrix: (soil/water) SOIL Lab Sample ID: 03011631-004

Sample wt/vol: 5.60 (g/mL) G Lab File ID: x020619

Level: (low/med) LOW Date Received: 01/31/03

% Moisture: not dec. 1 Date Analyzed: 02/06/03

Column: (pack/cap) CAP Dilution Factor: 0.893

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		
74-87-3	Chloromethane	9	U
74-83-9	Bromomethane	9	U
75-01-4	Vinyl Chloride	9	U
75-00-3	Chloroethane	9	U
75-09-2	Methylene Chloride	20	B
67-64-1	Acetone	9	U
75-15-0	Carbon Disulfide	4	U
75-35-4	1,1-Dichloroethene	4	U
75-34-3	1,1-Dichloroethane	4	U
540-59-0	1,2-Dichloroethene (total)	4	U
67-66-3	Chloroform	4	U
107-06-2	1,2-Dichloroethane	4	U
78-93-3	2-Butanone	9	U
71-55-6	1,1,1-Trichloroethane	4	U
56-23-5	Carbon Tetrachloride	4	U
75-27-4	Bromodichloromethane	4	U
78-87-5	1,2-Dichloropropane	4	U
10061-01-5	cis-1,3-Dichloropropene	4	U
79-01-6	Trichloroethene	4	U
124-48-1	Dibromochloromethane	4	U
79-00-5	1,1,2-Trichloroethane	4	U
71-43-2	Benzene	4	U
10061-02-6	Trans-1,3-Dichloropropene	4	U
75-25-2	Bromoform	4	U
108-10-1	4-Methyl-2-pentanone	9	U
591-78-6	2-Hexanone	9	U
127-18-4	Tetrachloroethene	4	U
79-34-5	1,1,2,2-Tetrachloroethane	4	U
108-88-3	Toluene	4	U
108-90-7	Chlorobenzene	4	U
100-41-4	Ethylbenzene	4	U
100-42-5	Styrene	4	U
1330-20-7	Xylene (total)	4	U

## Case Narrative



Client: BECHTEL-NEVADA V1879  
LVL #: 0301L631

W.O. #: 60052-001-001-0001-00  
Date Received: 01-31-2003

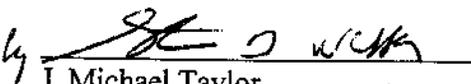
## SEMIVOLATILE

Two (2) soil samples were collected on 01-29-2003.

The samples and their associated QC samples were extracted according to Lionville Laboratory OPs based on method 3550 on 02-03-2003 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL Semivolatile target compounds on 02-04-2003.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. Samples were extracted and analyzed within required holding time.
3. Non-target compounds were detected in the samples.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blank contained the common laboratory contaminant Bis (2-Ethylhexyl) phthalate at a level less than the CRQL.
8. Internal standard area criteria were not met for the method blank and the blank spike; however, the GC/MS instrument was inspected for possible malfunction and was judged to be functioning properly and all surrogate recoveries were within QC limits; consequently, the samples were not reanalyzed.
9. Manual integrations are performed according to OP L-QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").

  
J. Michael Taylor  
President  
Lionville Laboratory Incorporated

02-14-03  
Date

soni\group\data\bna\bectel-nevada-0301-631.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

## GLOSSARY OF BNA DATA

### DATA QUALIFIERS

- U - Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J - Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- D - Identifies all compounds identified in an analysis at a secondary dilution factor.
- I - Interference.
- NQ - Result qualitatively confirmed but not able to quantify.
- A - Indicates that a TIC is a suspected aldol-condensation product.
- N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.
- X - This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).
- Y - Additional qualifiers used as required are explained in the case narrative.

## GLOSSARY OF BNA DATA

### ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Suffix added to sample number to indicate that results are from a diluted analysis.
- NA = Not Applicable.
- DF = Dilution Factor.
- NR = Not Required.
- SP, Z = Indicates Spiked Compound.

**Sample Data for each Sample**

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

232505-3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: (soil/water) SOIL

Lab Sample ID: 0301L631-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: A020410

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: 1 decanted: (Y/N)

Date Extracted: 02/03/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 02/04/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl) ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-di-n-propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy) methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	840	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	840	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
99-09-2	3-Nitroaniline	840	U
83-32-9	Acenaphthene	340	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

232505-3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: (soil/water) SOIL

Lab Sample ID: 0301L631-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: A020410

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: 1 decanted: (Y/N)

Date Extracted: 02/03/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 02/04/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

51-28-5-----	2,4-Dinitrophenol	840	U
100-02-7-----	4-Nitrophenol	840	U
132-64-9-----	Dibenzofuran	340	U
121-14-2-----	2,4-Dinitrotoluene	340	U
84-66-2-----	Diethylphthalate	340	U
7005-72-3-----	4-Chlorophenyl-phenylether	340	U
86-73-7-----	Fluorene	340	U
100-01-6-----	4-Nitroaniline	840	U
534-52-1-----	4,6-Dinitro-2-methylphenol	840	U
86-30-6-----	N-Nitrosodiphenylamine (1)	340	U
101-55-3-----	4-Bromophenyl-phenylether	340	U
118-74-1-----	Hexachlorobenzene	340	U
87-86-5-----	Pentachlorophenol	840	U
85-01-8-----	Phenanthrene	340	U
120-12-7-----	Anthracene	340	U
86-74-8-----	Carbazole	340	U
84-74-2-----	Di-n-butylphthalate	340	U
206-44-0-----	Fluoranthene	340	U
129-00-0-----	Pyrene	340	U
85-68-7-----	Butylbenzylphthalate	340	U
91-94-1-----	3,3'-Dichlorobenzidine	340	U
56-55-3-----	Benzo(a)anthracene	340	U
218-01-9-----	Chrysene	340	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	33	JB
117-84-0-----	Di-n-octyl phthalate	340	U
205-99-2-----	Benzo(b)fluoranthene	340	U
207-08-9-----	Benzo(k)fluoranthene	340	U
50-32-8-----	Benzo(a)pyrene	340	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	340	U
53-70-3-----	Dibenz(a,h)anthracene	340	U
191-24-2-----	Benzo(g,h,i)perylene	340	U

(1) - Cannot be separated from Diphenylamine

FORM 1 SV-2

RFW (v3.3)

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

232505-4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: (soil/water) SOIL

Lab Sample ID: 0301L631-004

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: A020413

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: 1 decanted: (Y/N)

Date Extracted: 02/03/03

Concentrated Extract Volume: 1000(uL)

Date Analyzed: 02/04/03

Injection Volume: 2.0(uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl) ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-di-n-propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy) methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	840	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	840	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
99-09-2	3-Nitroaniline	840	U
83-32-9	Acenaphthene	340	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

232505-4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: (soil/water) SOIL

Lab Sample ID: 0301L631-004

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: A020413

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: 1 decanted: (Y/N)

Date Extracted: 02/03/03

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 02/04/03

Injection Volume: 2.0 (uL)

Dilution Factor: 1.00

GPC Cleanup: (Y/N) N pH: 7.0

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

51-28-5-----	2,4-Dinitrophenol	840	U
100-02-7-----	4-Nitrophenol	840	U
132-64-9-----	Dibenzofuran	340	U
121-14-2-----	2,4-Dinitrotoluene	340	U
84-66-2-----	Diethylphthalate	340	U
7005-72-3-----	4-Chlorophenyl-phenylether	340	U
86-73-7-----	Fluorene	340	U
100-01-6-----	4-Nitroaniline	840	U
534-52-1-----	4,6-Dinitro-2-methylphenol	840	U
86-30-6-----	N-Nitrosodiphenylamine (1)	340	U
101-55-3-----	4-Bromophenyl-phenylether	340	U
118-74-1-----	Hexachlorobenzene	340	U
87-86-5-----	Pentachlorophenol	840	U
85-01-8-----	Phenanthrene	340	U
120-12-7-----	Anthracene	340	U
86-74-8-----	Carbazole	340	U
84-74-2-----	Di-n-butylphthalate	340	U
206-44-0-----	Fluoranthene	340	U
129-00-0-----	Pyrene	340	U
85-68-7-----	Butylbenzylphthalate	340	U
91-94-1-----	3,3'-Dichlorobenzidine	340	U
56-55-3-----	Benzo(a)anthracene	340	U
218-01-9-----	Chrysene	340	U
117-81-7-----	bis(2-Ethylhexyl)phthalate	23	JB
117-84-0-----	Di-n-octyl phthalate	340	U
205-99-2-----	Benzo(b)fluoranthene	340	U
207-08-9-----	Benzo(k)fluoranthene	340	U
50-32-8-----	Benzo(a)pyrene	340	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	340	U
53-70-3-----	Dibenz(a,h)anthracene	340	U
191-24-2-----	Benzo(g,h,i)perylene	340	U

(1) - Cannot be separated from Diphenylamine

FORM 1 SV-2

RFW (v3.3)

## **Case Narrative**



## Analytical Report

Client: BECHTEL NEVADA V1879  
LVL#: 0301L631

W.O.#: 60052-001-001-0001-00  
Date Received: 01-31-2003

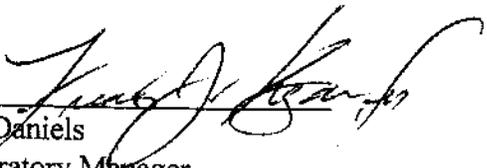
### PCB

Two (2) soil samples were collected on 01-29-2003.

The samples and their associated QC samples were extracted on 02-03-2003 and analyzed according to Lionville Laboratory OPs on 02-05,06-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The samples and their associated QC samples received a Sulfuric Acid cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. Nine (9) of fourteen (14) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

2/20/03  
Date

son\ra\group\data\pest\bechtel\0301-631.pcb

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## Sample Data

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: SOIL

Lab Sample ID: 0301L631-003

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: BLKLACHJ.02

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: not dec. 1 dec.

Date Extracted: 02/03/03

Extraction: (SepF/Cont/Sonc) N/A

Date Analyzed: 02/05/03

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

12674-11-2-----	Aroclor-1016	34	U
11104-28-2-----	Aroclor-1221	67	U
11141-16-5-----	Aroclor-1232	34	U
53469-21-9-----	Aroclor-1242	34	U
12672-29-6-----	Aroclor-1248	34	U
11097-69-1-----	Aroclor-1254	34	U
11096-82-5-----	Aroclor-1260	34	U

FORM 1 PEST

12/88 Rev.

1D  
PESTICIDE ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: SOIL Lab Sample ID: 0301L631-004

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BLKLACHJ.02

Level: (low/med) LOW Date Received: 01/31/03

% Moisture: not dec. 1 dec. Date Extracted: 02/03/03

Extraction: (SepF/Cont/Sonc) N/A Date Analyzed: 02/06/03

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		
12674-11-2-----	Aroclor-1016	34	U
11104-28-2-----	Aroclor-1221	67	U
11141-16-5-----	Aroclor-1232	34	U
53469-21-9-----	Aroclor-1242	34	U
12672-29-6-----	Aroclor-1248	34	U
11097-69-1-----	Aroclor-1254	34	U
11096-82-5-----	Aroclor-1260	34	U

FORM 1 PEST

12/88 Rev.

## **Case Narrative**



## Analytical Report

Client: BECHTEL-NEVADA V1879  
LVL #: 0301L631

W.O. #: 60052-001-001-0001-00  
Date Received: 01-31-2003

### GRO

Two (2) soil samples were collected on 01-29-2003.

The samples and their associated QC samples were analyzed according to Lionville Laboratory OPs based on SW-846 method 8015 for Gasoline range organics (GRO) on 02-06-2003.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LVL's sample acceptance policy.
2. The required holding time for analysis has been met.
3. One (1) of five (5) surrogate recoveries was outside acceptance criteria.
4. One (1) of two (2) blank spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
5. All initial calibrations associated with this data set were within acceptance criteria.
6. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

2/12/03  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF GASOLINE RANGE ORGANICS DATA

- D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C = This flag applies to a compound that has been confirmed by GC/MS.

## **Sample Data**

GC VOLATILES SHEET

CLIENT SAMPLE NO.

232505-3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: SOIL

Lab Sample ID: 0301L631-003

Sample wt/vol: 5.01 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: not dec. 1

Date Analyzed: 02/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>
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86290-81-5-----	Gasoline Range Organics (GRO)	30	U
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12/88 Rev.

GC VOLATILES SHEET

CLIENT SAMPLE NO.

232505-4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: SOIL

Lab Sample ID: 0301L631-004

Sample wt/vol: 5.02 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: not dec. 1

Date Analyzed: 02/06/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) UG/KG

86290-81-5-----	Gasoline Range Organics (GRO)	30	U
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12/88 Rev.

## **Case Narrative**



## Analytical Report

**Client:** BECHTEL-NEVADA V1879  
**LVL #:** 0301L631

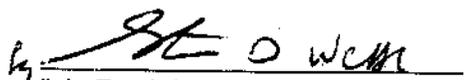
**W.O. #:** 60052-001-001-0001-00  
**Date Received:** 01-31-2003

### DIESEL RANGE ORGANICS

Two (2) soil samples were collected on 01-29-2003.

The samples and their associated QC samples were extracted on 02-03-2003 and analyzed according to Lionville Laboratory OPs on 02-11,12-2003. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8015B for Diesel Range Petroleum Hydrocarbons.

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
2. The required holding time for extraction and analysis has been met.
3. The method blank was below the reporting limits for all target compounds.
4. All surrogate recoveries were within acceptance criteria.
5. The blank spike recovery was within acceptance criteria.
6. The matrix spike recoveries were within EPA QC limits.
7. All initial calibrations associated with this data set were within acceptance criteria.
8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated

02-14-03  
Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.



## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.



## GLOSSARY OF PESTICIDE/PCB DATA

- P** = This flag is used for an PESTICIDE/PCB target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D** = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C** = This flag applies to a compound that has been confirmed by GC/MS.

## **Sample Data**

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-3

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: SOIL

Lab Sample ID: 0301L631-003

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: not dec. 1

Date Analyzed: 02/11/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.1	U
00-00-0000-----	Motor Oil	12	J

12/88 Rev.

ORGANICS ANALYSIS SHEET

CLIENT SAMPLE NO.

232505-4

Lab Name: Lionville Labs, Inc. Work Order: 60052001001

Client: BECHTEL NEVADA V1879

Matrix: SOIL

Lab Sample ID: 0301L631-004

Sample wt/vol: 25.0 (g/mL) G

Lab File ID: BLKLACHJ

Level: (low/med) LOW

Date Received: 01/31/03

% Moisture: not dec. 1

Date Analyzed: 02/12/03

Column: (pack/cap) CAP

Dilution Factor: 1.00

CAS NO.                      COMPOUND                      CONCENTRATION UNITS:  
 (ug/L or ug/Kg) mg/kg

68334-30-5-----	Diesel Range Organics	12.1	U
00-00-0000-----	Motor Oil	25	

12/88 Rev.

# Case Narrative



## Analytical Report

Client : BECHTEL NEVADA V1879  
LVL# : 0301L631

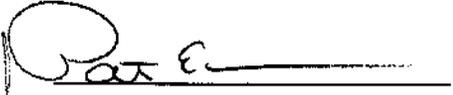
W.O.# : 60052-001-001-0001-00  
Date Received : 01-31-03

### SW846 METALS

1. This narrative covers the analyses of 2 soil samples.
2. The samples were prepared and analyzed in accordance with SW-846 protocol and reported with a CLP deliverable.
3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.
4. All analyses were performed within the required holding times.
5. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
6. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits with the exception of the final CCV for Cadmium. All samples were surrounded by QC in control.
7. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within method criteria.
8. All preparation/method blanks were within method criteria. Refer to form 3.
9. All ICP Interference Check Standards were within control limits. Refer to form 4.
10. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.
11. All sample IDs were changed to accommodate the EPA naming convention which allows a maximum of 6 characters on all CLP Forms. Refer to the comments section of form 1 for the original ID.
12. All matrix spike, duplicate and serial dilution analyses were performed on Bechtel Nevada, LvLI batch# 0301L596 within the same digestion batch. Please refer to this package for the associated QC forms.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage.

13. Recoveries on the Laboratory Summary Report and CLP forms will vary depending on the number of significant figures used in the recovery calculation.

  
Iain Daniels  
Laboratory Manager  
Lionville Laboratory Incorporated  
alm/m01-631

02-14-03  
Date

## METHOD REFERENCES AND DATA QUALIFIERS

### DATA QUALIFIERS

- U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- B = Indicates that the parameter was between the Instrument Detection Limit (IDL) and the Contract Required Detection Limit (CRDL)

### Q QUALIFIERS

- E = The reported value is estimated because of the presence of interference.
- M = Duplicate injection precision not met.
- N = Spiked sample recovery not within control limits.
- S = The reported value was determined by the Method of Standard Additions (MSA).
- W = Post Digestion spike for Furnace AA analysis is out of control limits (85 -115 %), while sample absorbance is less than 50% of spike absorbance.
- \* = Duplicate analysis not within control limits.
- + = Correlation coefficient for the MSA is less than 0.995.

### ABBREVIATIONS

- PB = Method or Preparation Blank.
- S = Matrix Spike.
- T = Matrix Spike Duplicate.
- R or D = Sample Replicate

### ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
4. Flame AA.
5. Graphite Furnace AA.

RFW 21-21L-033/O-01/97





## **SAMPLE DELIVERY GROUP**

**V1880**

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# PARAGON ANALYTICS, INC.

225 Commerce Drive ♦ Fort Collins, CO 80524 ♦ (800) 443-1511 ♦ (970) 490-1511 ♦ FAX (970) 490-1522

March 14, 2003

Mr. Ted Redding  
Bechtel Nevada  
US DOE Zone 1, Bldg 652, Rm 2, M/S NTS273  
Mercury NV 89023

RE: Paragon Workorder: 03-01-162  
Client Project Name: CAU 330  
Client Project Number: V1880

Dear Mr. Redding:

Two soil samples were received from Bechtel Nevada on January 31, 2003. The samples were scheduled for Gamma Spectroscopy (pages 1-136) analysis. The results for this analysis are contained in the enclosed reports.

Thank you for your confidence in Paragon Analytics, Inc. Should you have any questions, please call.

Sincerely,

Paragon Analytics, Inc.  
Ken Campbell  
Project Manager

KDC/hc  
Enclosure: Report

0301162

**Bechtel Nevada** ANALYTICAL LABORATORY **SERVICES REQUEST & CHAIN OF CUSTODY RECORD** Page 1 of 1

**PROJECT/CLIENT INFORMATION**  
 Project: CAU 330 BN Org #: B502  
 Charge Number: 5302 B D50  
 Project Manager: Jeffrey Smith  
 Phone: 702-295-7775 Fax: 702-295-7761 MS: 47530  
 Send Report to: Marcus Dixon  
 Phone: 702-295-4001 Fax: 702-295-7761 MS: 47530  
 Turnaround:  Standard - 14 days (H), 28 days Non-rad Env, 45 Days Rad Env, (H)  Rush Preliminary by:  1  2  7  14  28 (Radiological Env)

**SAMPLE INFORMATION**  
 Sampling Site: CAU 330  
 The samples submitted contain (check):  
 Hazardous (Res)  
 Radioactive (Res)  
 Unknown contamination.  
 If known, identify contaminants.  
 This information will ensure compliance with applicable regulations and allow for the safe handling of the sample materials.

**SAMPLE MANAGEMENT INFORMATION**  
 SDG: \_\_\_\_\_ (IH) \_\_\_\_\_ (Non-Rad Env) V1880 (Rad Env)  
 Samples submitted are associated with a signed Project SOW  Yes  No  
 Analyses entered here agree with the SOW  Yes  No  N/A  
 If not, identify the variation:  
 Subcontract Lab(s) used for this work: PARAGON

**Pay Item, Analysis, Method**

ID/DESCRIPTION	SAMPLING DATE	TIME	MATRIX	CONTAINER #	Est Vol	QC			Pres - Analysis eg. HCl - VOCs
						MSD	MS	MD	
① 232505-3	1/29/03	15:00	Soil	1	500 mL				
② 232505-4	1/29/03	15:20	Soil	1	500 mL				
LAST ITEM									
<del>_____</del>									

CUSTODY TRANSFER		Signature	Date/Time	Received by (print)	Signature	Date/Time
Sampled/Relinquished (print)	Marcus Dixon	Marcus Dixon	1/30/03 7:33	CA CASTANEDA	CA Castaneda	1-30-03 @ 0733
	CA CASTANEDA	CA Castaneda	1-30-03 1300	Jason Kaufman	792820744355	01-30-03 11300
	FedEx			Jason Kaufman	Jason Kaufman	1/31/03 0955



# Paragon Analytics, Inc.

## Radiochemistry Case Narrative Gamma Spectroscopy

### Bechtel Nevada

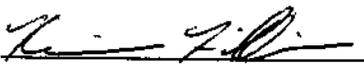
CAU 330 / V1880

Paragon Work Order 0301162

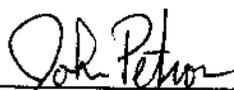
1. This report consists of analysis results for two soil samples received by Paragon on 1/31/03. The analysis results for these samples are reported on a 'dry weight' basis in units of pCi/gram.
2. These samples were prepared according to Paragon Analytics, Inc. procedure PAI SOP739R5.
3. The samples were analyzed for the presence of gamma emitting radionuclides according to Paragon Analytics, Inc. procedure PAI SOP713R7. The analyses were completed on 3/10/03.
4. The samples were analyzed using Seeker Version 2.2, which is a product of Vertechs Software Solutions, Inc..
5. Sample volumes were insufficient to allow preparation of a duplicate. A duplicate analysis of sample 232505-3 (PAI ID 0301162-1) was performed in lieu of a preparation duplicate.
6. Due to current software limitations, the DER determinations in this report were calculated using the 2 sigma TPU. The SOW indicates that the 1 sigma TPU be used in the DER determination. However, the requested DER limit of less than 3 at the 1 sigma level (which is equivalent to 1.5 at the 2 sigma level) was achieved. Data quality is not affected.
7. Activity concentrations above the  $2\sigma$  TPU are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above critical level (generally the most abundant, interference-free photopeak), or the minimum library peak tolerance of 75% must be attained. These data have been flagged with a "TI" qualifier.
8. There are cases where the magnitude of the negative activity is greater than the 2 sigma TPU. The analyst's review of the data does not indicate a problem with the instrument data or the subsequent reporting systems. The data quality is not believed to be affected and the results are submitted without qualification. Under typical conditions, where background level sample data is normally distributed and analyzed by paired observations, this event is likely to occur at least 2.5% of the time.

9. No further problems were encountered with either the client samples or the associated quality control samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics, Inc. certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

  
Radiochemistry Instrument Technician

3-11-03  
Date

  
Radiochemistry Final Data Review

3/13/03  
Date

PARAGON ANALYTICS, INC.  
Radiochemistry Data Package



Section 3

**INDIVIDUAL  
SAMPLE RESULTS**

000011

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 1 of 4

Reported on: Tuesday, March 11, 2003  
09:49:43

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1880

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0301162

Field ID: 232505-3

Lab ID: 0301162-1

Sample Matrix: Soil

Date Prepared: 26-Feb-03

Prep SOP: PAI 739R5

Prep Batch: GS01911

Date Collected: 29-Jan-03

Date Analyzed: 10-Mar-03

Analytical SOP: PAI 713R7

Spectrum Code: 030351D10A

Final Allquot: 508.1 g

Report Basis: Dry Weight

Count Time (min.): 30

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	3.59E-01 +/- 1.40E-01	3.09E-01	pCi/g	
Am-241	3.20E-02 +/- 1.26E-01	2.14E-01	pCi/g	U
Ce-144	-1.51E-01 +/- 1.86E-01	3.35E-01	pCi/g	U
Co-60	2.67E-02 +/- 3.37E-02	5.48E-02	pCi/g	U
Cs-134	-1.10E-02 +/- 5.34E-02	9.33E-02	pCi/g	U
Cs-137	3.49E-02 +/- 3.96E-02	6.40E-02	pCi/g	U
Eu-152	-1.18E-02 +/- 1.88E-01	3.40E-01	pCi/g	U
Eu-154	0.00E+00 +/- 1.88E-01	3.35E-01	pCi/g	U
Eu-155	-1.02E-02 +/- 1.02E-01	1.76E-01	pCi/g	U
K-40	5.65E+00 +/- 1.24E+00	8.35E-01	pCi/g	
Pb-212	4.35E-01 +/- 1.08E-01	1.01E-01	pCi/g	
Pm-144	2.15E-02 +/- 3.15E-02	5.20E-02	pCi/g	U
Pm-146	-1.69E-03 +/- 3.77E-02	6.68E-02	pCi/g	U
Ru-106	-3.06E-01 +/- 3.21E-01	6.04E-01	pCi/g	U
Sb-125	2.86E-02 +/- 8.34E-02	1.43E-01	pCi/g	U
Th-234	1.39E-01 +/- 6.65E-01	1.12E+00	pCi/g	U
U-235	8.19E-02 +/- 1.87E-01	3.14E-01	pCi/g	U
Y-88	2.50E-03 +/- 3.89E-02	6.98E-02	pCi/g	U

Data Package ID: GSS0301162-1

Paragon Analytics Inc.

000012

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 2 of 4

Reported on: Tuesday, March 11, 2003  
09:49:43

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1880

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0301162

Field ID: 232505-3

Lab ID: 0301162-1

Sample Matrix: Soil

Date Prepared: 26-Feb-03

Prep SOP: PAI 739R5

Prep Batch: GS01911

Date Collected: 29-Jan-03

Date Analyzed: 10-Mar-03

Analytical SOP: PAI 713R7

Spectrum Code: 030351D10A

Final Aliquot: 508.1 g

Report Basis: Dry Weight

Count Time (min.): 30

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
----------------	--------------------	-----	-----------------	---------------

### Comments:

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC or less than the associated TPU.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- SQ - Spectral quality prevents accurate quantitation.
- SI - Nuclide identification and/or quantitation is tentative.
- TI - Nuclide identification is tentative.
- R - Nuclide has exceeded 8 half-lives.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSS0301162-1

Paragon Analytics Inc.

000013

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 3 of 4

Reported on: Monday, March 03, 2003

10:24:06

Client Name: Bechtel Nevada

Client Project Name: CAU 330

Client Project Number: V1880

Laboratory Name: Paragon Analytics, Inc.

PAI Work Order: 0301162

Field ID: 232505-4

Lab ID: 0301162-2

Sample Matrix: Soil

Date Prepared: 26-Feb-03

Prep SOP: PAI 739R5

Prep Batch: GS01911

Date Collected: 29-Jan-03

Date Analyzed: 27-Feb-03

Analytical SOP: PAI 713R7

Spectrum Code: 030311D10A

Final Allquot: 504.0 g

Report Basis: Dry Weight

Count Time (min.): 30

Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
Ac-228	3.81E-01 +/- 1.53E-01	2.64E-01	pCi/g	
Am-241	6.85E-02 +/- 1.28E-01	2.13E-01	pCi/g	U
Ce-144	-7.08E-02 +/- 1.93E-01	3.40E-01	pCi/g	U
Co-60	1.07E-03 +/- 3.81E-02	6.83E-02	pCi/g	U
Cs-134	3.28E-03 +/- 5.75E-02	9.78E-02	pCi/g	U
Cs-137	-9.69E-03 +/- 3.36E-02	6.11E-02	pCi/g	U
Eu-152	1.05E-02 +/- 1.53E-01	2.78E-01	pCi/g	U
Eu-154	-2.24E-02 +/- 1.77E-01	3.22E-01	pCi/g	U
Eu-155	-9.79E-02 +/- 1.02E-01	1.84E-01	pCi/g	U
K-40	5.16E+00 +/- 1.21E+00	9.75E-01	pCi/g	
Pb-212	5.30E-01 +/- 1.29E-01	1.24E-01	pCi/g	
Pm-144	1.36E-02 +/- 3.42E-02	5.82E-02	pCi/g	U
Pm-146	4.23E-02 +/- 3.85E-02	6.02E-02	pCi/g	U
Ru-106	-5.81E-02 +/- 3.13E-01	5.61E-01	pCi/g	U
Sb-125	3.93E-02 +/- 7.89E-02	1.33E-01	pCi/g	U
Th-234	3.88E-01 +/- 6.30E-01	1.04E+00	pCi/g	U
U-235	-8.92E-02 +/- 1.83E-01	3.24E-01	pCi/g	U
Y-88	4.39E-03 +/- 4.29E-02	7.56E-02	pCi/g	U

Data Package ID: GSS0301162-1

Paragon Analytics Inc.

000016

# Gamma Spectroscopy Results

Method PAI 713R7

## Sample Results

Page: 4 of 4

Client Name: Bechtel Nevada  
Client Project Name: CAU 330  
Client Project Number: V1880

Reported on: Monday, March 03, 2003  
10:24:06

Laboratory Name: Paragon Analytics, Inc.  
PAI Work Order: 0301162

Field ID: 232505-4  
Lab ID: 0301162-2

Sample Matrix: Soil  
Date Prepared: 26-Feb-03  
Prep SOP: PAI 739R5  
Prep Batch: GS01911

Date Collected: 29-Jan-03  
Date Analyzed: 27-Feb-03  
Analytical SOP: PAI 713R7  
Spectrum Code: 030311D10A

Final Allquot: 504.0 g  
Report Basis: Dry Weight  
Count Time (min.): 30  
Library: GAM-A-001.LI

Target Nuclide	Result +/- 2 s TPU	MDC	Reporting Units	Lab Qualifier
----------------	--------------------	-----	-----------------	---------------

### Comments:

#### Qualifiers/Flags:

- U - Result is less than the sample specific MDC or less than the associated TPU.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Y2 - Chemical Yield outside default limits.
- LT - Result is less than Requested MDC, greater than sample specific MDC.
- SQ - Spectral quality prevents accurate quantitation.
- SI - Nuclide identification and/or quantitation is tentative.
- TI - Nuclide identification is tentative.
- R - Nuclide has exceeded 8 half-lives.

#### Abbreviations:

- TPU - Total Propagated Uncertainty (see PAI SOP 743)
- MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: GSS0301162-1

**APPENDIX C**

**WASTE DISPOSITION DOCUMENTATION**

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# **Bechtel Nevada**

## **NONRADIOACTIVE WASTE CERTIFICATION**

**03N25**

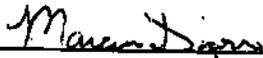
Associated Onsite Manifest

1. Is this waste considered abandoned?  Yes  No
2. Has any of the waste listed on the attached manifest been used or stored in a Controlled Waste Management Area (CWMA) as defined below?  Yes  No  

A CWMA is "an area in which the potential exists for contamination due to presence of unencapsulated or unconfined radioactive material or an area that is exposed to beams or other sources of particles capable of causing activation, i.e. neutrons, protons, etc.
3. Has any of the waste listed on the attached manifest been used or stored in any other posted or suspected radiological control area?  Yes  No
4. Has any of the waste listed on the attached manifest commingled with any radioactive mixed waste?  Yes  No
5. Has any of the waste listed on the attached manifest commingled with loose radioactive contamination?  Yes  No
6. Has any of the waste listed on the attached manifest commingled with fixed radioactive contamination?  Yes  No

1. Generator able to certify waste as nonradioactive:

Based upon the knowledge of the origin, storage, use and potential exposure of the waste, I CERTIFY THAT **NO** RADIOACTIVITY HAS BEEN **ADDED** TO THE WASTE LISTED ON THE ATTACHED MANIFEST.



Signature of Certifier

3/18/03

Date

2. **To be completed by Hazardous Waste Operations personnel only**

No further analysis required, all process knowledge is present and documented and the waste listed on the attached manifest is fully characterized



Signature

3/18/03

Date

IF ANY OF THE ABOVE QUESTIONS ARE ANSWERED "YES," THE WASTE WILL REQUIRE ONE OF THE FOLLOWING:

1. DOCUMENTATION DEMONSTRATING THAT NO POTENTIAL FOR INTERNAL CONTAMINATION EXISTS (PROCESS KNOWLEDGE); OR
2. RESULTS OF RADIOANALYSES PERFORMED ON THE WASTE.

Manifest Document No.:

# Bechtel Nevada

0 3 N 2 5

Generation Date: 3/18/03

## ONSITE WASTE TRANSPORT MANIFEST

1. Generator's Name, Organization, and Location: (Please Print)

**BN/Env. Restoration, Marcus Dixon  
B502, NTS A-23, CAU 330 CAS 23-25-05  
Mercury Hwy/Bypass Jct, #NTS0115**

Generator's Phone: ( ) 5-4001

2. Receiving Facility, Organization, Location: (Please Print)

**BN - Hazardous Waste Operations, A497  
NTS A-5 Hazardous Waste Storage Unit  
Bldg. 5-20**

Facility Phone: ( ) 5-7669

3a. Transporter Name:  
(Please Print)

*Wayne Lawrence*

Transport Date:

3/18/03

3b. Vehicle I.D. Number:

*E 105162*

4. U.S. D.O.T. Description. Include: EPA Waste Code and Package Identification Numbers.

5. Containers

6. Total Quantity

7. Unit Wt./Vol.

No.

Type

HM

X

Waste Flammable liquids, n.o.s. (water contaminated with gasoline), 3, UN1993, PG-II  
D001  
BN-NTS-03-0128

1

DM

52

G

*433*

*P*

Use continuation pages for additional items, as necessary.

8. Special Handling Instructions and Additional Information: 24 Hour emergency contact: 702 - 295-0311 / Secondary: **Troy Belka 5-3505**  
Name & phone no.

a. ERG #128. Water contaminated with gasoline.

9. Released by: (Signature)

*Marcus Dixon*

Date:

3/18/03

10. Received for Transport by: (Signature)

*Wayne Lawrence*

Date:

3/18/03

11. Discrepancy Indication:

12. Disposal/Accumulation Site Signature:  
(Acknowledges acceptance of waste)

*Charles Gaylor*

Date:

3/18/03

**APPENDIX D**  
**FIELD PHOTOGRAPHS**

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## PHOTOGRAPH LOG

PHOTOGRAPH NUMBER	DATE	DESCRIPTION
<b>CAS 06-02-04</b>		
1	04/21/2003	Excavating pipe
2	06/04/2003	Excavation backfilled
3	04/22/2003	Excavating Underground Storage Tank
4	06/04/2003	Excavation backfilled
<b>CAS 22-99-06</b>		
5	03/10/2003	Excavating fuel spill
6	04/09/2003	Excavation backfilled
<b>CAS 23-01-02</b>		
7	02/13/2003	Demolishing fill stand
8	04/28/2003	Fill stand removed
9	02/13/2003	Demolishing/removing piping
10	04/28/2003	Piping removed
11	02/24/2003	Demolishing Diesel AST
12	04/28/2003	Diesel AST removed
13	02/20/2003	Demolishing Gasoline AST
14	04/28/2003	Gasoline AST removed
<b>CAS 23-25-05</b>		
15	01/29/2003	Transfer and removal of 55-gal drum
16	03/19/2003	55-gal drum removed
17	03/11/2003	Excavating/removing asphalt oil/tar and concrete
18	03/20/2003	Asphalt oil/tar and concrete removed

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1



2



3



4



5



6



7



8



9



10



11



12



13



14



15



16



17



18

## **APPENDIX E**

# **CLOSURE CERTIFICATION\***

\*As referenced in Section 1.3 of this CR, a Closure Certification is not applicable to the closure of CAU 330. No Closure Certification is required or necessary for closure of CAU 330.

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## **APPENDIX F**

### **AS-BUILT DOCUMENTATION\***

\*As referenced in Section 1.3 of this CR, As-Built Documentation is not applicable to the closure of CAU 330. No engineered structures were constructed during the closure of CAU 330.

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## **APPENDIX G**

### **MODIFICATIONS TO THE POST-CLOSURE PLAN\***

\*As referenced in Section 1.3 of this CR, CAU 330 was clean closed; no post-closure monitoring is required.

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## **APPENDIX H**

# **NEVADA ENVIRONMENTAL RESTORATION PROJECT DOCUMENT REVIEW SHEET**

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