R-03-94-8

FIELD SAMPLING REPORT
FOR
INSTALLATION RESTORATION SITE 5 - SWALE 2
INDIAN HEAD DIVISION, NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Engineering Field Activity, Chesapeake
Environmental Branch, Code 18
Naval Facilities Engineering Command
Washington Navy Yard, Building 212
Washington, D.C. 20374-2121

Submitted by:
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TABLE OF CONTENTS

TABLES

FIGURES

1.0 INTRODUCTION

The Northern Division of the Naval Facilities Engineering Command issued Contract Task Order Number 152 (CTO 152) to Halliburton NUS Corporation (NUS), under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62472-90-D-1298. Under CTO 152, environmental sampling and analysis was conducted for Installation Restoration (IR) Site 5 on Indian Head Division, Naval Surface Warfare Center (NSWC) in Indian Head, Maryland. This report presents the results of the IR Site 5 sampling and analysis.

1.1 OBJECTIVE

The primary objective of CTO 152 was to determine the nature and extent of silver contaminated soils and sediments in Swale 2 at IR Site 5. The data supports an Engineering Evaluation/Cost Analysis (EE/CA) and engineering design of a removal action for Swale 2.

Halliburton NUS prepared an Abbreviated Field Sampling Plan (AFSP) for Site 5 (Halliburton NUS, 1994). The AFSP outlined sampling and analysis procedures to achieve the objective of CTO 152. These procedures included:

- Collecting surface (0-12 inches) and subsurface (18-24 inches) samples on measured transects along the length of Swale 2 and having them analyzed for total silver to determine the horizontal and vertical extent of silver contamination.

- Analyzing four soil samples with the highest total silver concentrations for toxicity characteristic using the Toxic Characteristic Leaching Procedure (TCLP) to determine the nature of the contamination .

1.2 REPORT ORGANIZATION

Section 1.0 provides the general scope and purpose of the sampling and analysis activities conducted under CTO 152. Section 2.0 provides project background and briefly describes the environmental setting. Section 3.0 describes the field program and presents the analytical results of the sampling program.

2.0 SITE BACKGROUND AND DESCRIPTION

2.1 SITE DESCRIPTION

Indian Head Division, Naval Surface Warfare Center (NSWC) is located approximately 25 miles south of Washington, DC, adjacent to the town of Indian Head, in west-central Charles County, Maryland. The primary mission of Indian Head Division NSWC is the development and production of propellent and explosive ingredients and formulants used in ordnance devices.

The project site (IR Site 5) is located on the southwestern side of the main area of the Indian Division NSWC (Figure 2-1). As shown on Figure 2-2, IR Site 5 is located near Voegeli Road, southwest of Building 731. The site consists of a drainage swale emanating from the southwest (Swale 2) corner of Building 731 (a drainage swale (Swale 1) emanating from the southeast corner of Building 731 was previously remediated as described below). Soils in the swales were contaminated by silver-ladened photographic processing wastewaters released from Building 731 between 1953 and 1965. Photographic operations are still performed in Building 731. However, the spent fixer is now collected and the silver is recovered.

As shown on Figure 2-2, Swale 2 originates near the southwest corner of Building 731 and runs approximately 300 feet south to Mattawoman Creek. Swale 2 is a shallow, vegetated drainage channel which conveys surface runoff as a direct result of precipitation; it is not a constant flowing stream.

2.2 SITE HISTORY

In January 1993, a removal action was completed on Swale 1 which extended from the southeast corner of Building 731. The removal action included excavation of soils and sediments exhibiting total silver concentrations greater than 10 mg/kg; treatment of the excavated soils through solidification/stabilization; and, placement of the treated material into an earthen explosion barrier as part of Military Construction (MILCON) Project 059. The results of the removal action were documented by ABB Environmental Services, Inc., in a Removal Action Findings Report (ABB-ES, 1993).

Previous sampling at IR Site 5 (ABB-ES, 1993) indicated that some soils and sediments in Swale 2 also exceed the 10 mg/kg levels.

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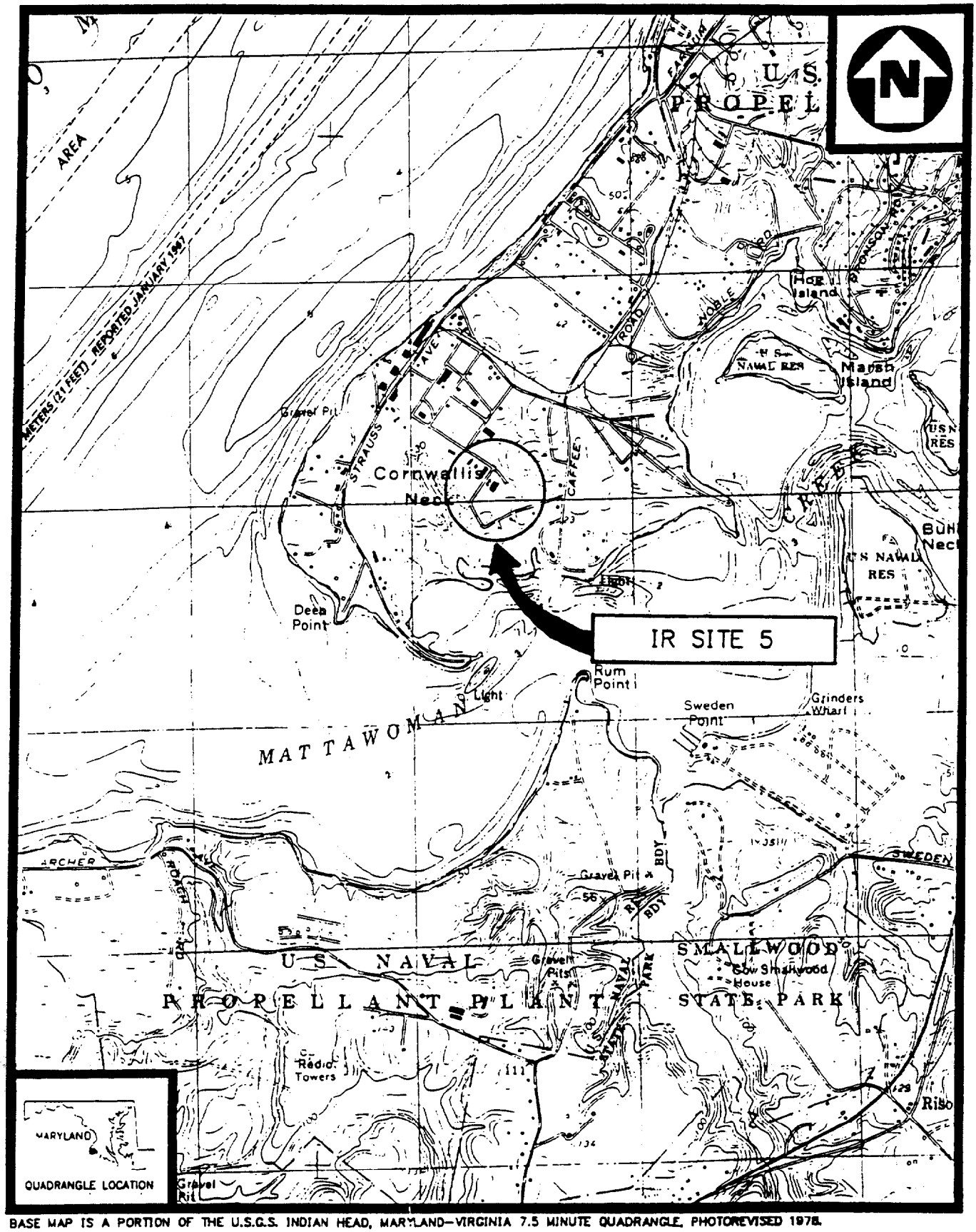


BASE MAP IS A PORTION OF THE U.S.G.S. INDIAN HEAD, MARYLAND–VIRGINIA 7.5 MINUTE QUADRANGLE, PHOTOREVISED 1978.

LOCATION MAP OF INDIAN HEAD PENINSULA

FIGURE 2-1

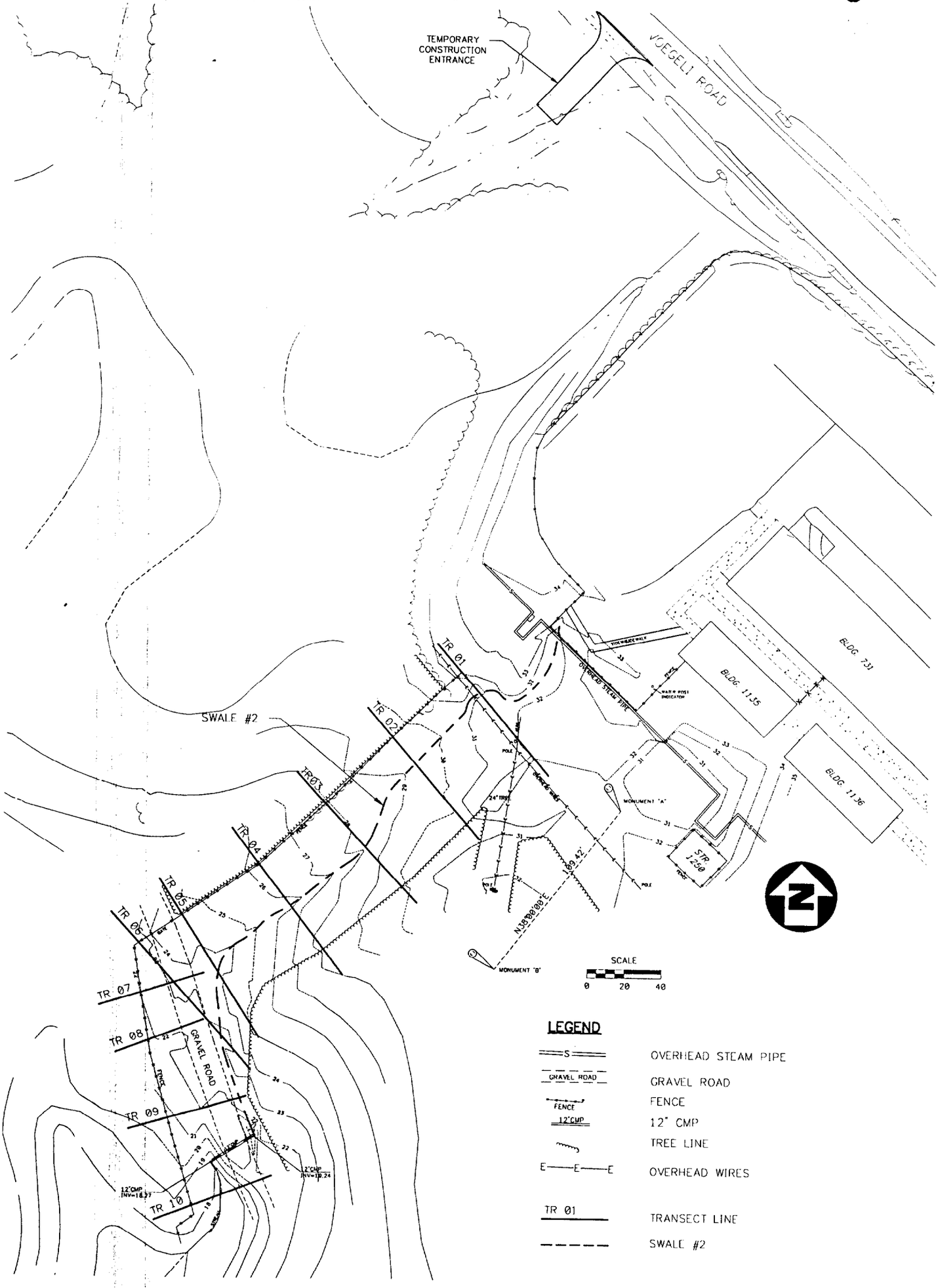
INDIAN HEAD, MARYLAND

0 2000 4000

SCALE IN FEET

R-03-94-8

HALLIBURTON NUS Corporation



IR SITE 5
INDIAN HEAD DIVISION, NSWC
INDIAN HEAD, MARYLAND

FIGURE 2-2

HALLIBURTON NUS CORPORATION

2.3 ENVIRONMENTAL SETTING

IR Site 5 is located within the Atlantic Coastal Plain Physiographic Province. It is comprised of a seaward-thickening wedge of unconsolidated sediments consisting of interbedded sands, silts, clays, gravels, and marls deposited in a variety of terrestrial and marine environments. The Coastal Plain wedge is approximately 600 feet deep in the study area (ABB-ES, 1991). These sediments are underlain by the crystalline basement rocks of the Piedmont Plateau. The Coastal Plain formations are a local source of construction sands and gravels. The porous nature of these materials provide excellent reservoirs for groundwater.

The soils at IR Site 5 are part of the Keyport-Elkton Soil Association, which are described as typically level to moderately sloping, excessively drained sandy soils; and level to gently sloping, moderately well drained to poorly drained, loamy soils having a clayey subsoil. Individual soils within IR Site 5 include Elkton silt loams, Keyport silt loams, Matawan loamy sand, and Tidal marsh. (ABB-ES, 1991).

3.0 SAMPLING AND ANALYSIS RESULTS

3.1 FIELD ACTIVITIES

Halliburton NUS began sample collection on February 7, 1994. Due to weather related delays, field sampling was not completed until February 24. Samples were collected in accordance with the procedures described in the AFSP (Halliburton NUS, 1994).

Samples were collected along perpendicular transect lines that were established every 50 feet along the length of Swale 2. The approximate location of the transect lines are shown on Figure 2-2. Previous sampling results at Swale 2 (ABB-ES 1993) indicated that silver contamination of soil above the 10 mg/kg action limit was present up to a depth of 30 inches within the center of Swale 2. Given the sampling plan objective: to determine the nature and extent of silver contamination within Swale 2, only a few confirmatory samples were collected from the soils at the center of the Swale 2 channel.

The horizontal and vertical extents of silver contamination were determined by obtaining soil samples at two depth intervals: 0-12 inches and 18-24 inches. During the first two days, sampling activity was concentrated at the perimeter of the swale. Rapid turnaround (24 hour) lab analysis for these samples was used to determine if the horizontal limit of silver contamination had been located. Additional samples, were obtained at more distant points along those transects where the silver contamination action level of 10 mg/kg silver soil had not been reached. Using a similar logic, the results from analysis of the 18- to 24-inch soil samples were used to define the vertical extent of silver contamination within Swale 2. Sample collection followed strict chain-of-custody procedures as outlined in the AFSP. Copies of the chain-of-custody forms are provided in Appendix A.

The following visual observations made during field activities:

- Water was observed flowing from surface drainages along the western edge of the dirt road. These drainages consolidate and continue to flow south along a course which is between the fence and the dirt road.

- Water was observed in Swale 2 east of the dirt road at Transect 8. The water flowed south along the side of the road. Approximately 10 feet before Transect 10 the flow passes through a steel culvert under the dirt road to join with other surface drainage, and flows off site.

- The surface area in and around Swale 2 has been disturbed by recent clearing activities. It is difficult to determine the original course of Swale 2. The extent of silver contamination revealed in the soil samples could have been produced by natural flow characteristics or the clearing activity.

3.2 ANALYTICAL RESULTS

The analytical results for total silver concentrations are listed in Table 3-1. Supporting laboratory documentation is found in the appendices. Actual total silver concentrations (Appendix B) from each sampling point were plotted on a site diagram (Figure 3-1).

TCLP analysis were performed on the four soil samples containing the highest levels of silver contamination: TR01-01-01, TR01-04-01, TR02-01-01 and TR04-01-01. Analytical results, summarized in Table 3-2, show silver concentrations in the leachate at nondetectable levels or at levels considered non-toxic under 40 CFR 261.24. Laboratory documentation is provided in Appendix C.

3.3 CONCLUSIONS

The action level (10 mg/kg) for silver-contaminated soil at IR Site 5 was established by the Navy in consultation with the Maryland Department of the Environment. Silver contamination above 10 mg/kg soil was found in surface and subsurface samples (Figure 3-1). Surface contamination by silver above the 10 mg/kg limit is present at distances of up to 20 feet west of the fence (samples TR01-08-01, TR03-10-01 and TR04-08-01), and up to 72 feet east of the fence (TR05-07-01). Silver contamination of surface soil at concentrations above the 10 mg/kg limit is also present in the area between Building 731 and Building 1135.

Vertical contamination to depths of 18-24 inches was detected at various locations within the Site. Subsurface contamination by silver discharges from Building 731 include the northwest corner of Swale 2 near Transects 2, 3 and 4 (samples TR02-06-24, TR03-03-24 and TR04-07-18). Also, silver contamination of subsurface soils above the 10 mg/kg action limit was identified in soil samples removed from the area southeast of the Swale termination point (samples SW04-02-24 and SW06-01-24).

Finally, TCLP results for the four soil samples containing the highest levels of silver contamination indicate that leachate concentrations of silver do not exceed the toxicity characteristic level of 5.0 mg/L established under the Resource Conservation and Recovery Act (40 CFR 261.24).

TABLE 3-1

SOIL SAMPLE RESULTS - TOTAL SILVER CONCENTRATIONS
IR SITE 5 - SWALE 2
INDIAN HEAD, MARYLAND

Sample Number	Location	Depth	Date	Time	Tracking Number	Result (mg/kg)
TR00-01	15 feet east of Fence M, Along Fence K.	1 inch	02/07/94	2:30 PM	TR00-01-01	106
TR00-02	45 feet east of Fence M, along Fence K.	1 inch	02/07/94	2:33 PM	TR00-02-01	7
TR00-03	5 feet east of corner of Fence M and K, and 10 feet west of TR00-01.	1 inch	02/24/94	10:50 AM	TR00-03-01	99
TR01-01	Located 49 feet south of corner of Fence M and K forming Transect 01. This transect is perpendicular to Fence M. Sample was collected at fence.	1 inch	02/09/94	3:15 PM	TR01-01-01	1,180
TR01-02	Located 11 feet west of Fence M on Transect 01.	1 inch	02/07/94	2:40 PM	TR01-02-01	33
TR01-03	Located 17 feet east of Fence M on Transect 01.	24 inches	02/09/94	3:15 PM	TR01-03-24	12
TR01-04	Located 25 feet east of Fence M on Transect 01.	1 inch	02/09/94	3:10 PM	TR01-04-01	251
TR01-05	Located 35 feet east of Fence M on Transect 01.	24 inches	02/09/94	3:16 PM	TR01-05-24	0.48U*
TR01-06	Located 50 feet east of Fence M on Transect 01.	1 inch	02/07/94	2:35 PM	TR01-06-01	13
TR01-07	Located 10 feet west of Fence M on Transect 01, same location as TR01-02.	18 inches	02/24/94	12:50 PM	TR01-07-18	0.51U*
TR01-08	Located 20 feet west of Fence M on Transect 01.	1 inch	02/24/94	12:15 PM	TR01-08-01	30
TR01-09	Located 50 feet east of Fence M on Transect 01, same location as TR01-06.	18 inches	02/24/94	12:45 PM	TR01-09-18	0.49U*
TR01-10	Located 60 feet east of Fence M on Transect 01.	1 inch	02/24/94	12:30 PM	TR01-10-01	19
TR02-01	Located 51 feet south of Transect 01, forming Transect 02. This sample was collected at Fence M on Transect 02.	1 inch	02/09/94	2:45 PM	TR02-01-01	1,030
TR02-02	Located 10 feet west of Fence M on Transect 02.	1 inch	02/07/94	2:30 PM	TR02-02-01	13
TR02-03	Located 20 feet east of Fence M on Transect 02.	24 inches	02/09/94	2:45 PM	TR02-03-24	246

TABLE 3-1 (Continued)
SOIL SAMPLE RESULTS - TOTAL SILVER CONCENTRATIONS
IR SITE 5 - SWALE 2
INDIAN HEAD, MARYLAND

Sample Number	Location	Depth	Date	Time	Tracking Number	Result (mg/kg)
TR02-04	Located 38 feet east of Fence M on Transect 02.	24 inches	02/09/94	3:00 PM	TR02-04-24	0.50U*
TR02-05	Located 53 feet east of Fence M on Transect 02.	1 inch	02/07/94	2:40 PM	TR02-05-01	16
TR02-06	Located 20 feet east of Fence M on Transect 02 (Dup. TR02-03).	24 inches	02/09/94	2:46 PM	TR02-06-24	180
TR02-07	Located 20 feet west of Fence M on Transect 02.	1 inch	02/24/94	10:50 AM	TR02-07-01	5
TR02-08	Located 63 feet east of Fence M on Transect 02.	1 inch	02/24/94	10:45 AM	TR02-08-01	2
TR03-01	Located 150 feet south of corner of Fence M and Fence K, forming Transect 03. This sample collected at fence.	1 inch	02/22/94	2:15 PM	TR03-01-01	173
TR03-02	Located 10 feet west of Fence M along Transect 03.	1 inch	02/07/94	2:55 PM	TR03-02-01	88
TR03-03	Located 20 feet east of Fence M along Transect 03.	24 inches	02/22/94	2:30 PM	TR03-03-24	42
TR03-04	Located 30 feet east of Fence M along Transect 03.	24 inches	02/22/94	2:00 PM	TR03-04-24	9
TR03-05	Located 38 feet east of Fence M along Transect 03.	24 inches	02/10/94	1:35 PM	TR03-05-24	7
TR03-06	Located 53 feet east of Fence M along Transect 03.	1 inch	02/07/94	2:45 PM	TR03-06-01	25
TR03-07	Located 63 feet east of Fence M along Transect 03.	1 inch	02/24/94	11:10 AM	TR03-07-01	8
TR03-08	Located 53 feet east of Fence M along Transect 03 (same location as TR03-06.	18 inches	02/24/94	11:05 AM	TR03-08-18	0.51U*
TR03-09	Located 10 feet west of Fence M along Transect 03 (same location as TR03-02).	18 inches	02/24/94	11:20 AM	TR03-09-18	5
TR03-10	Located 20 feet west of Fence M along Transect 03.	1 inch	02/24/94	11:00 AM	TR03-10-01	96
TR04-01	Located 200 feet south of the corner of Fence M and Fence K, forming Transect 04. This sample was collected at the fence.	1 inch	02/22/94	2:30 PM	TR04-01-01	313
TR04-02	Located 10 feet west of Fence M along Transect 04.	1 inch	02/07/94	2:50 PM	TR04-02-01	226
TR04-03	Located 20 feet east of Fence M along Transect 04.	24 inches	02/22/94	12:45 PM	TR04-03-24	15

TABLE 3-1 (Continued)
SOIL SAMPLE RESULTS - TOTAL SILVER CONCENTRATIONS
IR SITE 5 - SWALE 2
INDIAN HEAD, MARYLAND

Sample Number	Location	Depth	Date	Time	Tracking Number	Result (mg/kg)
TR04-04	Located 38 feet east of Fence M along Transect 04.	24 inches	02/10/94	1:20 PM	TR04-04-24	2
TR04-05	Located 53 feet east of Fence M along Transect 04.	1 inch	02/07/94	2:55 PM	TR04-05-01	39
TR04-06	Located 63 feet east of Fence M along Transect 04.	1 inch	02/24/94	11:40 AM	TR04-06-01	52
TR04-07	Located 10 feet west of Fence M along Transect 04 (same location as TR04-02).	18 inches	02/24/94	11:30 AM	TR04-07-18	10
TR04-08	Located 20 feet west of Fence M along Transect 04.	1 inch	02/24/94	11:35 AM	TR04-08-01	77
TR05-01	Located 250 feet south of the corner of Fence M and K, forming Transect 05 which is perpendicular to Fence M. This sample was collected at Fence M.	1 inch	02/22/94	12:25 PM	TR05-01-01	38
TR05-02	Located 10 feet west of Fence M along Transect 05.	1 inch	02/07/94	3:15 PM	TR05-02-01	3
TR05-03	Located 28 feet east of Fence M along Transect 05.	24 inches	02/22/94	11:30 AM	TR05-03-24	16
TR05-04	Located 37 feet east of Fence M along Transect 05.	24 inches	02/10/94	9:00 AM	TR05-04-24	1
TR05-05	Located 47 feet east of Fence M along Transect 05.	24 inches	02/10/94	8:50 AM	TR05-05-24	1
TR05-06	Located 62 feet east of Fence M along Transect 05.	1 inch	02/07/94	3:10 PM	TR05-06-01	33
TR05-07	Located 72 feet east of Fence M along Transect 05.	1 inch	02/24/94	12:10 PM	TR05-07-01	21
TR05-08	Located 62 feet east of Fence M along Transect 05 (same location as TR05-06).	18 inches	02/24/94	11:50 AM	TR05-08-18	0.51U*
TR06-01	Located 280 feet south of corner of Fence M and K. Did not end up on the North shoulder of road as planned, TR05 is on the north shoulder, TR06 is south of the road. Transect 06 is perpendicular to Fence M. This sample was collected at the fence.	1 inch	02/22/94	12:30 PM	TR06-01-01	108
TR06-02	Located 10 feet west of Fence M along Transect 06.	1 inch	02/07/94	3:35 PM	TR06-02-01	6
TR06-03	Located 34 feet east of Fence M along Transect 06.	9 inches	02/10/94	2:45 PM	TR06-03-09	0.46U*
TR06-04	Located 70 feet east of Fence M along Transect 06.	24 inch	02/10/94	2:00 PM	TR06-04-24	2

TABLE 3-1 (Continued)
SOIL SAMPLE RESULTS - TOTAL SILVER CONCENTRATIONS
IR SITE 5 - SWALE 2
INDIAN HEAD, MARYLAND

Sample Number	Location	Depth	Date	Time	Tracking Number	Result (mg/kg)
TR06-05	Located 85 feet east of Fence M along Transect 06.	1 inch	02/07/94	3:35 PM	TR06-05-01	2
TR07-01	Located 25 feet east of corner of Fence M and southern Fence, forming Transect 07, perpendicular to southern Fence. This sample was collected at the southern fence.	1 inch	02/07/94	3:40 PM	TR07-01-01	11
TR07-02	Located 30 feet north of southern fence.	1 inch	02/07/94	4:15 PM	TR07-02-01	0.45U*
TR08-01	Located 50 feet east of corner of Fence M and southern Fence, forming Transect TR08, perpendicular to southern fence. Sample collected at fence.	1 inch	02/08/94	3:15 PM	TR08-01-01	53
TR08-02	Located 29 feet north of southern Fence along Transect 08.	12 inches	02/08/94	3:20 PM	TR08-02-12	0.45U*
TR09-01	Located 95 feet east of corner of Fence M and southern Fence, forming Transect 09, perpendicular to southern Fence. This sample was collected at the fence.	1 inch	02/22/94	12:00 PM	TR09-01-01	2
TR09-02	Located at southern fence along Transect 09.	24 inches	02/22/94	11:45 AM	TR09-02-24	3
TR09-03	Located 10 feet south of southern fence along Transect 09.	1 inch	02/08/93	3:15 PM	TR09-03-01	64
TR09-04	Located 14 feet north of southern fence along Transect 09.	24 inches	02/22/93	12:00 PM	TR09-04-24	45
TR09-05	Located 23 feet north of southern fence along Transect 09.	24 inches	02/22/94	11:30 AM	TR09-05-24	3
TR09-06	Located 38 feet north of southern fence along Transect 09.	1 inch	02/08/94	10:40 AM	TR09-06-01	2
TR10-01	Located 145 feet east of corner of Fence M and southern fence, forming Transect 10, perpendicular to southern fence. This sample was collected at the fence.	1 inch	02/08/94	10:00 AM	TR10-01-01	8
TR10-02	Located at fence along Transect 10.	24 inch	02/08/94	10:15 AM	TR10-02-24	0.49U*
TR10-03	Located 10 feet south of fence along Transect 10.	1 inch	02/08/94	10:30 AM	TR10-03-01	0.66U*

TABLE 3-1 (Continued)
SOIL SAMPLE RESULTS - TOTAL SILVER CONCENTRATIONS
IR SITE 5 - SWALE 2
INDIAN HEAD, MARYLAND

Sample Number	Location	Depth	Date	Time	Tracking Number	Result (mg/kg)
TR10-04	Located 22 feet north of southern fence along Transect 10.	24 inches	02/08/94	10:25 AM	TR10-04-24	82
TR10-05	Located 38 feet north of southern fence along Transect 10.	1 inch	02/08/94	10:32 AM	TR10-05-01	1
TR10-06	Located 22 feet north of southern fence along Transect 10 (Dup. TR10-04).	24 inches	02/08/94	10:20 AM	TR10-06-24	97
TR11-01	Located inside fenced area. Transect was placed from the corner of the fence north of the command post across to the southwest corner of the green outbuilding located behind Building 731. This sample was collected 17 feet NE from the corner of the fence.	1 inch	02/09/94	11:55 AM	TR11-01-01	72
TR11-02	Located 35 feet NE of the corner of the fence along Transect 11.	1 inch	02/09/94	11:50 AM	TR11-02-01	24
BU01-01	Located 31 feet E of the SW corner of the green outbuilding and 22 feet west of the fence.	1 inch	02/09/94	12:20 AM	BU01-01-01	15
BU02-01	Located 2 feet 8 inches north of green building along western fence in Bay 8.	1 inch	02/09/94	12:00 PM	BU02-01-01	12
BU03-01	Located between Building 731 and green outbuilding in Bay 7, 1.5 feet north of green outbuilding along eastern fence.	1 inch	02/09/94	12:35 PM	BU03-01-01	106
BU04-01	Located 3 feet 6 inches north of corner of fence near green building, taken along eastern fence in Bay 6.	1 inch	02/09/94	12:20 AM	BU04-01-01	910
BU05-01	Located inside fenced area, 26 feet 7.5 inches south of SW corner of green building, then 13 feet 3 inches west.	1 inch	02/09/94	12:15 PM	BU05-01-01	595
BU06-01	Located 14 feet south of the SE corner of green outbuilding.	1 inch	02/24/94	1:40 PM	BU06-01-01	12
SW01-01	Located 3 feet due south of the steam vent, in the swale.	1 inch	02/24/94	1:30 PM	SW01-01-01	8

TABLE 3-1 (Continued)
SOIL SAMPLE RESULTS - TOTAL SILVER CONCENTRATIONS
IR SITE 5 - SWALE 2
INDIAN HEAD, MARYLAND

Sample Number	Location	Depth	Date	Time	Tracking Number	Result (mg/kg)
SW02-01	Located 95 feet east of Fence M along Transect 1. Sample collected in swale.	1 inch	02/24/94	1:35 PM	SW02-01-01	19
SW03-01	Located 35 feet east of the eastern termination of the southern fence and then 17 feet south.	24 inch	02/22/94	3:20 PM	SW03-01-24	8
SW04-01	Located 35 feet east of the eastern termination of the southern fence and then 17 feet south.	1 inch	02/22/94	3:20 PM	SW04-01-01	1
SW04-02	Located 35 feet east of the eastern termination of the southern fence and then 17 feet south. Duplicate of SW03-01-24.	24 inch	02/22/94	3:20 PM	SW04-02-24	18
SW05-01	Located 70 feet east of southern fence and then 18 feet south into stream.	24 inches	02/22/94	3:15 PM	SW05-01-24	19
SW06-01	Located 85 feet east of the eastern termination of the southern fence and then 11 feet south. This sample was collected in the stream.	24 inches	02/24/94	1:00 PM	SW06-01-24	36
SW07-01	Located 6 feet west of the eastern termination point of the southern fence. This sample was collected in the swale.	24 inches	02/24/94	1:05 PM	SW07-01-24	0.48U*
SW08-01	Located 95 feet east of Fence M along Transect 1. Sample collected in swale and is a duplicate of SW02.	1 inch	02/24/94	1:35 PM	SW08-01-01	7

U = Considered a Nondetect

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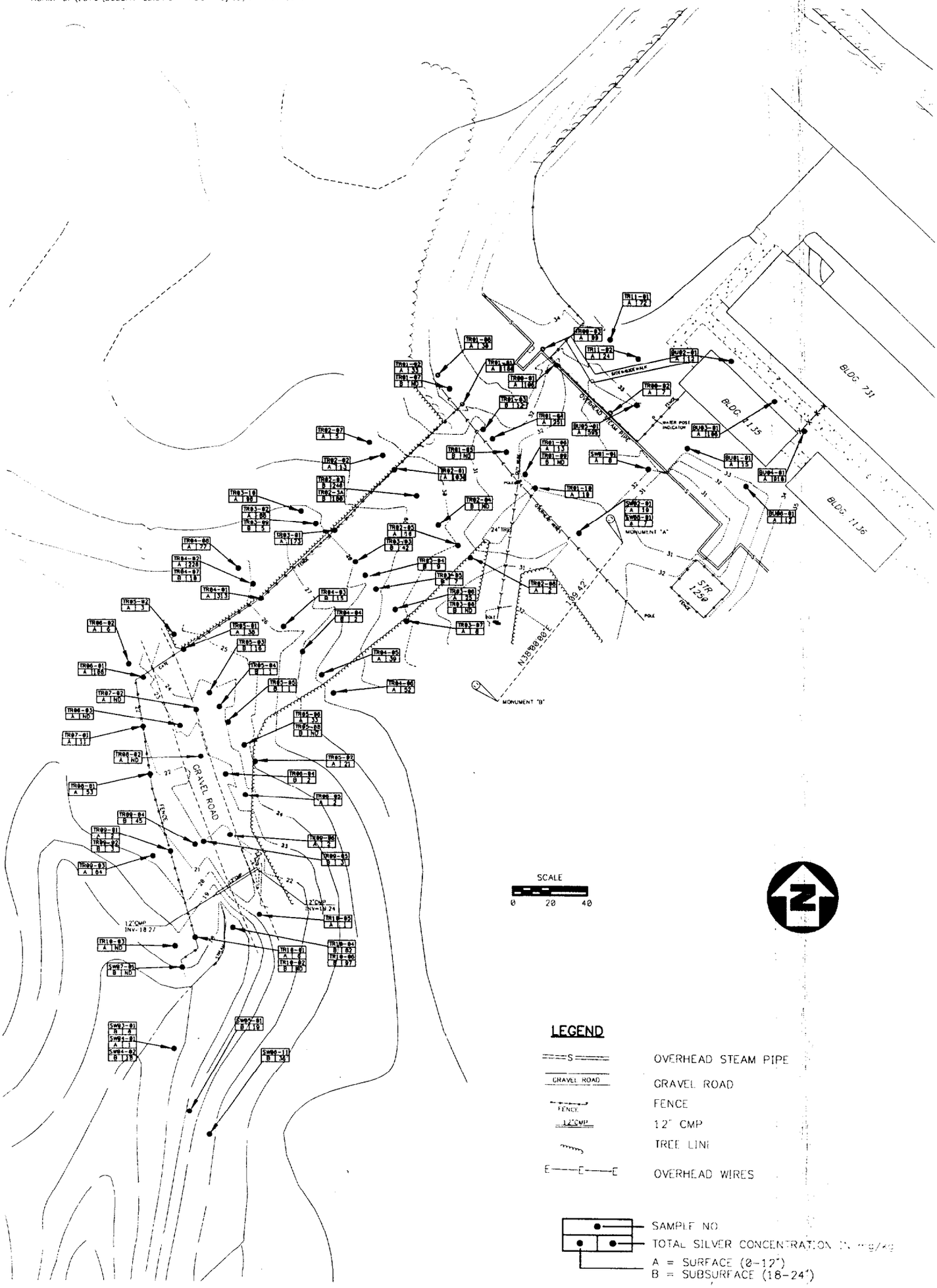

LEGEND

- OVERHEAD STEAM PIPE
- GRAVEL ROAD
- FENCE
- 12" CMP
- TREE LINE
- OVERHEAD WIRES
- SAMPLE NO
- TOTAL SILVER CONCENTRATION IN mg/kg
- A = SURFACE (0-12")
- B = SUBSURFACE (18-24")

TOTAL SILVER CONCENTRATIONS
IR SITE 5
INDIAN HEAD DIVISION, NSWC
INDIAN HEAD, MARYLAND

FIGURE 3-1

HALLIBURTON NUS CORPORATION

TABLE 3-2

SOIL SAMPLE RESULTS - TCLP, SILVER
IR SITE 5 - SWALE 2
INDIAN HEAD, MARYLAND

Sample Number	Location	Tracking Number	Total Silver (mg/kg)	TCLP[1] (mg/L)
TR01-01	Located 49 feet south of corner of Fence M and K forming Transect 01. This transect is perpendicular to Fence M. Sample was collected at fence.	TR01-01-01	1,180	0.04U[2]
TR01-04	Located 25 feet east of Fence M on Transect 01.	TR01-04-01	251	0.102
TR02-01	Located 51 feet south of Transect 01, forming Transect 02. This sample was collected at Fence M on Transect 02.	TR02-01-01	1,030	0.04U[2]
TR04-01	Located 200 feet south of the corner of Fence M and Fence K, forming Transect 04. This sample was collected at the fence.	TR04-01-01	313	0.0477

Notes:
1. Maximum concentration of silver for toxicity characteristic is 5.0 mg/L. (40 CFR 261.24 Table 1)
2. U = Non-detect concentration

REFERENCES

ABB Environmental Services (ABB-ES), 1991. Draft Site Characterization and Remediation Evaluation Report.

ABB Environmental Services (ABB-ES), 1993. Removal Action Findings Report.

Halliburton NUS, 1994. Abbreviated Field Sampling Plan (AFSP), IR Site 5.

APPENDIX A

CHAIN OF CUSTODY FORMS

HALLIBURTON NUS Environmental Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
0152	Sites S.6 No 5

SAMPLERS (SIGNATURE): Robin Summerhill, Craig Fatkos

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40z jars						REMARKS
TR00-01-01	2/7/94	2:30 PM	X		15ft E Surf Samp	1	1						
TR00-02-01	2/7/94	2:33 PM	X		45ft E surf samp	1	1						
TR01-02-01	2/7/94	2:40 PM	X		11ft W surf samp	1	1						
TR01-06-01	2/7/94	2:25 PM	X		50ft E Surf samp	1	1						
TR02-02-01	2/7/94	2:20 PM	X		10ft W Surf samp	1	1						
TR02-05-01	2/7/94	2:40 PM	X		53ft E surf samp	1	1						Soil w/ Ig rocks
TR03-02-01	2/7/94	2:55 PM	X		10 W Surf Samp	1	1						
TR03-06-01	2/7/94	2:45 PM	X		53 E surf samp	1	1						
TR04-02-01	2/7/94	2:50 PM	X		10 W surf samp	1	1						
TR04-05-01	2/7/94	2:55 PM	X		53E surf samp	1	1						
TR05-02-01	2/7/94	3:15 PM	X		10W 250ft Alg Line	1	1						
TR05-06-01	2/7/94	3:10 PM	X		62 E	1	1						
TR06-05-01	2/7/94	3:30 PM	X		85E	1	1						
TR06-02-01	2/7/94	3:35 PM	X		10W	1	1						

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
Robin Summerhill	4:50P 2/8/94				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
		Dennis McAfee	2-8-94 4.50 PM		

NUS 440 REVISED 0891

HALLIBURTON NUS Environmental Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
0152	Silver Site No 5
SAMPLERS (SIGNATURE): Robin Summerhill	Craig Farkas

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40z. Jars	500 ml. Poly	REMARKS
TR07-01-01	2/7/94	3:40 PM	X		0ft @ Fence	1	1		
TR07-01-02	2/7/94	4:15	X		30ft N	1	1		RS 2/8/94
TR10-01-01	2/8/94	10:00 AM	X		~~50ft from Roof Pt~~ at Fence	1	1		
TR10-02-24	2/8/94	10:15 AM	X		22N of Fence	1	1		
TR10-03-01	2/8/94	10:30 AM	X		10S of Fence	1	1		
TR10-04-24	2/8/94	10:25 AM	X		22N of fence	1	1		
TR10-05-01	2/8/94	10:32 AM	X		38N of Fence	1	1		
TR10-06-4012	2/8/94	10:37 AM	X		22N of Fence	1	1		
TR09-06-01	2/8/94	10:40 AM	X		38N of Fence	1	1		
TR09-03-01	2/8/94	3:15 PM	X		10S of Fence	1	1		
TR06-02-12	2/8/94	3:20 PM	X		29N of Fence	1	1		
TR06-01-01	2/8/94	3:15 PM	X		~~RS~~ at Fence	1	1		RS 2/8/94
RS-01-06	2/8/94	11:00 AM		X		1		1	
E-1	2/8/94	11:00 AM		X	Rinsate	1		1	

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Robin Summerhill	2/8/94 4:50 PM				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE): Donna McAfee	DATE / TIME: 8.94 4.50 PM	REMARKS:	

NUS 440 REVISED

HALLIBU[illegible] NUS Environmental Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.: 0152

SITE NAME: Silver Site 5

SAMPLERS (SIGNATURE): Robin Summerhill [signature]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	4oz jar						REMARKS
TR11-01-01	2/9/94	11:55 AM	X		17 feet ~~NW~~ NE from Corner of fence	1	1						
TR11-02-01	2/9/94	11:50 AM	X		35 feet from corner of fence ~~(NW)~~ (NE)	1	1						
BU01-01-01	2/9/94	12:20 PM	X		31 feet SE from corner 22 feet E of fence	1	1						
BU02-01-01	2/9/94	12:00 PM	X		2'8" N of green Building on Western Fence (BAY 8)	1	1						
BU03-01-01	2/9/94	12:35 PM	X		1'5" N of Green Building on W. Eastern Fence (Bay 7)	1	1						
BU04-01-01	2/9/94	12:20 PM	X		3'6" N of Green Building on Western Fence (Bay 6)	1	1						
BU05-01-01	2/9/94	12:15 PM	X		26' 7½" SW of western (south) Corner of Green Bldg, 13ft 3" ~~[illegible]~~ W of Fence	1	1						
TR02-03-24	2/9/94	2:45 PM	X		~~19 E~~ 20'E of Western Fence TRO2	1	1						
TR02-01-01	2/9/94	2:45 PM	X		Along Western Fence - TRO2	1	1						
TR02-06-24	2/9/94	2:46 PM	X		20'E of Western Fence, TRO2	1	1						
TR02-04-24	2/9/94	3:00 PM	X		33'E of Western Fence, TRO2	1	1						
TR01-01-01	2/9/94	3:10 PM	X		25'E of Western Fence (TRO1)	1	1						
TR01-03-24	2/9/94	3:15 PM	X		17'E of Western Fence (TRO1)	1	1						
TR01-05-24	2/9/94	3:16 PM	X		35'E of Western Fence (TRO1)	1	1						

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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
[signature]					

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:
[signature]	2/10/94 4:50	Dennis McGuffie	2-10-94 4:50pm	

NUS 440 REVISED 0891

HALLIBURTON NUS Environmental Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
0152	Silver Sites

SAMPLERS (SIGNATURE): Robin Summerhill

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	40z jar	200ml Poly					REMARKS
F-2	2/10/94	12:55 PM		X	Runsate film Mixing bowl	1		1					
TR01-C1 -C1	2/10/94	3:15 PM	X		Along western fence (TR01)	1	1						
TR05-C5 -24	2/10/94	8:50 AM	X		47 feet E. of western fence (TR05)	1	1						
TR05-C4 -24	2/10/94	9:00 AM	X		37 feet E of western fence (TR05)	1	1						
E-1	2/10/94	12:45 PM		X		1		1					
TR04-04 -24	2/10/94	1:20 PM	X		38 feet E of western fence (TR04)	1	1						
TR03-C3 -24	2/10/94	1:35 PM	X		38 feet E of western fence (TR03)	1	1						
TR06-C3 -09	2/10/94	2:45 PM	X		34 feet E of western fence (TR06)	1	1						

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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME: 2/10/94 4:50	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME: 2-10-94 4.50 pm	REMARKS: Sample # TR06-04-2 (no left off the cap).	

NUS 440 REV1

HALLIBU...ON NUS Environmental Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
0152	Silver Site 5

SAMPLERS (SIGNATURE): Robin Summerhill

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	8021/415						REMARKS
TR01-05-24	2/22/94	11:30 AM	X		23ft. N of Southern Fence (TR09)	1	1						
TR05-03-24	2/22/94	11:30 AM	X		28 ft. E of Western Fence (TR05)	1	1						
TR09-02-24	2/22/94	11:45 AM	X		At Southern fence (TR09)	1	1						
TR09-04-24	2/22/94	12:00 PM	X		14ft. N of Southern fence (TR09)	1	1						
TR06-01-01	2/22/94	12:30 PM	X		At Western fence (TR06)	1	1						
TR05-01-01	2/22/94	12:25 PM	X		At Western fence (TR06)	1	1						
TR04-03-24	2/22/94	12:45 PM	X		20ft. East of Western fence (TR04	1	1						
TR09-01-01	2/22/94	12:15 PM	X		At Southern fence (TR09)	1	1						
TR03-04-24	2/22/94	2:00 PM	X		~~26ft~~ 30ft. East of Western fence (TR03)	1	1						
TR03-01-01	2/22/94	2:15 PM	X		At Fence (TR03)	1	1						
TR03-02-24	2/22/94	2:30 PM	X		20ft. East of Western fence (TR03)	1	1						
TR04-01-01	2/22/94	2:30 PM	X		At Fence (TR04)	1	1						
SW05-01-24	2/22/94	3:15 PM	X		~~15~~ 10 ft. E of end of Southern fence then 18' South into stream	1	1						
~~SW09~~													

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Robin Summerhill	2/22/94 4:15				
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
		Dennis McFall	2-22-94 4:15 PM		

NUS 440 REVISED 0891

HALLIBURTON NUS Environmental Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.:	SITE NAME:
0152	Silver Site 5

SAMPLERS (SIGNATURE): Robin Summerhill

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	6-02 jar	1000 ml. Poly	REMARKS
SW04-01 -01	2/22/94	3:20 PM	X		Located 35ft. E of fence (Southern) then 17 feet South (centered)	1	1		
SW04-02 -24	2/22/94	3:20 PM	X		Located 38ft. E of fence then 17 feet South	1	1		
SW04-SW03-01 -24	2/22/94	3:20 PM	X		Located 38 feet E of (southern) fence, then 17ft. South	1	1		
F-3	2/22/94	3:30 PM	X			1		1	

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Robin Summerhill	2/22/94 4:15				
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RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
		Dennis McAfee	2-22-94. 15 PM		

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Corpora[illegible] and Subsidiaries

CHAIN OF CUSTC[illegible] RECORD

PROJECT NO.: 0152

SITE NAME: Silver Site 5

SAMPLERS (SIGNATURE): Robin Summerhill

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	8oz jars						REMARKS
TR02-08-01	2/24/94	10:45 AM	X		63 feet east of Fence on TR02.	1	1						AG
TR02-07-01	2/24/94	10:50 AM	X		20 feet west of fence on TR02	1	1						Ag
TR00-03-01	2/24/94	10:55 AM	X		10 feet due west of TR00-01 (5ft. E of fence)	1	1						Ag
TR03-10-01	2/24/94	11:00 AM	X		20 feet west of fence on TR03	1	1						Ag
TR03-08	2/24/94	11:05 AM	X		53 feet east of fence on TR03 at 06-01.	1	1						Ag
TR05-07-01	2/24/94	11:10 AM	X		63 feet east of fence on TR03.	1	1						Ag
TR03-09-18	2/24/94	11:20 AM	X		Located 10 feet west of fence at TR03-02.	1	1						Ag
TR04-09-18	2/24/94	11:30 AM	X		Located 10 feet west of fence at TR04-02	1	1						Ag
TR04-08-01	2/24/94	11:35 AM	X		Located 20 feet west of fence along TR04.	1	1						Ag
TR04-06-01	2/24/94	11:40 AM	X		63 feet east of fence along TR04	1	1						Ag
TR05-08-18	2/24/94	11:50 AM	X		62 feet east of fence at TR05-06	1	1						Ag
TR05-07-01	2/24/94	12:10 PM	X		72 feet east of fence along TR05	1	1						Ag
TR01-08-01	2/24/94	12:15 PM	X		Located 20 feet west of fence on TR01	1	1						Ag
TR01-10-01	2/24/94	12:30 PM	X		Located 60 feet east of fence on TR01	1	1						Ag

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Robin Summerhill	2/24/94 9:35AM	G. Jones / TDC #318			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
G. Jones / TDC					
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
		Debbie Maxwell	2/25/94 1200		

NUS 440 REVISED 0891

HALLIBURTON NUS Environmental Corporation and Subsidiaries

CHAIN OF CUSTODY RECORD

PROJECT NO.: 0152

SITE NAME: Silver Site 5

SAMPLERS (SIGNATURE): Robin Summerhill

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	8oz jars							REMARKS
TR01-09 -18	2/24/94	12:45 PM	X		Located 50 feet E of fence at TR01-06	1	1							Ag
TR01-07 -18	2/24/94	12:50 PM	X		Located 10 ft. west of fence at TR01-02	1	1							Ag
SW06-01 -24	2/24/94	1:00 PM	X		Located 850 ft East of end of southern fence, then 11 ft. South	1	1							Ag
SW07-01 -24	2/24/94	1:05 PM	X		Located 6 ft. W of the end of the fence and 9 feet south	1	1							Ag
SW08-01 -01	2/24/94	1:35 PM	X		Located 95 feet east of fence on TR01. This is in swale that runs under steam vent	1	1							Ag
SW02-01 -01	2/24/94	1:35 PM	X		Located 95 feet east of fence on TR01	1	1							Ag
SW01-01 -01	2/24/94	1:30 PM	X		Located 3 feet due South of Steam vent, in swale	1	1							Ag
BU06-01 -01	2/24/94	1:40 PM	X		Located 14 feet south of the SE. corner of green outbuilding.	1	1							Ag

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
Robin Summerhill	2/24/94 9:35am	L. Owens/TDC #318			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
L. Owens/TDC					
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
		Debbie Maxwell	2/24/94 1200		

NUS 440 REVISED 0891

APPENDIX B

ANALYTICAL RESULTS FOR TOTAL SILVER CONCENTRATION

ANALYTICAL DATA PACKAGE
Metals Section

CLIENT: HALLIBURTON NUS
SITE: NSWC INDIAN HEAD
CODE-BATCH: HN NSWC - 1
CONTROL #: 9067
DATE: 09-FEB-94

February 9, 1994

Narrative
VLI Project 420.2.0 - Batch 1
VLI Control 9067

Client Information:
HALLIBURTON NUS / NSWC INDIAN HEAD

Analytical Methodology:
U.S. EPA Test Methods for Evaluating Solid Waste (SW-846, 3rd. Edition), 6000 Series for ICP Analysis, for Silver.

Sample Management:
Twenty-six soil samples and one water sample were received by VLI on February 8, 1994.

Sample List:
A cross reference list of the laboratory sample numbers and the field sample numbers appears on the cover page of the report.

Quality Control:
There were no preparation or analysis problems associated with this batch. All method required quality assurance checks were within acceptable control limits. All analyses were performed within method required holding times.

For Additional Information:
For all questions, please refer to the VLI Control number at the top of this narrative.
For questions concerning sample scheduling, billing, or other program management issues, please contact Janet Jaufmann, VLI Client Services Manager.
For questions concerning technical integrity of the data, please contact Linda Bock, Quality Assurance Officer.

Release Authority:
Release of this data package is approved by the Laboratory Directory or his designee as indicated by the following signature:

Oksana Pozda

Oksana Pozda
Senior Analyst, Metals Section

DEFINITION OF QUALIFIERS

Some of the following qualifiers may have been used in this data package.

Under the "M" method qualifier, column the following flags may have been used.

"P" for ICP
"A" for Flame AA
"F" for Furnace AA
"CV" for Manual Cold Vapor AA
"AS" for Semi-Automated Spectrophotometric
" " where no data has been entered
"NR" if the analyte is not required to be analyzed.

Under the "C" concentration qualifier, column the following flags may have been used.

"U" is used when the sample concentration beneath the instrument detection limit.

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : HALLIBURTON_NUS_____ Site : NSWC_IND._HEAD___

Lab Name: VERSAR Control No.: 9067_ Code: HN_NSWC_ Batch: 1_____

SOW No.: SW846, 3RD. EDITION__

Field Sample No.	Lab Sample ID
_F-1_____	__15771_____
_TROO-01-01____	__15745_____
_TROO-01-01SD__	__15745SD____
_TROO-01-01S___	__15745S_____
_TROO-02-01____	__15746_____
_TRO1-02-01____	__15747_____
_TRO1-06-01____	__15748_____
_TRO2-02-01____	__15749_____
_TRO2-05-01____	__15750_____
_TRO3-02-01____	__15751_____
_TRO3-06-01____	__15752_____
_TRO4-02-01____	__15753_____
_TRO4-05-01____	__15754_____
_TRO5-02-01____	__15755_____
_TRO5-06-01____	__15756_____
_TRO6-02-01____	__15758_____
_TRO6-05-01____	__15757_____
_TRO7-01-01____	__15759_____
_TRO7-02-01____	__15760_____
_TR08-01-01____	__15770_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verifield by the following signature.

Signature: Oksana Ponda Name: OKSANA PONDA

Date: 2-9-94 Title: Senior analyst

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : HALLIBURTON_NUS_____ Site : NSWC_IND._HEAD___

, Name: VERSAR Control No.: 9067_ Code: HN_NSWC_ Batch: 1_____

SOW No.: 3/90_____

Field Sample No.	Lab Sample ID
_TR08-02-12____	__15769_____
_TR09-03-01____	__15768_____
_TR09-06-01____	__15767_____
_TR10-01-01____	__15761_____
_TR10-02-24____	__15762_____
_TR10-02-24SD__	__15762SD____
_TR10-02-24S___	__15762S_____
_TR10-03-01____	__15763_____
_TR10-04-24____	__15764_____
_TR10-05-01____	__15765_____
_TR10-06-24____	__15766_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

:e ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

_____

_____

_____

_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verifield by the following signature.

Signature: Oksana Foxda Name: OKSANA FOXDA

Date: 2-9-94 Title: Senior analyst

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: WATER
Concentration Units: UG/L

Lab ID	15771					
Client ID	F-1					
Analyte						
Silver	U	4.0				

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
rix: SOIL
centration Units: MG/KG

Lab ID	15745	15746	15747	15748	15749	
Client ID	TROO-01-01	TROO-02-01	TRO1-02-01	TRO1-06-01	TRO2-02-01	
Analyte						
Silver	106	6.6	32.8	12.9	13.2	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	15750	15751	15752	15753	15754	
Client ID	TRO2-05-01	TRO3-02-01	TRO3-06-01	TRO4-02-01	TRO4-05-01	
Analyte						
Silver	15.9	88.1	25.0	226	39.4	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	15755	15756	15758	15757	15759	
Client ID	TRO5-02-01	TRO5-06-01	TRO6-02-01	TRO6-05-01	TRO7-01-01	
Analyte						
Silver	3.0	33.1	5.9	1.9	11.1	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	15760	15770	15769	15768	15767	
Client ID	TR07-02-01	TR08-01-01	TR08-02-12	TR09-03-01	TR09-06-01	
Analyte						
Silver	U 0.45	53.1	U 0.45	63.6	1.5	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
trix: SOIL
ıcentration Units: MG/KG

Lab ID	15761	15762	15763	15764	15765	
Client ID	TR10-01-01	TR10-02-24	TR10-03-01	TR10-04-24	TR10-05-01	
Analyte						
Silver	8.1	U 0.49	U 0.66	82.2	1.4	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	15766					
Client ID	TR10-06-24					
Analyte						
Silver	97.4					

5A
SPIKE SAMPLE RECOVERY

FIELD SAMPLE NO.
TROO-01-01S

.ent: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9067_ Code: HN_NSWC_ Batch: 1_____

Matrix: SOIL_____ % Solids for Sample: _52.6

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	386.2527		105.6806		369.15	76.0		P

Comments:
THIS_SAMPLE_CONTAINED_ROCKS._____

5B

SPIKE DUPLICATE SAMPLE RECOVERY

FIELD SAMPLE NO.

TROO-01-01SD

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9067_ Code: HN_NSWC_ Batch: 1_____

Matrix: SOIL_____ % Solids for Sample: _52.6

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Duplicate Sample Result (SDSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	404.2803		105.6806		369.15	80.9		P

Comments:

THIS_SAMPLE_CONTAINED_ROCKS._____

5A
SPIKE SAMPLE RECOVERY

FIELD SAMPLE NO.
TR10-02-24S

.ent: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9067_ Code: HN_NSWC_ Batch: 1_____

Matrix: SOIL_____ % Solids for Sample: _80.9

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	210.2959		0.4944	U	242.37	86.8		P

Comments:
THIS_SAMPLE_CONTAINED_ROCKS._____

5B

SPIKE DUPLICATE SAMPLE RECOVERY

FIELD SAMPLE NO.

TR10-02-24SD

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9067_ Code: HN_NSWC_ Batch: 1_____

Matrix: SOIL_____ % Solids for Sample: _80.9

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Duplicate Sample Result (SDSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	217.3347		0.4944	U	244.77	88.8		P

Comments:

THIS_SAMPLE_CONTAINED_ROCKS._____

LABORATORY CONTROL SAMPLE

ent: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9067_ Code:HN_NSWC_ Batch: 1_____

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver	2000.0	1781.50	89.1						

FORM VII - IN

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9067_ Code:HN_NSWC_ Batch: 1_____

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver	2000.0	1767.84	88.4						

FORM VII - IN

LABORATORY CONTROL SAMPLE

'ent: HALLIBURTON_NUS__________ Site: NSWC_IND._HEAD______________

Lab Name: VERSAR Control No.: 9067_ Code:HN_NSWC_ Batch: 1_____

Solid LCS Source: ____________

Aqueous LCS Source: INORG._VENT.

	Aqueous (ug/L)			Solid (mg/kg)					
Analyte	True	Found	%R	True	Found	C	Limits		%R
Silver	2000.0	1814.54	90.7						

FORM VII - IN

ICP SERIAL DILUTION

FIELD SAMPLE NO.

F-1L

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9067_ Code: HN_NSWC_ Batch: 1_____

Matrix : WATER_____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Silver	4.00	U	20.00	U			P

FORM IX - IN

ICP SERIAL DILUTION

FIELD SAMPLE NO.

TROO-01-01L

ent: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9067_ Code: HN_NSWC_ Batch: 1_____

Matrix : SOIL_____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Silver	555.88		650.75		17.1		P

ICP SERIAL DILUTION

FIELD SAMPLE NO.

TR10-02-24L

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9067_ Code: HN_NSWC_ Batch: 1_____

Matrix : SOIL_____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Silver	4.00	U	20.00	U			P

BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR_INC. Control No.: 9067____ Code: HN_NSWC_ Batch: 1_____

Preparation Blank Matrix: WATER_____

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Preparation Blank	C	M
Silver	4.000	U	P

FORM III - IN

BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR_INC. Control No.: 9067____ Code: HN_NSWC_ Batch: 1_____

Preparation Blank Matrix: WATER_____

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Preparation Blank	C	M
Silver	4.000	U	P

BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR_INC. Control No.: 9067____ Code: HN_NSWC_ Batch: 1_____

Preparation Blank Matrix: WATER_____

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Preparation Blank	C	M
Silver	4.000	U	P

FORM III - IN

ANALYTICAL DATA PACKAGE
Metals Section

CLIENT: HALLIBURTON NUS
SITE: NSWC INDIAN HEAD
CODE-BATCH: HN NSWC - 2
CONTROL #: 9079
DATE: 17-FEB-94

February 17, 1994

Narrative
VLI Project 420.2.0 - Batch 2
VLI Control 9079

Client Information:
HALLIBURTON NUS / NSWC INDIAN HEAD

Analytical Methodology:
U.S. EPA Test Methods for Evaluating Solid Waste (SW-846, 3rd. Edition), 6000 Series for ICP Analysis, for Ag.

Sample Management:
Twenty-one soil samples and two water samples were received by VLI on February 10, 1994.

Sample List:
A cross reference list of the laboratory sample numbers and the field sample numbers appears on the cover page of the report.

Quality Control:
There were no preparation or analysis problems associated with this batch. All method required quality assurance checks were within acceptable control limits. All analyses were performed within method required holding times.

For Additional Information:
For all questions, please refer to the VLI Control number at the top of this narrative.
For questions concerning sample scheduling, billing, or other program management issues, please contact Theresa Spalletta.
For questions concerning technical integrity of the data, please contact Linda Bock, Quality Assurance Officer.

Release Authority:
Release of this data package is approved by the Laboratory Directory or his designee as indicated by the following signature:

Oksana Pozda

Oksana Pozda
Senior Analyst, Metals Section

DEFINITION OF QUALIFIERS

Some of the following qualifiers may have been used in th data package.

Under the "M" method qualifier, column the following flags m have been used.

"P" for ICP
"A" for Flame AA
"F" for Furnace AA
"CV" for Manual Cold Vapor AA
"AS" for Semi-Automated Spectrophotometric
" " where no data has been entered
"NR" if the analyte is not required to be analyzed.

Under the "C" concentration qualifier, column the followin flags may have been used.

"U" is used when the sample concentration beneath th instrument detection limit.

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : HALLIBURTON_NUS_____ Site : NSWC_IND._HEAD___

b Name: VERSAR Control No.: 9079_ Code: HN_NSWC_ Batch: 2_____

SOW No.: SW846, 3RD. EDITION__

Field Sample No.	Lab Sample ID
_BU01-01-01____	__15831_____
_BU02-01-01____	__15832_____
_BU03-01-01____	__15833_____
_BU04-01-01____	__15834_____
_BU05-01-01____	__15835_____
_E-1_____	__15851_____
_F-2_____	__15850_____
_TR01-01-01____	__15843_____
_TR01-03-24____	__15841_____
_TR01-04-01____	__15840_____
_TR01-05-24____	__15842_____
_TR02-01-01____	__15837_____
_TR02-03-24____	__15836_____
_TR02-04-24____	__15839_____
_TR02-06-24____	__15838_____
_TR03-05-24____	__15847_____
_TR04-04-24____	__15846_____
_TR05-04-24____	__15845_____
_TR05-05-24____	__15844_____
_TR06-03-09____	__15848_____

:e ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verifield by the following signature.

Signature: Oksana Porda Name: ORSANA PORDA

Date: 2-16-94 Title: Senior analyst

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : HALLIBURTON_NUS_____ Site : NSWC_IND._HEAD___

Lab Name: VERSAR Control No.: 9079_ Code: HN_NSWC_ Batch: 2_____

SOW No.: SW846, 3RD. EDITION__

Field Sample No.	Lab Sample ID
_TR06-04-24____	__15849_____
_TR06-04-24SD__	__15849SD____
_TR06-04-24S___	__15849S_____
_TR11-01-01____	__15829_____
_TR11-01-01SD__	__15829SD____
_TR11-01-01S___	__15829S_____
_TR11-02-01____	__15830_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

_____

_____

_____

_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verifield by the following signature.

Signature: Oksana Pozda Name: OKSANA POZDA

Date: 2-16-94 Title: Senior analyst

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: WATER
Concentration Units: UG/L

Lab ID	15851	15850				
Client ID	E-1	F-2				
Analyte						
Silver	U 4.0	U 4.0				

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	15831	15832	15833	15834	15835	
Client ID	BU01-01-0	BU02-01-0	BU03-01-0	BU04-01-0	BU05-01-0	
Analyte						
Silver	14.5	11.5	106	910	595	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
ncentration Units: MG/KG

Lab ID	15843	15841	15840	15842	15837	
Client ID	TR01-01-0	TR01-03-2	TR01-04-0	TR01-05-2	TR02-01-0	
Analyte						
Silver	1180	11.8	251	U 0.48	1030	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID / Client ID / Analyte	15836 TR02-03-2	15839 TR02-04-2	15838 TR02-06-2	15847 TR03-05-2	15846 TR04-04-2	
Silver	246	U 0.50	180	7.4	1.8	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	15845	15844	15848	15849	15829	
Client ID	TR05-04-2	TR05-05-2	TR06-03-0	TR06-04-2	TR11-01-0	
Analyte						
Silver	0.78	0.61	U 0.46	1.8	72.3	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	15830					
Client ID	TR11-02-0					
Analyte						
Silver	24.3					

5A
SPIKE SAMPLE RECOVERY

FIELD SAMPLE NO.
TR06-04-24S

ient: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9079_ Code: HN_NSWC_ Batch: 2_____

Matrix: SOIL_____ % Solids for Sample: _83.3

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	221.6687		1.7984		235.39	93.4		P

Comments:
THE_SAMPLE_CONTAINED_WEEDS._____

FORM V (Part 1) - IN

5B

SPIKE DUPLICATE SAMPLE RECOVERY

FIELD SAMPLE NO.

TR06-04-24SD

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9079_ Code: HN_NSWC_ Batch: 2_____

Matrix: SOIL_____ % Solids for Sample: _83.3

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Duplicate Sample Result (SDSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	222.2811		1.7984		233.10	94.6		P

Comments:

THE_SAMPLE_CONTAINED_WEEDS._____

FORM V (Part 2) - IN

5A
SPIKE SAMPLE RECOVERY

FIELD SAMPLE NO.
TR11-01-01S

ient: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9079_ Code: HN_NSWC_ Batch: 2_____

Matrix: SOIL_____ % Solids for Sample: _81.6

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	311.4418		72.2627		235.67	101.5		P

Comments:
THE_SAMPLE_CONTAINED_ROCKS._____

5B

SPIKE DUPLICATE SAMPLE RECOVERY

FIELD SAMPLE NO.

TR11-01-01SD

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9079_ Code: HN_NSWC_ Batch: 2_____

Matrix: SOIL_____ % Solids for Sample: _81.6

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Duplicate Sample Result (SDSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	306.9937		72.2627		240.29	97.7		P

Comments:

THE_SAMPLE_CONTAINED_ROCKS._____

LABORATORY CONTROL SAMPLE

Client: VERSAR_DIV30_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9079_ Code:HN_NSWC_ Batch: 2_____

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver	2000.0	1807.82	90.4						

FORM VII - IN

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9079_ Code:HN_NSWC_ Batch: 2_____

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver	2000.0	1882.86	94.1						

FORM VII - IN

7

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS__________ Site: NSWC_IND._HEAD______________

Lab Name: VERSAR Control No.: 9079_ Code:HN_NSWC_ Batch: 2_____

Solid LCS Source: ____________

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	C	Limits		%R
Silver___	_2000.0	_1832.56	_91.6_						

FORM VII - IN

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR_INC. Control No.: 9079____ Code: HN_NSWC_ Batch: 2_____

Preparation Blank Matrix: SOIL_____

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Preparation Blank	C	M
Silver	0.004	U	P

BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR_INC. Control No.: 9079____ Code: HN_NSWC_ Batch: 2_____

Preparation Blank Matrix: SOIL_____

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Preparation Blank	C	M
Silver	0.004	U	P

BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR_INC. Control No.: 9079____ Code: HN_NSWC_ Batch: 2_____

Preparation Blank Matrix: WATER_____

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Preparation Blank	C	M
Silver	4.000	U	P

ANALYTICAL DATA PACKAGE
Metals Section

CLIENT: HALLIBURTON NUS
SITE: NSWC INDIAN HEAD
CODE-BATCH: HN NSWC - 3
CONTROL #: 9117
DATE: 03-MAR-94

March 3, 1994

Narrative
VLI Project 420.2.0 - Batch 3
VLI Control 9117

Client Information:
Halliburton NUS / NSWC Indian Head

Analytical Methodology:
U.S. EPA Test Methods for Evaluating Solid Waste (SW-846, 3rd. Edition), 6000 Series for ICP Analysis, for silver.

Sample Management:
Sixteen soil samples and one water sample were received by VLI on February 22, 1994.

Sample List:
A cross reference list of the laboratory sample numbers and the field sample numbers appears on the cover page of the report.

Quality Control:
There were no preparation or analysis problems associated with this batch. All method required quality assurance checks were within acceptable control limits. All analyses were performed within method required holding times.

For Additional Information:
For all questions, please refer to the VLI Control number at the top of this narrative.
For questions concerning sample scheduling, billing, or other program management issues, please contact Theresa Spalletta.
For questions concerning technical integrity of the data, please contact Linda Bock, Quality Assurance Officer.

Release Authority:
Release of this data package is approved by the Laboratory Director or her designee as indicated by the following signature:

Oksana Pozda
Senior Analyst, Metals Section

DEFINITION OF QUALIFIERS

Some of the following qualifiers may have been used in this data package.

Under the "M" method qualifier, column the following flags may have been used.

"P" for ICP
"A" for Flame AA
"F" for Furnace AA
"CV" for Manual Cold Vapor AA
"AS" for Semi-Automated Spectrophotometric
" " where no data has been entered
"NR" if the analyte is not required to be analyzed.

Under the "C" concentration qualifier, column the following flags may have been used.

"U" is used when the sample concentration beneath the instrument detection limit.

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : HALLIBURTON_NUS_____ Site : NSWC_INDIAN_____

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3____

SOW No.: SW-846, 3RD. EDITION

Field Sample No.	Lab Sample ID
_F-3_____	__16163_____
_SW0301_____	__16162_____
_SW0401_____	__16160_____
_SW0402_____	__16161_____
_SW0501_____	__16159_____
_TRO301_____	__16156_____
_TRO303_____	__16157_____
_TRO304_____	__16155_____
_TRO401_____	__16158_____
_TRO403_____	__16153_____
_TRO501_____	__16152_____
_TRO501SD_____	__16152SD_____
_TRO501S_____	__16152S_____
_TRO503_____	__16148_____
_TRO601_____	__16151_____
_TRO901_____	__16154_____
_TRO902_____	__16149_____
_TRO904_____	__16150_____
_TRO905_____	__16147_____
_____	_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:
_____DUE_TO_THE_LENGTH,_THE_FIELD_SAMPLE_NUMBERS_WERE_ABBREVIATED._THE_____
_____ENTIRE_FIELD_SAMPLE_NUMBERS_APPEAR_IN_THE_COMMENTS_SECTION_OF_THE_____
_____FORM_I'S._____
_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verifield by the following signature.

Signature: Oksana Ponder Name: OKSANA PONDA

Date: 3-3-94 Title: Senior analyst

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

F-3

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: WATER Lab Sample ID: 16163

% Solids: 0.0 Date Received: 02/22/94

Concentration Units: UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	4.0	U		P

Comments:

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SW0301

Client: HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3____

Matrix: SOIL_____ Lab Sample ID: 16162_____

% Solids: _81.4_ Date Received: 02/22/94

Concentration Units: MG/KG_____

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4_	Silver___	8.3	_		P_

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_SW03-01-24._____

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SW0401

Client: HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3_____

Matrix: SOIL_____ Lab Sample ID: 16160_____

% Solids: _70.1_ Date Received: 02/22/94

Concentration Units: MG/KG_____

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	1.3			P

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_SW04-01-01.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SW0402

Client: HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3____

Matrix: SOIL_____ Lab Sample ID: 16161_____

% Solids: _80.2_ Date Received: 02/22/94

Concentration Units: MG/KG_____

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4_	Silver___	17.6	_		P_

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_SW04-02-24._____

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SW0501

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16159

% Solids: _78.5_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	19.0			P

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_SW05-01-24.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.: TRO301

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL

Lab Sample ID: 16156

% Solids: _63.1_

Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	173			P

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO3-01-01.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO303

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16157

% Solids: _81.9_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	42.1			P

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO3-03-24.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.: TRO304

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16155

% Solids: _73.8_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	8.9			P

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO3-04-24.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO401

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16158

% Solids: _73.9_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	313			P

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO4-01-01.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO403

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16153

% Solids: _81.4_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	14.7			P

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO4-03-24.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO501

Client: HALLIBURTON_NUS__________ Site: NSWC_INDIAN______

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3_____

Matrix: SOIL______ Lab Sample ID: 16152_____

% Solids: _74.5_ Date Received: 02/22/94

Concentration Units: MG/KG_____

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4_	Silver___	37.9	_		P_

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO5-01-01.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO503

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16148

% Solids: _74.2_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	15.8			P

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO5-03-24.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO601

Client: HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3_____

Matrix: SOIL_____ Lab Sample ID: 16151_____

% Solids: _68.9_ Date Received: 02/22/94

Concentration Units: MG/KG_____

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4_	Silver___	108	_		P_

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO6-01-01._____

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO901

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16154

% Solids: _77.6_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	1.5			P

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO9-01-01.

1

FIELD SAMPLE NO.

INORGANIC ANALYSES DATA SHEET

TRO902

Client: HALLIBURTON_NUS__________ Site: NSWC_INDIAN______

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3_____

Matrix: SOIL______ Lab Sample ID: 16149_____

% Solids: _81.1_ Date Received: 02/22/94

Concentration Units: MG/KG_____

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4_	Silver___	2.7			P_

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO9-02-24.

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO904

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL Lab Sample ID: 16150

% Solids: _81.8_ Date Received: 02/22/94

Concentration Units: MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	44.7			P

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO9-04-24.

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TRO905

Client: HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

ıb Name: VERSAR Control No.: 9117_ Code: HN_NSWC_ Batch: 3_____

Matrix: SOIL_____ Lab Sample ID: 16147_____

% Solids: _79.3_ Date Received: 02/22/94

Concentration Units: MG/KG_____

CAS No.	Analyte	Concentration	C	Q	M
7440-22-4	Silver	3.0			P

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO9-05-24.

5A
SPIKE SAMPLE RECOVERY

FIELD SAMPLE NO.
TRO501S

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No. 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL % Solids for Sample: _74.5

Concentration Units: MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	262.1154		37.8658		268.46	83.5		P

Comments:
THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO5-01-01S.

5B

SPIKE DUPLICATE SAMPLE RECOVERY

FIELD SAMPLE NO.

TRO501SD

Client: HALLIBURTON_NUS Site: NSWC_INDIAN

Lab Name: VERSAR Control No. 9117_ Code: HN_NSWC_ Batch: 3

Matrix: SOIL % Solids for Sample: _74.5

Concentration Units: MG/KG

Analyte	Control Limit %R	Spiked Duplicate Sample Result (SDSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	270.1455		37.8658		265.80	87.4		P

Comments:

THE_ENTIRE_FIELD_SAMPLE_NUMBER_IS_TRO5-01-01SD.

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR Control No.: 9117_ Code:HN_NSWC_ Batch: 3___

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver	2000.0	1811.45	90.6						

FORM VII - IN

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR Control No.: 9117_ Code:HN_NSWC_ Batch: 3_____

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver	2000.0	1766.44	88.3						

FORM VII - IN

PREPARATION BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR_INC. Control No.: 9117____ Code: HN_NSWC_ Batch: 3_____

Preparation Blank Matrix: WATER_____

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Preparation Blank	C	M
Silver	4.000	U	P

PREPARATION BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_INDIAN_____

Lab Name: VERSAR_INC. Control No.: 9117____ Code: HN_NSWC_ Batch: 3_____

Preparation Blank Matrix: SOIL_____

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Preparation Blank	C	M
Silver	0.040	U	P

FORM III - IN

ANALYTICAL DATA PACKAGE
Metals Section

CLIENT: HALLIBURTON NUS
SITE: NSWC INDIAN HEAD
CODE-BATCH: HN NSWC - 4
CONTROL #: 9130
DATE: 09-MAR-94

March 9, 1994

Narrative
VLI Project 420.2.0 - Batch 4
VLI Control 9130

Client Information:
HALLIBURTON NUS / NSWC INDIAN HEAD

Analytical Methodology:
U.S. EPA Test Methods for Evaluating Solid Waste (SW-846, 3rd. Edition), 6000 Series for ICP Analysis, for silver.

Sample Management:
Twenty-two soil samples were received by VLI on February 25, 1994.

Sample List:
A cross reference list of the laboratory sample numbers and the field sample numbers appears on the cover page of the report.

Quality Control:
There were no preparation or analysis problems associated with this batch. All method required quality assurance checks were within acceptable control limits. All analyses were performed within method required holding times.

For Additional Information:
For all questions, please refer to the VLI Control number at the top of this narrative.
For questions concerning sample scheduling, billing, or other program management issues, please contact Theresa Spalletta.
For questions concerning technical integrity of the data, please contact Linda Bock, Quality Assurance Officer.

Release Authority:
Release of this data package is approved by the Laboratory Director or her designee as indicated by the following signature:

Oksana Pozda
Senior Analyst, Metals Section

DEFINITION OF QUALIFIERS

Some of the following qualifiers may have been used in this data package.

Under the "M" method qualifier, column the following flags may have been used.

"P" for ICP
"A" for Flame AA
"F" for Furnace AA
"CV" for Manual Cold Vapor AA
"AS" for Semi-Automated Spectrophotometric
" " where no data has been entered
"NR" if the analyte is not required to be analyzed.

Under the "C" concentration qualifier, column the following flags may have been used.

"U" is used when the sample concentration beneath the instrument detection limit.

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : HALLIBURTON_NUS_____ Site : NSWC_IND._HEAD___

Lab Name: VERSAR Control No.: 9130_ Code: NN_NSWC_ Batch: 4_____

SOW No.: SW846, 3RD. EDITION__

Field Sample No.	Lab Sample ID
_BU06-01-01____	__16295_____
_SW01-01-01____	__16294_____
_SW02-01-01____	__16293_____
_SW06-01-24____	__16290_____
_SW06-01-24SD__	__16290SD____
_SW06-01-24S___	__16290S_____
_SW07-01-24____	__16291_____
_SW08-01-01____	__16292_____
_TRO0-03-01____	__16276_____
_TRO1-07-18____	__16289_____
_TRO1-08-01____	__16286_____
_TRO1-09-18____	__16288_____
_TRO1-10-01____	__16287_____
_TRO2-07-01____	__16275_____
_TRO2-08-01____	__16274_____
_TRO2-08-01SD__	__16274SD____
_TRO2-08-01S___	__16274S_____
_TRO3-07-01____	__16279_____
_TRO3-08-18____	__16278_____
_TRO3-09-18____	__16280_____

re ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verifield by the following signature.

Signature: Oksana Pozda Name: OKSANA POZDA

Date: 3-9-94 Title: Senior analyst

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : HALLIBURTON_NUS_____ Site : NSWC_IND._HEAD___

Lab Name: VERSAR Control No.: 9130_ Code: NN_NSWC_ Batch: 4_____

SOW No.: SW846, 3RD. EDITION__

Field Sample No.	Lab Sample ID
_TRO3-10-01_____	__16277_____
_TRO4-06-01_____	__16283_____
_TRO4-08-01_____	__16282_____
_TRO4-07-18_____	__16281_____
_TRO5-07-01_____	__16285_____
_TRO5-08-18_____	__16284_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verifield by the following signature.

Signature: Oksana Pozda Name: OKSANA POZDA

Date: 3-9-94 Title: Senior analyst

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	16295	16294	16293	16290	16291	
Client ID	BU06-01-01	SW01-01-01	SW02-01-01	SW06-01-24	SW07-01-24	
Analyte						
Silver	11.8	8.0	18.9	35.9	U 0.48	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	16292	16276	16289	16286	16288	
Client ID	SW08-01-01	TRO0-03-01	TRO1-07-18	TRO1-08-01	TRO1-09-18	
Analyte						
Silver	7.3	98.7	U 0.51	29.7	U 0.49	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	16287	16275	16274	16279	16278	
Client ID	TRO1-10-01	TRO2-07-01	TRO2-08-01	TRO3-07-01	TRO3-08-18	
Analyte						
Silver	18.9	5.0	1.9	8.3	U 0.51	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	16280	16277	16283	16282	16281	
Client ID	TRO3-09-18	TRO3-10-01	TRO4-06-01	TRO4-08-01	TRO4-07-18	
Analyte						
Silver	5.0	96.2	51.6	77.0	10.4	

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC IND. HEAD
Matrix: SOIL
Concentration Units: MG/KG

Lab ID	16285	16284				
Client ID	TRO5-07-01	TRO5-08-18				
Analyte						
Silver	21.3	U 0.51				

5A
SPIKE SAMPLE RECOVERY

FIELD SAMPLE NO.
SW06-01-24S

Client: HALLIBURTON_NUS Site: NSWC_IND._HEAD

Lab Name: VERSAR Control No. 9130_ Code: NN_NSWC_ Batch: 4

Matrix: SOIL % Solids for Sample: _76.4

Concentration Units: MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	248.8599		35.9097		261.78	81.3		P

Comments:
THE_FIELD_SAMPLE_CONTAINED_WEEDS.

5B

SPIKE DUPLICATE SAMPLE RECOVERY

FIELD SAMPLE NO.

SW06-01-24SD

ient: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9130_ Code: NN_NSWC_ Batch: 4_____

Matrix: SOIL_____ % Solids for Sample: _76.4

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Duplicate Sample Result (SDSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	243.7121		35.9097		259.19	80.2		P

Comments:

THE_FIELD_SAMPLE_CONTAINED_WEEDS._____

5A
SPIKE SAMPLE RECOVERY

FIELD SAMPLE NO.
TRO2-08-01S

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9130_ Code: NN_NSWC_ Batch: 4_____

Matrix: SOIL_____ % Solids for Sample: _71.3

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	229.8493		1.8594		272.33	83.7		P

Comments:
THE_FIELD_SAMPLE_CONTAINED_WEEDS._____

5B

SPIKE DUPLICATE SAMPLE RECOVERY

FIELD SAMPLE NO.

TRO2-08-01SD

ient: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD____

Lab Name: VERSAR Control No. 9130_ Code: NN_NSWC_ Batch: 4_____

Matrix: SOIL_____ % Solids for Sample: _71.3

Concentration Units: MG/KG_____

Analyte	Control Limit %R	Spiked Duplicate Sample Result (SDSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver	75-125	236.5825		1.8594		275.00	85.4		P

Comments:

THE_FIELD_SAMPLE_CONTAINED_WEEDS._____

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9130_ Code:NN_NSWC_ Batch: 4_____

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver	2000.0	1719.72	86.0						

FORM VII - IN

ICP SERIAL DILUTION

FIELD SAMPLE NO.

TRO2-08-01L

.ient: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9130_ Code: NN_NSWC_ Batch: 4_____

Matrix : SOIL_____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Silver	13.39		20.00	U	100.0		P

FORM IX - IN

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR_INC. Control No.: 9130____ Code: NN_NSWC_ Batch: 4_____

Preparation Blank Matrix: SOIL_____

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Preparation Blank	C	M
Silver	0.040	U	P

BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD______

Lab Name: VERSAR_INC. Control No.: 9130____ Code: NN_NSWC_ Batch: 4______

Preparation Blank Matrix: SOIL______________

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Preparation Blank	C	M
Silver	0.040	U	P

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS_____ Site: NSWC_IND._HEAD_____

Lab Name: VERSAR Control No.: 9130_ Code:NN_NSWC_ Batch: 4___

Solid LCS Source: _____

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Silver___	_2000.0	_1727.63	_86.4_						

APPENDIX C

ANALYTICAL RESULTS FOR TOXIC CHARACTERISTIC LEACHING PROCEDURE (TCLP) FOR SILVER

ANALYTICAL DATA PACKAGE
Metals Section

CLIENT: HALLIBURTON NUS
SITE: NSWC INDIAN HEAD
CODE-BATCH: HN NSWC - 5
CONTROL #: 9209
DATE: 17-MAR-94

March 17, 1994

Narrative
VLI Project 420.2.0 - Batch 5
VLI Control 9209

Client Information:
HALLIBURTON NUS / NSWC INDIAN HEAD

Analytical Methodology:
The samples were extracted by the Federal Register, Toxicity Characteristic Leaching Procedure (TCLP) Volume 55, No. 261, June 1990, method 1311, appendix II. The leachates were then prepared and analyzed by the U.S. EPA Test Methods for Evaluating Solid Waste (SW-846, 3rd. Edition), 6000 Series for ICP Analysis, for silver.

Sample Management:
Four soil samples were received by VLI on March 14, 1994.

Sample List:
TR01-01-01, TR01-04-01, TR02-01-01, TR04-01-01.

Quality Control:
There were no preparation or analysis problems associated with this batch. All method required quality assurance checks were within acceptable control limits. All analyses were performed within method required holding times.

For Additional Information:
For all questions, please refer to the VLI Control number at the top of this narrative.
For questions concerning sample scheduling, billing, or other program management issues, please contact Theresa Spalletta.
For questions concerning technical integrity of the data, please contact Linda Bock, Quality Assurance Officer.

Release Authority:
Release of this data package is approved by the Laboratory Director or her designee as indicated by the following signature:

Oksana Pozda

Oksana Pozda
Senior Analyst, Metals Section

DEFINITION OF QUALIFIERS

Some of the following qualifiers may have been used in this data package.

Under the "M" method qualifier, column the following flags may have been used.

"P" for ICP
"A" for Flame AA
"F" for Furnace AA
"CV" for Manual Cold Vapor AA
"AS" for Semi-Automated Spectrophotometric
" " where no data has been entered
"NR" if the analyte is not required to be analyzed.

Under the "C" concentration qualifier, column the following flags may have been used.

"U" is used when the sample concentration beneath the instrument detection limit.

METALS RESULTS

Client: HALLIBURTON NUS
Site: NSWC INDIAN HEAD
Matrix: LEACHATE
Concentration Units: UG/L

Lab ID	PB1T	17010	17011	17012	17013	
Client ID	PB1T	TR01-01-01	TR01-04-01	TR02-01-01	TR04-01-01	
Analyte						
Silver	U 4.0	U 40.0	102	U 40.0	47.7	

LABORATORY CONTROL SAMPLE

Client: HALLIBURTON_NUS__________ Site: NSWC_INDIAN_HEAD____________

Lab Name: VERSAR Control No.: 9209_ Code:HN_NSWC_ Batch: 5_____

Solid LCS Source: ____________

Aqueous LCS Source: INORG._VENT.

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	C	Limits		%R
Silver	100.0	95.25	95.2						

FORM VII - IN

PREPARATION BLANKS

Client : HALLIBURTON_NUS_____ Site: NSWC_INDIAN_HEAD____

Lab Name: VERSAR_INC. Control No.: 9209____ Code: HN_NSWC_ Batch: 5_____

Preparation Blank Matrix: LEACHATE_____

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Preparation Blank	C	M
Silver	4.000	U	P