FINAL

Interim Measures Report
SWMU - 25/07D
Highway 58 Dump Site A

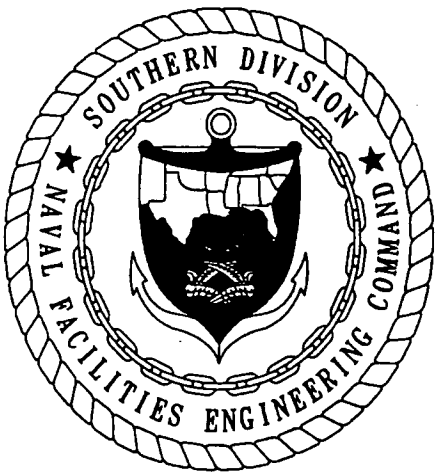
Volume 1

NSWC Crane
Crane, Indiana

Unit Identification Code: N00164
Contract No. N62467-93-D-1106

November, 1999

Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina
29419-9010



FINAL

Interim Measures Report
SWMU - 25/07D
Highway 58 Dump Site A

Volume 1

NSWC Crane
Crane, Indiana

Unit Identification Code: N00164
Contract No. N62467-93-D-1106

November, 1999

Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina
29419-9010

FINAL

INTERIM MEASURES REPORT
SWMU - 25/07D
Highway 58 Dump Site A

NSWC CRANE
CRANE, INDIANA

Volume 1

November, 1999

CONTRACT N62467-93-D-1106
DELIVERY ORDER #0009
STATEMENT OF WORK #007

Prepared for

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29419-9010

Prepared by:

MORRISON KNUDSEN CORPORATION
2420 Mall Drive
Corporate Square 1 - Suite 211
North Charleston, South Carolina 29406

PREPARED/APPROVED BY:

Valarie Ann Mariola
MK Project Engineer

11/19/99
Date

APPROVALS:

Alan Fosdick
MK Program Manager

11/23/99
Date

EXECUTIVE SUMMARY

This Interim Measures Report has been prepared by Morrison Knudsen (MK) for the Naval Facilities Engineering Command (NAVFACENGCOM), Southern Division pursuant to the scope of work defined in Delivery Order #0009, under Contract #N62467-93-D-1106. All remediation actions and interim measures taken at the Solid Waste Management Unit (SWMU) 25/07D, located at Highway 58 Dump Site A, Naval Surface Warfare Center, Crane, Indiana (NSWC Crane), were performed in response to the RCRA Part B Permit for NSWC Crane.

The objectives at SWMU 25/07D, Highway 58 Dump Site A, were to remove debris and incidental soil excavated with the debris. Disposal was to be either on-site or off-site depending on contaminant concentration. Soils were to be left in place and characterized for any future remediation requirements. Any excavated areas would be backfilled to original grade and restored with vegetation.

SWMU 25/07D, Dump Site A had two dump areas. The larger area was approximately 39 feet by 150 feet, and the second area was approximately 25 feet by 10 feet. Photographs taken during various working stages of the site are contained in Appendix A. This site was found to be contaminated with pieces of varying sizes of Transite (asbestos-containing material). The material was determined to be non-friable in its current state. No other contaminants were found above the TCLP limits. The primary area of removal was approximately 2000 square feet and the debris extended to depths of approximately two feet.

A small excavator and skid steer loader were used to remove the large debris and ammunition shells. Random debris was hand picked throughout the work area, where possible, with minimal disturbance to the hillside. During debris clean-up, workers scanned the completed areas with metal detectors to confirm the removal of metallic debris. All the debris collected was non-hazardous and was removed from the site by truck.

Following the completion of debris removal, confirmation sampling was performed. Eleven samples 25/07D-006 through 25/07D-016 were collected and analyzed by a laboratory for 40 CFR 264, Appendix IX criteria in accordance with the Sampling and Analysis Plan (SAP). The confirmation sample results were reviewed and accepted, and the site was restored with backfill and native ground cover.

SWMU 25/07D Acceptance and Turnover statement is dated July 12, 1996, and reflects the final inspection of SWMU 25/07D by Naval Surface Warfare Center (NSWC) personnel. The work performed at SWMU 25/07D has been accepted by the Navy.

The Interim Measure project at SWMU #25/07D was terminated. The confirmatory samples showed no contamination levels above the cleanup objectives, and all visible signs of transite and "strange" debris has been removed. Additional debris discovered during this interim measure was left in place since it may have been used as backfill to support the road (Highway 58). It is recommended that SWMU #25/07D revert back to the RFI process beginning with soil borings under the road to determine the need for further remediation.

TABLE OF CONTENTS

VOLUME 1

SECTION			PAGE
EXECUTIVE SUMMARY			I
ACRONYMS AND ABBREVIATIONS			iv
1.0	INTRODUCTION		1-1
2.0	SITE BACKGROUND		2-1
	2.1	SITE DESCRIPTION	2-1
	2.2	ENVIRONMENTAL SETTING	2-1
3.0	WORK EXECUTION		3-1
	3.1	SITE CHARACTERIZATION	3-1
	3.2	EXCAVATION AND REMOVAL OF DEBRIS	3-1
	3.3	RECONSTRUCTION AND RESTORATION	3-1
	3.4	WASTE DISPOSAL	3-2
4.0	SAMPLING AND ANALYSIS		4-1
	4.1	SAMPLING PROCEDURES	4-1
	4.2	SAMPLE COLLECTION	4-1
		4.2.1 Characterization	4-1
		4.2.2 Confirmation	4-1
	4.3	SAMPLE ANALYSES	4-1
	4.4	DATA QUALITY CONTROL	4-2
		4.4.1 Field Quality Control	4-2
		4.4.2 Laboratory Quality Control	4-2
5.0	SUMMARY AND CONCLUSIONS		5-1
6.0	REFERENCES		6-1

LIST OF FIGURES

FIGURE		PAGE
2-1	NSWC CRANE VICINITY MAP	2-2
2-2	LOCATION OF SOLID WASTE MANAGEMENT UNITS	2-3
4-1	SAMPLE LOCATIONS	4-5

LIST OF TABLES

TABLE		PAGE
3-1	SAMPLE COLLECTION SUMMARY	3-3
3-2	CHARACTERIZATION SAMPLE ANALYTICAL RESULTS SUMMARY	3-4
3-3	CONFIRMATION SAMPLE ANALYTICAL RESULTS SUMMARY	3-5
3-4	BACKGROUND AND BORROW PIT ANALYTICAL RESULTS	3-7
4-1	ANALYTE REPORTING LIMITS EXCEEDING IM CLEANUP LEVELS	4-6

LIST OF APPENDICES

APPENDIX		PAGE
A	PHOTOGRAPHS	A-1
B	CORRESPONDENCE	B-1
C	APPROVALS, PERMITS, AND REGULATORY INFORMATION	C-1

VOLUME 2

APPENDIX

D	ANALYTICAL RESULTS	D-1
E	QC DATA	E-1
F	WASTE MANIFESTS	F-1

ACRONYMS AND ABBREVIATIONS

AENI	American Environmental Network, Inc
CAAA	Crane Army Ammunition Activity
CEC	CompuChem Environmental Corporation
CFR	Code of Federal Regulations
DRMO	Defense Reutilization and Marketing Office
HSWA	Hazardous and Solid Waste Amendments
IDEM	Indiana Department of Environmental Management
IM	Interim Measure
IMR	Interim Measures Report
MK	Morrison Knudsen Corporation
MS	Matrix Spike
MS/MD	Matrix Spike/Matrix Duplicate
NAVFACENGCOM	Naval Facilities Engineering Command
NSWC	Naval Surface Warfare Center
QAPP	Quality Assurance Project Plan
QCP	Quality Control Plan
RFI	RCRA Facilities Investigation
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SWMU	Solid Waste Management Unit
USEPA	United States Environmental Protection Agency

1.0
INTRODUCTION

Morrison Knudsen Corporation (MK) was contracted by the Southern Division (SOUTHDIV), Naval Facilities Engineering Command (NAVFACENGCOM), under Contract #N62467-93-D-1106, Delivery Order #0009, Statement of Work #007 to remediate Solid Waste Management Units (SWMUs) at Naval Surface Warfare Center (NSWC) Crane, Crane, Indiana. This Interim Measures Report (IMR) summarizes the construction and environmental tasks associated with the sampling, excavation, and disposal of materials from SWMU 25/07D, Highway 58 Dump Site A, during a voluntary interim measure conducted in 1995 and 1996.

Promulgation of the United States Environmental Protection Agency's (USEPA's) regulatory program under the Resource Conservation and Recovery Act (RCRA) provided the impetus to identify and control environmental contamination from past practices at NSWC Crane. On December 23, 1989, the USEPA issued the Federal portion of the final RCRA Part B permit for NSWC Crane to the US Navy; the permit renewal, for a period of five years, was issued on July 31, 1995. This permit also contains the State permit conditions, which were issued separately by the State of Indiana RCRA program. The permit establishes the Hazardous and Solid Waste Amendment (HSWA) corrective action requirements and compliance schedules which obligate the US Navy to perform RCRA Facility Investigations (RFIs) at 30 SWMUs, to conduct Corrective Measures Studies, and to implement corrective measures if needed. Voluntary interim measures were performed at SWMU 25/07D (Highway 58 Dump Site A) as part of the RCRA Part B Permit for NSWC Crane.

MK provided project management, construction management, scientific and environmental, health and safety oversight, and quality control staff. MK's primary subcontractor, US Tech, provided debris removal and disposal, and backfilling/restoration services. American Environmental Network, Inc. (AENI) and CompuChem Environmental Corporation (CEC) provided analytical services under contract to MK.

MK prepared the following project documents which describe the procedures to be used in execution of the voluntary interim measure (IM) at SWMU 25/07D:

- *Work Plan for Interim Measures Cleanup at Solid Waste Management Units #23/00, #25/07D, and #26/08D,* Revision B, as amended, dated August 25, 1995, (MK, 1995a)
- *Task-Specific Site Safety and Health Plan, Supplement to Work Plan for Solid Waste Management Units #23/00/ #25/07D, and #26/08D,* Revision B, dated August 25, 1995, (MK, 1995b)
- *General Project Plans for Interim Measures Cleanup, Revision C*, August 18, 1995, consisting of the following plans:
    - *Quality Control Plan*, Rev. C, August 18, 1995, (MK, 1995c)
    - *Quality Assurance Project Plan*, Rev. C, December 29, 1995, (MK, 1995d)
    - *Waste Management Plan*, Rev. C, August 18, 1995, (MK, 1995e)
    - *Sampling and Analysis Plan*, Rev. C, August 18, 1995, (MK, 1995f)
    - *Environmental Protection Plan*, Rev. C, August 18, 1995, (MK, 1995g)

MK received approval of the Work Plan for SWMUs #23/00, #25/07D, and #26/08D on September 27, 1995.

The target cleanup levels for this IM were taken from "*RCRA Corrective Action Guidance Human Data Quality Levels for RFI Projects,*" June 18, 1994, (USEPA, 1994), as site-specific risk-based cleanup levels had not been developed for NSWC Crane. The target cleanup levels are presented in Volume 2, Appendix D.

2.0
SITE BACKGROUND

2.1 SITE DESCRIPTION

NSWC Crane consists of 62,463 acres located approximately 75 miles south of Indianapolis, Indiana, as shown in Figure 2-1. The facility provides support for equipment, shipboard weapons systems, and ordnance. In addition, NSWC Crane supports the Crane Army Ammunition Activity (CAAA), including production and renovation of conventional ammunition, as well as storage, shipment, demilitarization, and disposal of conventional ammunition.

The Highway 58 Dump Site A is located west of the NSWC Crane Salvage Yard, across the road from Building 2167 as shown in Figure 2-2. The dump site is along a hillside with an intermittent stream located at the base of the hill. Access to the site is from above, via Highway 58 (H-58), or a trail below, as shown in photographs 1a and 1b provided in Appendix A of this report. There are two dump areas: the larger area is approximately 39 feet by 150 feet, and the smaller area to the southeast is about 25 feet by 10 feet. The disposal areas are heavily wooded with underbrush and a thick layer of leaves covering the ground. Visual inspection revealed that the smaller area contained primarily transite tiles of non-friable asbestos.

2.2 ENVIRONMENTAL SETTING

The topography of NSWC Crane consists of flat to gently rolling terrain dissected by numerous well-defined drainage ways. Surface elevation ranges from approximately 470 feet at the drainage exiting the southern boundary of Crane to 860 feet on a ridge in the west-central portion of the facility. Ridge crests generally lie at elevations of 750 to 800 feet (NEESA 1983).

Natural surface drainage at NSWC Crane is dendritic and defines four drainage basins. Dump Site A is located in Basin IV which occupies the central portion of the facility. Surface drainage in the immediate area of Dump Site A empties into Turkey Creek. All surface drainage from the NSWC empties into the East Fork of the White River south of the installation (NEESA 1983).

NSWC Crane is underlain by unconsolidated deposits of Quaternary (Pleistocene) age and residual soil derived from Pennsylvanian and Mississippian bedrock. The unconsolidated deposits are limited to the small floodplains and are composed of alluvial, colluvial, and paludal (marshland) silt, sand, and gravel; lacustrine clay, silt, and sand; and outwash plain gravel, sand, and silt. The remainder of NSWC Crane surficial deposits consist of residual clays and silt from the Pennsylvanian Raccoon Creek Group and Mississippian Stephensport and West Baden Groups with small areas of Quaternary clay, silt, and sand (Lacustrine deposits). The bedrock units beneath the facility, primarily Raccoon Creek and Stephensport Groups containing predominately sandstone and shale, reportedly dip gently from the Cincinnati Arch to the Illinois Basin in the southwest (NEESA 1983).

From boring logs collected from the facility, the major soil type is a 2- to 3-inch-thick surface layer of brown to tan organic clay loam underlain by clay intermixed with silts and sand. Occasionally, a clay hardpan occurs between 25 and 32 inches below the surface (NEESA 1983).

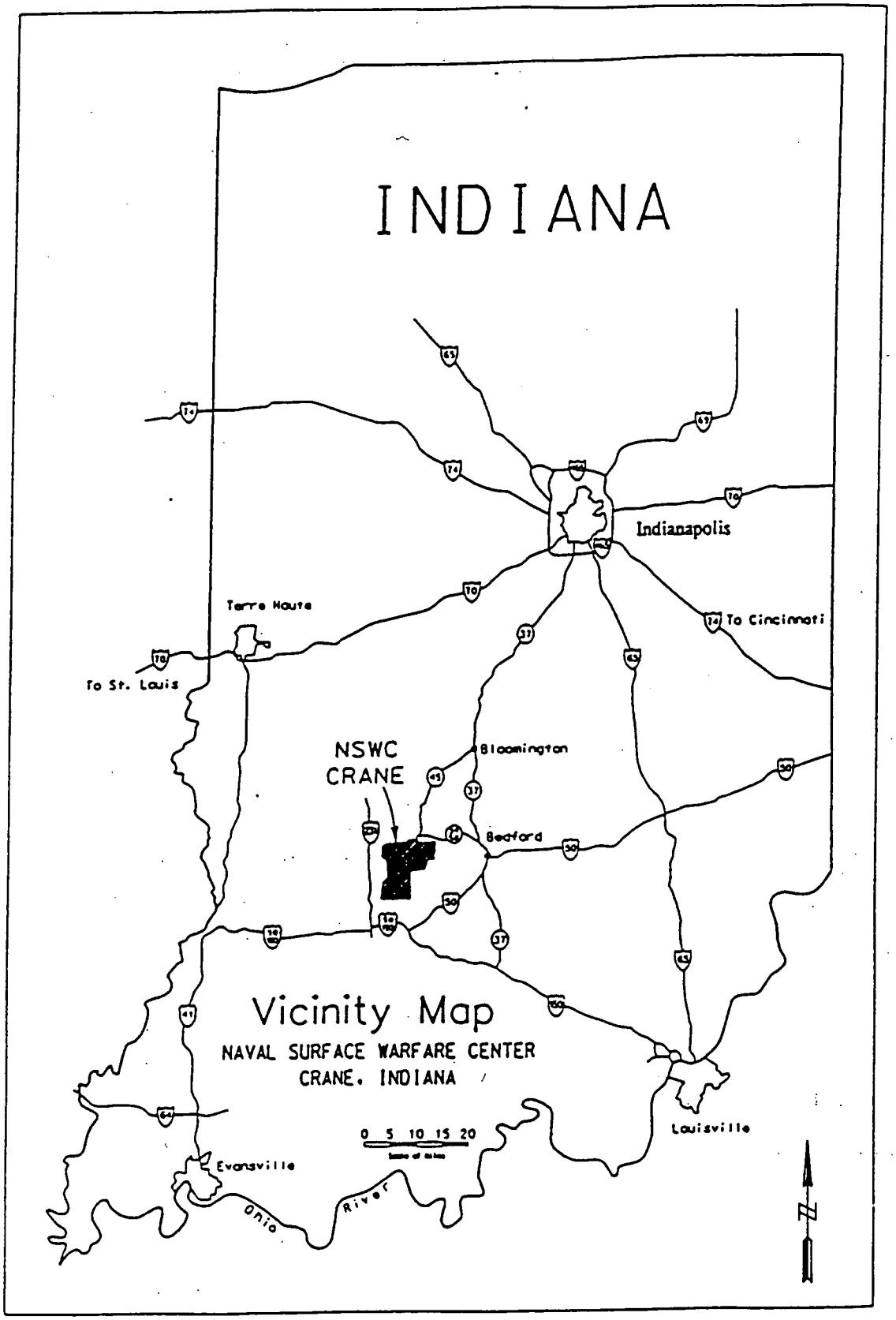


FIGURE 2-1
NSWC CRANE VICINITY MAP

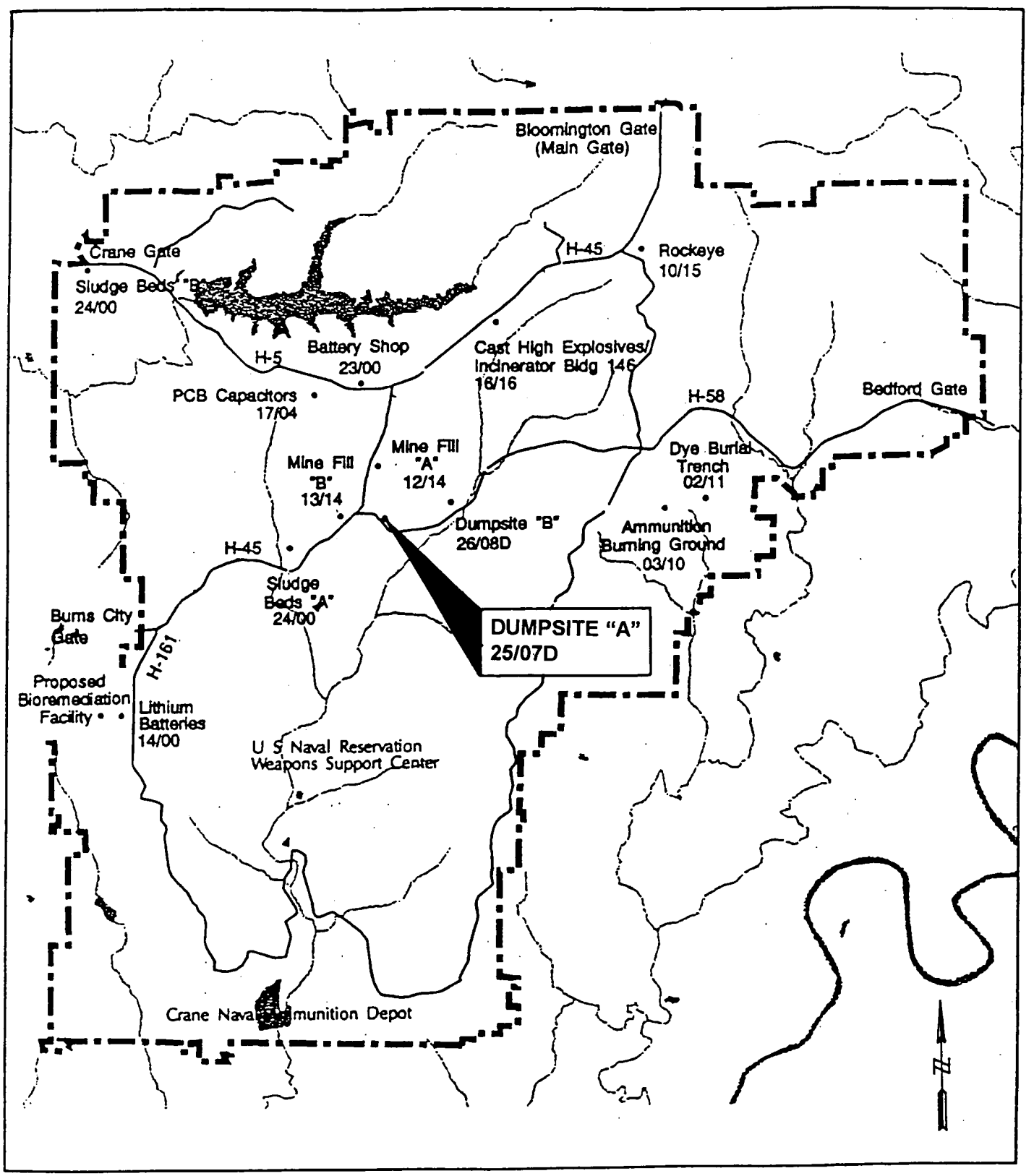


FIGURE 2-2
LOCATION OF SOLID WASTE MANAGEMENT UNIT 25/07D

FIGURE 2-2
LOCATION OF SOLID WASTE MANAGEMENT UNIT 25/07D

3.0 WORK EXECUTION

3.1 SITE CHARACTERIZATION

Visual inspection of Highway 58 Dump Site A indicated scattered debris consisting of transite siding and pipe, various sizes of concrete pipe and block, metal cans, caps, drums, blocks of roofing tar, chunks of cast concrete, metal pipe, cast metal drains, and electrical porcelain insulators. There were no detectable smells or organic vapor indications noted in the area during the initial walk downs. Inert (concrete-filled) hardware, such as 12.75 inch warheads (Hedgehog), had been used as filler to prevent land erosion. A memo dated June 5, 1995, in Appendix B, shows a sketch of the configuration of disposed ordnance buried at the site. Photographs 2a through 5b in Appendix A show the debris and heavy foliage at the dump site.

Two random soil characterization samples were initially collected for Dump Site A on July 18, 1995, (25/07D-001 and 002). The samples were analyzed for 40 CFR 264, Appendix IX analytes. Results indicate arsenic, beryllium, and cobalt above the target cleanup levels. Table 3-1 identifies the analysis requested for each sample. A summary of detected analytes is presented in Table 3-2.

As debris removal began, it became apparent that the affected depth and horizontal area was greater than originally projected. Transite tile and other debris were intermingled with the natural vegetation, soil, and humic material. Five additional characterization samples were collected on November 16 and 17, 1995, (25/07D-003 thru 007). The samples were analyzed for Appendix IX analytes and ignitability, corrosivity, and reactivity. Samples 25/07D-006 and 007 were also analyzed for TCLP metals and semi-volatile organics. These sample results indicated arsenic, beryllium, and cobalt were detected at concentrations above the cleanup levels for most samples, and the additional metals of copper, lead, and zinc above cleanup levels in one sample (25/07D-006). The established cleanup levels are shown in Table 5 of the SAP which is provided in Volume 2, Appendix D of this report. Levels of arsenic ranging from 2,600 to 201,000 ppb were detected in all of the samples collected. Beryllium and cobalt were also detected in levels as high as 820 ppb and 17,500 ppb, respectively. Previous background and backfill material sample results also indicate high levels of various metals which are shown in Table 3-4. Complete analytical results are included in Volume 2, Appendix D.

3.2 EXCAVATION AND REMOVAL OF DEBRIS

A small excavator and skid steer loader was used to remove the large debris and ammunition shells. Photograph 10 in Appendix A shows the excavator and triaxle dump truck. Random smaller debris was hand-picked wherever possible, with minimal disturbance to the hillside. During debris clean-up, workers scanned the completed areas with metal detectors to confirm the removal of metallic cans, drums, and debris. Metal debris as deep as two feet below ground surface was detected and removed. All the excavated debris mixed with transite material and incidental soil was removed and disposed as special waste at an approved landfill.

Following the completion of debris removal, confirmation sampling was performed. Eleven soil samples were collected and analyzed by CEC laboratory for 40 CFR 264, Appendix IX analytes in accordance with the SAP. Sampling and analytical results are discussed in Section 4.0 of this report.

3.3 RECONSTRUCTION AND RESTORATION

Following review of analysis on confirmation samples 25/07D-006 through 25/07D-016, the excavated area was backfilled with topsoil material from the Bioremediation Facility construction site located next to the NSWC Crane onsite landfill (see Figure 2-2). Samples NSWC-BIOF-001 through 014 were analyzed for RCRA metals. The results, shown in Table 3-4, indicate that the topsoil was acceptable for use at Dump Site A. The backfill, including topsoil, was placed and compacted in one foot increments or less until the site was restored to near original grade. The area was seeded, mulched, and subsequently monitored to ensure establishment of adequate ground cover to prevent erosion. Adequate ground cover has been re-established, and the work was accepted by the US Navy on July 12, 1996. A copy of the SWMU Acceptance and Turnover Statement is included with the regulatory documents in Appendix C.

3.4 WASTE DISPOSAL

The debris and incidental soils, including asbestos-containing material, removed from Dump Site A (SWMU 25/07D) were classified as non hazardous "special" wastes and were transported by truck to the Southside Landfill in Indianapolis, Indiana. Fourteen loads totaling approximately 240 tons were taken to the landfill. A copy of the Asbestos Waste Shipment/Disposal Records dated February 2, February 5, and March 11, 1995, are provided in Volume 2, Appendix F.

Table 3-1
Sample Collection Summary

Sample No.	Medium	Sample Type	Date Sampled	Analysis	Location
25/07D-001	SOIL	WASTE CHARACTERIZATION	07/18/95	APPENDIX IX	Fig 4-1
25/07D-002	SOIL	WASTE CHARACTERIZATION	07/18/95	APPENDIX IX	Fig 4-1
25/07D-003	SOIL	WASTE CHARACTERIZATION	11/16/95	APPENDIX IX / ASBESTOS / RCRA	Fig 4-1
25/07D-004	SOIL	WASTE CHARACTERIZATION	11/16/95	APPENDIX IX / ASBESTOS / RCRA	Fig 4-1
25/07D-005	SOIL	WASTE CHARACTERIZATION	11/16/95	APPENDIX IX / ASBESTOS / RCRA	Fig 4-1
25/07D-006	SOIL	WASTE CHARACTERIZATION	11/17/95	APPENDIX IX / RCRA	Fig 4-1
25/07D-007	SOIL	WASTE CHARACTERIZATION	11/17/95	APPENDIX IX / RCRA	Fig 4-1
25/07D-006	SOIL	WASTE CHARACTERIZATION	11/17/95	TCLP	Fig 4-1
25/07D-007	SOIL	WASTE CHARACTERIZATION	11/17/95	TCLP	Fig 4-1
25/07D-006	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-007	SOIL	CONFIRMATION D	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-008	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-009	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-010	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-011	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-012	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-013	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-014	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-015	SOIL	CONFIRMATION	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-016	SOIL	CONFIRMATION D	03/12/96	APPENDIX IX / 9002	Fig 4-1
25/07D-T20	LIQUID	TRIP BLANK	03/12/96	8240	N/A
25/07D-T21	LIQUID	TRIP BLANK	03/12/96	8240	N/A
25/07D-T22	LIQUID	TRIP BLANK	03/12/96	8240	N/A
25/07D-T23	LIQUID	TRIP BLANK	03/12/96	8240	N/A
25/07D-T24	LIQUID	TRIP BLANK	03/12/96	8240	N/A

Note: A 'D' next to the Sample Type indicates a duplicate.

TABLE 3-2
Characterization Sample Analytical Results Summary

Compound	Interim Measure Cleanup Level ug/kg	Sample ID Sample Date Medium	25/07D-001 7/18/95 SOIL		25/07D-001RE 7/18/95 SOIL		25/07D-002 7/18/95 SOIL		25/07D-002RE 7/18/95 SOIL		25/07D-003 11/16/95 SOIL		25/07D-004 11/16/95 SOIL		25/07D-005 11/16/95 SOIL		25/07D-006 11/17/95 SOIL		25/07D-007 11/17/95 SOIL	
Methylene Chloride	22000		38		39	B	25	B			28		15		22				53	
Acetone	230000		110	JB	84	JB					12	J								
Tetrachloroethene	22000		19		16						34						11000		45	
Hexachlorobenzene	530		200	J																
Phenanthrene	660		55	J							110	J								
Fluoranthene	1600000		130	J					65	J										
Pyrene	1200000		130	J					60	J										
Benzo[a]anthracene	660		140	J					61	J										
Chrysene	800		210	J					76	J										
Benzo[b]fluoranthene	660		220	J																
Benzo[k]fluoranthene	660		190	J																
Benzo[a]pyrene	660		200	J																
Indeno[1,2,3-cd]pyrene	1200		190	J																
Dibenz[a,h]anthracene	120		100	J																
Benzo[g,h,i]perylene	660		220	J																
Endosulfan I	2000																4.3	P		
Arsenic	970		**11300**				**13100**				**12200**	N	**9600**	N	**7000**	N	**120000**	N	**201000**	N
Antimony	31000																**32000**	N	**101000**	N
Barium	5500000		87700				61900				64300		64600		111000		100000			
Beryllium	400		**800**				**790**				**750**		**820**		**480**	B				
Cadmium	39000		1800	N							1300		580				11700		1400	
Chromium	940000		25300	EN			27600	EN			22100	N*	19500	N*	19200	N*	23300	N*	14400	N*
Cobalt	100		**15600**				**8100**				**12700**		**7400**		**6100**	B	**2500**		**4800**	
Copper	2900000		92100				17100				110000	N*	26500	N*	20200	N*	**3810000**	N*	1190000	N*
Lead	500000		22400				24400				19500	EN*	16500	EN*	41300	EN*	**728000**	EN*	119000	EN*
Mercury	23000														190				250	
Nickel	1600000		45300				21100				34600	N	13700	N	12600	N	211000	N	55400	N
Vanadium	550000		36100				32500				26900	N*	27700	N*	24600	N*				
Zinc	23000000		1360000	E			78900	E			16100000	N	1990000	N	70500	N	**102000000**	N	7810000	N
1,2,3,4,6,7,8,9-OCDD			1.33				1.69													
1,2,3,4,6,7,8-HpCDF			0.251																	
TCLP RESULTS																				
Hexachloroethane	*3000 ug/l*																*140 ug/l*	*D*	*29 ug/l*	*JD*
Barium	*100000 ug/l*																		*1800 ug/l*	
Cadmium	*1000 ug/l*																*79.2 ug/l*		*61.5 ug/l*	
Lead	*5000 ug/l*																*347 ug/l*		*117 ug/l*	

Notes:
1. Outlined results in **BOLD** indicate a sample level above the Interim Measures Cleanup Level.
2. Flagcode explanations:
   - J: Estimated below reporting limit
   - B: (for Organic Analytes): Analyte also found in corresponding Blank sample(s)
   - *B: (for metals): Indicates a concentration below reporting limit.*
   - P: Value from quantitation and confirmation columns differed by more than 25%. Data flagged and lower of two values reported.
   - N: Spike recoveries outside of QC limits
   - *: For Metals, Replicate precision results outside of QC limits
   - E: Exceeded range of calibration curve
   - D: Value from dilution run
3. All sample results not shown in this table are non-detects.
4. *Samples 25/07D-006 and 25/07D-007 were re-analyzed for TCLP metals and semi-volatile analyses. Results are shown in last four rows of table. Criteria for these analytes are toxicity level criteria for TCLP.*
5. Soil sample results are reported in ug/kg.

TABLE 3-3
Confirmation Sample Analytical Results Summary

Compound	Interim Measures Cleanup Level ug/kg	Sample ID Sample Date Medium	25/07D-006 3/12/96 SOIL	25/07D-007 3/12/96 SOIL	25/07D-008 3/12/96 SOIL	25/07D-009 3/12/96 SOIL	25/07D-010 3/12/96 SOIL	25/07D-011 3/12/96 SOIL	25/07D-012 3/12/96 SOIL	25/07D-013 3/12/96 SOIL	25/07D-014 3/12/96 SOIL	25/07D-015 3/12/96 SOIL	25/07D-016 3/12/96 SOIL
Methylene Chloride	22000		8 JB	6 JB	6 JB	9 JB	11 JB	7 JB	14 B	12 B	7 JB	6 JB	8 JB
Acetone	230000		14 B	7 JB	6 JB	12 B	10 JB	11 JB		10 JB	12 B	13 B	14 B
Tetrachloroethene	22000				2 J		29	26	3 J				
Acenaphthylene	660									160 J			
Hexachloroethane	39000						8800 E	68 J					
Hexachlorobenzene	530						95 J						
Phenanthrene	660					46 J				260 J			
Anthracene	1900									120 J			
Benzo[a]anthracene	660				75 J	120 J	45 J			**1900**			
Chrysene	800				86 J	120 J	52 J			**2100**			
Benzo[b]fluoranthene	660				220 XJ	330 XJ	160 JX	92 XJ	78 XJ	**3700** X			
Benzo[k]fluoranthene	660				200 XJ	300 XJ	140 JX	84 XJ	82 XJ	**3900** X			
Fluoranthene	1600000				65 J	130 J				1700			
Pyrene	1200000				70 J	130 J				1900			
Indeno[1,2,3-cd]pyrene	1200				93 J	140 J	85 J			**1800**			
Dibenz[a,h]anthracene	120									**460**			
Benzo[g,h,i]perylene	660				150 J	190 J	100 J			**2000**			
Aldrin	50				0.25 JP	0.38 JP	0.28 JP	0.068 JP				0.26 JP	0.45 JP
beta-BHC	4.02				0.68 JP				0.22 JP				1.1 JP
delta-BHC	6.03		0.15 JP		0.061 JP	0.16 JP	0.14 J	0.13 JP	0.16 JP	0.097 JP	0.14 JP	0.22 J	0.14 JP
Dieldrin	53			3.9 JP	0.12 JP	0.23 JP	0.49 JP		0.098 JP	0.36 JP	0.43 JP	0.1 JP	0.13 JP
Endosulfan I	2000				1.2 JP	3.6 P	2.2 P	0.77 JP	1.3 JP	3.1 P		1.0 JP	2.4
Endosulfan II	2000				0.15 JP	0.71 JP		0.52 JP	0.39 JP	0.97 JP	0.15 JP	1.4 J	0.18 JP
Endosulfan Sulfate	44.2				0.66 JBP	0.64 JB	0.45 JBP	0.29 JBP		1.1 JBP		0.53 JBP	0.13 JBP
Endrin	12000				3.6 P	0.33 JP	0.36 JP	1.5 JP	0.37 J	0.57 JP	0.26 J	0.29 JP	0.44 JP
Endrin Aldehyde	15.4				2.0 P	2.3 P	0.36 JP	0.4 JP		2.6 P	0.95 JP	0.15 JP	0.35 JP
gamma-BHC (Lindane)	2.68				0.32 JP		0.1 JP		0.071 JP		0.082 JP	0.10 JP	0.21 JP
Heptachlor	190		0.11 JP		0.33 JP	0.69 JP	0.19 JP	0.096 JP	0.068 JP	0.15 JP	0.077 JP	0.087 JP	0.25 JP
Heptachlor Epoxide	94						0.20 JP	0.097 JP	0.15 JP	0.45 JP	0.22 JP	0.28 J	0.19 JP
Methoxychlor	200000		0.35 JP		4.5	5.0 P	2.0 JP	1.8 JP	0.43 JP	0.80 JP		0.32 JP	
4,4'-DDD	3500				0.27 J	0.54 JP	0.48 JP			1.2 JP	0.41 JP	0.64 JP	0.25 JP
4,4'-DDE	2500		0.16 JP		0.13 JP	0.12 JP	0.19 J	0.54 JP	0.23 JP	0.29 J	0.26 JP		0.078 JP
4,4'-DDT	8				0.68 JP	1.4 J	0.47 JP		0.55 JP	0.94 JP	0.16 JP	1.1 JP	0.98 JP
2,4,5-TP (Silvex)	110		2.7 JBP	2.8 JBP	1.8 JBP	0.69 JBP	10 JBP	2.4 JBP	2.4 JBP	4.7 JBP			1.6 JBP
2,4,5-T	390000		1.8 JBP				2.6 JBP		3.0 JBP	1.2 JBP	0.43 JBP	2.9 JBP	1.3 JBP
Antimony	31000		900 N*B	290 N*B		400 N*B			730 N*B	420 N*B	690 N*B		230
Arsenic	970		**22500**	**13800**	**2600**	**4800**	**8500**	**3100**	**8000**	**6900**	**4200**	**6000**	**6400**
Barium	5500000		41500	36800	24200	35400	71500	30300	36700	53100	37600	34700	64500
Beryllium	400		**580** B	**420** B	290 B	370 B	290 B	280 B	330 B	**480** B	**450** B	380 B	**410** B
Cadmium	39000					330 N	1200 N		170 N				
Chromium	940000		21000 N*	10600 N*	8400 N*	6700 N*	9800 N*	6900 N*	8800 N*	12700 N*	10000 N*	7100 N*	7100 N*
Cobalt	100		**7000**	**4100** B	**3300** B	**5200** B	**4400** B	**6400**	**5900** B	**8100**	**5300** B	**17500**	**10300**
Copper	2900000		12400	10900	8200	18500	117000	11800	70800	25500	92400	8400	9900
Lead	500000		16000 *	11600 *	6600 *	10500 *	35100 *	63900 *	38800 *	22000 *	62800 *	12000 *	15800 *
Nickel	1600000		5900	4300 B	7100	10800	14000	10600	11300	12000	11500	12500	8000
Selenium	390000		860 N	570 N*B	290 N*B		650 N		610 N	360 N*B	370 N*B		1100 N
Tin	47000000			510 N*B	760 N*B	890 N*B	2200 N*B	4200 N*B	2100 N*B	1200 N*B	1600 N*B	820 N*B	720 N*B
Vanadium	550000		20400	15000	6200	8400	9500	5100 B	8400	19100	10500	8700	9300
Zinc	23000800		510000	410000	45100	1630000	5970000	332000	2110000	452000	472000	25300	27900

TABLE 3-3
Confirmation Sample Analytical Results Summary

Notes:
1. Outlined results in **BOLD** indicate a sample level above the Interim Measures Cleanup Level.
2. Flagcode explanations:
   - J: Estimated below reporting limit
   - B: Analyte also found in corresponding Blank sample(s)
   - *B: (for metals): Indicates a concentration below reporting limit.*
   - P: Value from quantitation and confirmation columns differed by more than 25%. Data flagged and lower of two values reported.
   - N: Spike recoveries outside of QC limits
   - *: For Metals, Replicate precision results outside of QC limits
   - E: Exceeded range of calibration curve
   - X: Benzo(b)fluoranthene and Benzo(k)fluoranthene determined to be indistinguishable co-eluting isomers
3. All sample results not shown in this table are non-detects.
4. Trip blank samples are not shown because no detectable compounds were found.

TABLE 3-4
BACKGROUND AND BORROW PIT ANALYTICAL RESULTS SUMMARY

Interim Measures			Arsenic	Barium	Beryllium	Chromium	Cobalt	Copper	Lead	Lithium	Nickel	Vanadium	Zinc
Cleanup Level (ug/kg)			970	5500000	400	940000	100	2900000	500000	1600	1600000	550000	23000000
NSWC-BP/BF-001	3/16/95		**9400**	62400	**570**	15800	**3900**	15300	13800	**12800**	10000	31200	395
NSWC-BP/BF-002	3/16/95		**9000**	65100	**560**	16900	**4600**	16100	14900	**11700**	10800	30800	41900
NSWC-BP/BF-003	10/12/95		**7800**	92100	**740**	22100	**8600**	15100	14200	**14900**	14500	39000	40800
NSWC-BP/BF-004	10/12/95		**6300**	83900	**810**	22800	**7000**	13900	13700	**14700**	13500	38200	40100
NSWC-BP/BF-005	10/27/95		**1900**	20600	NR	4600	**2400**	4300	3500	NR	6200	7300	16000
NSWC-BP/BF-006	10/27/95		**1800**	26700	NR	5600	**3200**	4800	3900	NR	6600	8600	17700
NSWC-BIOF001	3/7/96		**9200**	86300	**627**	17700	**9200**	14600	15900	**7440**	11100	30200	34000
NSWC-BIOF002	3/7/96		**6210**	82000	**557**	11100	**10700**	9190	16200	**4690**	8540	20100	24300
NSWC-BIOF003	3/7/96		**8200**	61200	**417**	15900	**10800**	9910	13500	**6960**	9500	27100	27000
NSWC-BIOF004	3/7/96		**4950**	123000	**729**	10400	**9890**	10300	16700	**4730**	9860	18300	27000
NSWC-BIOF005	3/7/96		**7430**	105000	**602**	12100	**8690**	10900	16300	**5820**	9050	24100	29700
NSWC-BIOF006	3/7/96		**5880**	89200	**642**	11300	**10300**	10400	16500	**5100**	9410	20900	25800
NSWC-BIOF007	3/7/96		**11400**	58300	**546**	17700	**6370**	15400	16400	**8730**	10900	32000	35700
NSWC-BIOF008	3/7/96		**6130**	91900	**648**	11400	**11100**	10400	17000	**6220**	10500	22300	29900
NSWC-BIOF009	3/7/96		**2960**	83500	**540**	9490	**4860**	10500	13200	**6030**	8990	17200	39700
NSWC-BIOF010	3/7/96		**5260**	46700	**478**	12400	**8080**	7120	13700	**4430**	7240	20900	20600
NSWC-BIOF011	3/7/96		**6870**	73000	**542**	38300	**9180**	16000	15200	**45200**	193000	24200	38700
NSWC-BIOF012	3/7/96		**6730**	54600	**459**	17600	**12600**	11200	14500	**7940**	21100	23500	31300
NSWC-BIOF013	3/7/96		**2880**	51600	**454**	9360	**7820**	8510	7380	**5580**	10600	14200	25300
NSWC-BIOF014	3/7/96		**2580**	62700	**623**	9480	**12100**	10400	7720	**6520**	17900	13200	36100

Notes:
1. Outlined results in **BOLD** indicate a sample level above the Interim Measures Cleanup Level.
2. NR = Not Requested
3. Analytical results are for metals only. No other analytes were present at levels near or above Interim Measures Cleanup Levels Criteria.

4.0
SAMPLING AND ANALYSIS

4.1 SAMPLING PROCEDURES

All sample collection activities were performed in accordance with the SAP for Interim Measures Cleanup. Chain of Custody records were maintained for each sample shipment sent to the laboratory for analysis. Samples were collected and preserved per the SAP in order to maintain the sample integrity. Field duplicates and trip blanks were collected and submitted to the laboratory in order to assist in evaluating field and analytical precision, accuracy, representativeness, and comparability. The laboratory performed method blank, sample matrix spike, sample matrix spike duplicate, sample duplicate, surrogate, and standard matrix spike analyses in order to evaluate laboratory accuracy and precision.

4.2 SAMPLE COLLECTION

4.2.1 Characterization

Seven random soil characterization samples were taken for NSWC Crane SWMU 25/07D—two initially (25-07D-001 and 25-07D-002), and five additional after commencing debris removal (25-07D-003 through 25-07D-007). Soil characterization samples were collected using either a stainless steel core sampler lined with a brass sleeve that was hand driven into undisturbed soil, or a stainless trowel. These samples were placed in appropriate containers for sample analysis per the SAP. The characterization samples were marked and placed in a cooler with "blue ice" prior to shipment to maintain sample integrity. All samples were transported using proper chain of custody procedures. Copies of the chain of custody can be found in Volume 2, Appendix D of this report.

4.2.2 Confirmation

After excavation, 11 confirmation samples (25-07D-006 through 25-07D-016) of soil were collected and submitted to CEC Laboratory to be analyzed for Appendix IX requirements per the SAP. The number of samples collected was the cube root of the number of grid intersections, based on a 20 foot grid interval laid out over the excavated area. Eleven confirmation samples (25/07D-006 through 25/07D-016) were collected using a random number generator to determine the grid sample number location. Figure 4-1 shows the actual field location of each sample. Soil confirmation samples were collected using either a stainless steel core sampler lined with a brass sleeve that was hand driven into undisturbed soil, or a stainless trowel. These samples were placed in appropriate containers for sample analysis per the SAP. The confirmation samples were marked and placed in a cooler with "blue ice" prior to shipment to maintain sample integrity. All soil and liquid samples were transported using proper chain of custody procedures. Copies of the chain of custody can be found in Volume 2, Appendix D of this report.

4.3 SAMPLE ANALYSES

Two site characterization samples 25/07D-001 and -002 were analyzed for Appendix IX compounds. Five additional characterization samples (25/07D-003 through 25/07D-007) were collected to determine the method of disposal and were analyzed for RCRA characteristics, in addition to Appendix IX compounds. Analytical parameters and results are provided in Volume 2, Appendix D. Characterization sample 25/07D-001 had low internal standards during the initial volatile analysis, and sample 25/07D-002 had low internal standards during the initial semivolatile analysis. These samples were re-run with similar results, which may indicate a matrix interference. The sample matrix spikes also had low internal standards, and recovery of target analytes was acceptable. Both the original results and the re-run results (indicated by "RE" for sample 001 and "R" for sample 002) have been included. Confirmatory sampling was for

Appendix IX compounds to ensure complete removal of all contaminated material. The analytical methods employed for this SWMU were in accordance with the SAP and followed *Test Methods for Evaluating Solid Waste, SW 846, USEPA 1986,* (SW 846) methodologies. The analytical methods used for analyses associated with these interim measures activities are presented in Table 3-1 and in Volume 2, Appendix D. A summary of the sampling activity and results for SWMU-25/07D are included in Tables 3-2 through 3-4.

4.4 DATA QUALITY CONTROL

All soil and liquid samples collected from SWMU-25/07D were transported using proper chain-of-custody procedures. Copies of the chain of custody documents are included in Volume 2, Appendix D of this report.

4.4.1 Field Quality Control

Field quality control samples, which included trip blanks and field duplicate samples, were collected during the confirmation phase of the work at SWMU 25/07D. Results of the field duplicate samples are summarized in Tables 3-3 along with the sample data. Trip blanks and field duplicate analytical results from confirmation sampling events were evaluated to identify potential sources of error introduced during sampling.

Trip blank sample results were evaluated to identify any cross-contamination that may have occurred during storage and shipping of the samples to the analytical laboratory. Trip blanks were received in sealed sample containers from the laboratory and are not opened at the site. No target analytes were detected in the trip blanks for the confirmation samples.

Duplicate samples were collected from sample locations during the confirmation sampling event. Samples 25/07D-006 and 25/07D-007, as well as samples 25/07D-015 and 25/07D-016, were duplicates for the confirmation samples. Arsenic, beryllium, and cobalt were the only target analytes detected above cleanup criteria in these samples. As mentioned previously, these analytes were detected in the confirmation samples and are naturally present in soils of the surrounding area. Precision criteria for duplicate samples with results above the reporting limits differ for different analyses, and these criteria can be found in the QAPP. Field duplicate samples taken in support of the Interim Measure at SWMU 25/07D met this precision criteria for most samples.

Precision for samples 25/07D-006 and 25/07D-007 was acceptable, except for arsenic, chromium, cobalt, lead, nickel, and selenium, which had precision results ranging from 27% Relative Percent Difference (RPD) to 49.5% RPD. Precision criteria for duplicate samples 25/07D-015 and 25/07D-016 was acceptable for all analytes except Endosulfan-1, barium, cobalt, and nickel. Endosulfan-I was detected below the reporting limit at 1.0 ug/kg in 25/07D-015 and was detected at 2.4 ug/kg in sample 25/07D-016. Both of these results were well below the criteria of 2000 ug/kg for this analyte, and data is acceptable for the data quality objectives. Precision criteria were not met for barium, cobalt, and nickel, with RPD's of 46.2%, 41.1%, and 36%, respectively. Matrix interference due to the inherent heterogeneity of soils is commonly observed in soils and could be contributing to the these results.

4.4.2 Laboratory Quality Control

Eighteen soil samples taken for NSWC Crane SWMU 25/07D were analyzed for pesticides/PCB's, metals, organophosphorus pesticides, semi-volatiles, volatile organic compounds, herbicides, and/or dioxins. In addition, characterization samples 003-007 were analyzed for RCRA characteristics. Characterization samples 006 and 007 were re-analyzed by TCLP. The laboratory performed method blank, sample matrix spike, sample matrix spike duplicate, sample duplicate, surrogate, and standard matrix spike analyses in order to evaluate laboratory accuracy and precision. QA objectives for precision, accuracy and

completeness are established in the QAPP. MK reviewed the laboratory data received to determine whether data quality objectives were met for the sampling and analytical programs through the assessment of precision, accuracy, representativeness, comparability, and completeness.

Precision is a measure of the reproducibility of measurements under a given set of conditions. Laboratory duplicates, matrix spikes, and matrix spike duplicates were used to determine the precision of the analytical process. Accuracy is a measure of the bias in a measurement system and is defined as the closeness of the reported value to the true value. The accuracy of a measurement system was assessed by evaluating the results of quality control samples such as matrix spikes, analytical surrogates and the use of trip blanks. Representativeness in the laboratory is ensured by using the proper analytical procedures, meeting sample holding times, and analyzing and assessing field duplicated samples. Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Analytical data are considered to be comparable when similar sampling and analytical methods are used and documented per the QAPP. Laboratory completeness is a measure of the number of valid measurements obtained from all measurements taken in the project. The laboratory completeness goal established in the QAPP is 90 percent; this goal has been met. MK's evaluation is summarized below. The QA/QC data is presented in Volume 2, Appendix E.

Method blanks were free of target compounds above the reporting limits, except for methylene chloride and acetone, which were present in several method blanks at concentrations both above and below the reporting limit. Corresponding field sample results impacted by these method blanks were qualified accordingly. All VOC surrogate recoveries fell within acceptable ranges to meet the project data quality objectives. The primary columns used for quantitation of pesticide and herbicides showed acceptable surrogate recoveries. For sample 25/07D-006, sampled on November 17,1995, all surrogates on both columns were uniformly low, which is believed to be attributed to matrix interference. Samples 25/07D-003, -004, and -005 were diluted prior to analysis, due to dark coloration and potential for damage to analytical instruments; consequently, the surrogates were diluted out of these samples. In one SVOC run, the method blank, sample 25/07D-015, and the matrix spike duplicate had low surrogate recoveries. Because the method blank in particular had been affected, all samples from this batch were re-run. Soil sample results replicated well between the two runs, and sample results were reported from the first run.

The sample matrix spikes and matrix spike duplicates (MS/MSD) had acceptable accuracy and precision, with few exceptions. The MS and MSD precision for the SVOC run mentioned above was high for all analytes on the first run. This was due to the low recoveries of all spiked analytes, including the surrogates, for the MSD. When the samples in this batch were rerun, both the MS and the MSD had acceptable recoveries for all spiked analytes. Although precision for pyrene was still high at 56% RPD on the second run, data is considered acceptable for this batch because all recoveries were acceptable.

MS/MSD recoveries for several metals were slightly low, but in all cases the post-digest spike recoveries were acceptable, and affected data was qualified appropriately. Post-digestion spikes were run for metals demonstrating unsatisfactory matrix spike recoveries. The satisfactory recoveries of post-digest spike analytes can imply interference by the required preparation procedure or in the sample matrix itself. Precision and accuracy were acceptable for MS/MSDs performed for all other types of analyses.

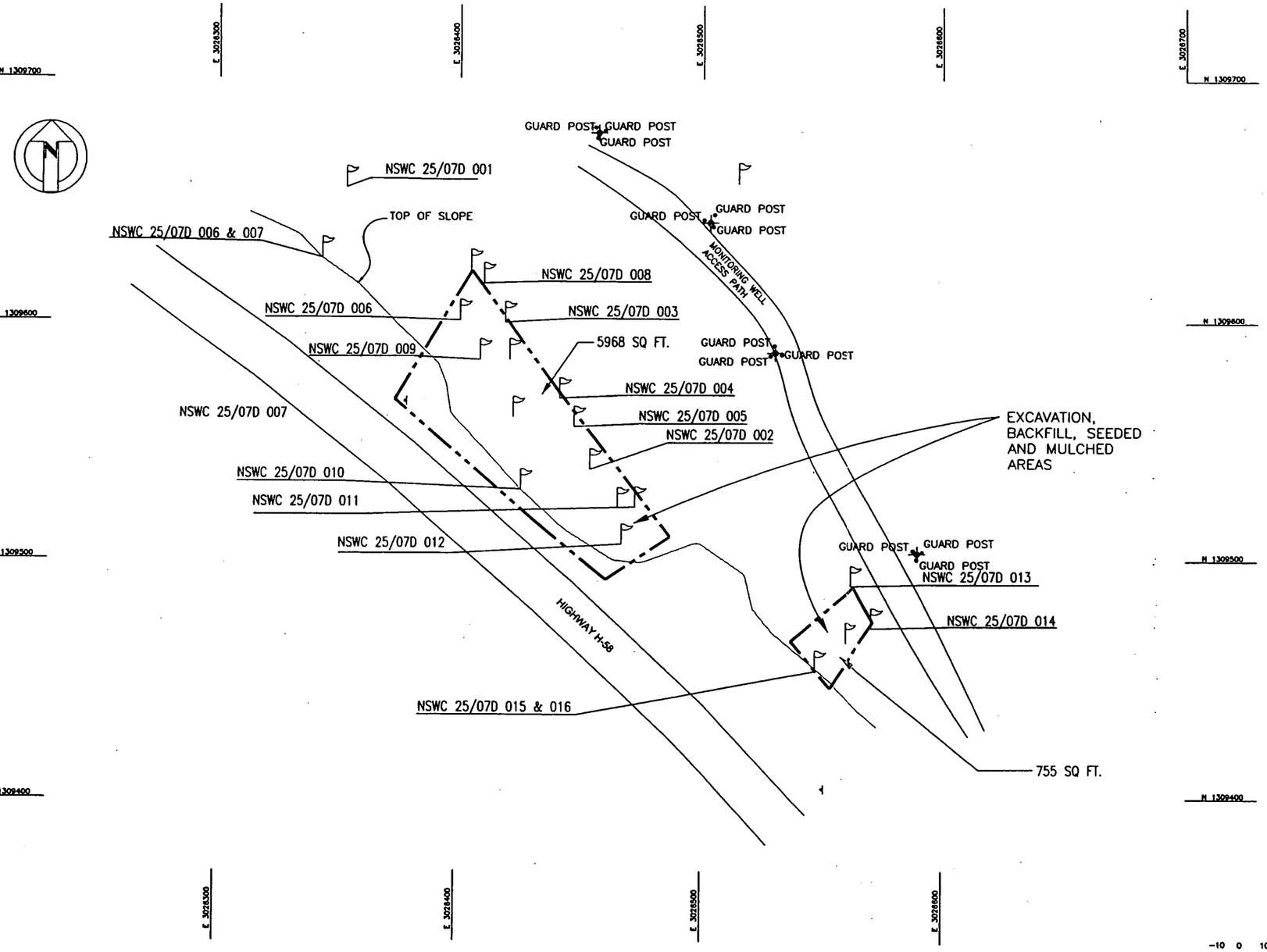
The laboratory duplicate samples analyzed had acceptable results, with few exceptions. Chromium, antimony, copper, and lead results were high for one or more metals analyses. As noted earlier, matrix interference due to the inherent heterogeneity of soils is commonly observed in soils and is likely contributing to the these results.

The laboratory control spikes (LCS's) which corresponded to the characterization and confirmation samples had acceptable accuracy and precision for all analyses performed.

Overall, data quality objectives for accuracy, precision, comparability, and completeness were met and the

data is considered to be acceptable.

A number of samples, summarized in Table 4-1, had analytes with reporting limits that exceeded the IM cleanup levels specified in Tables 5 and 6 of the Sampling and Analysis Plan. In these instances, the practical quantitation limit has been reported per the USEPA 1994 Guidance Document. The results of these samples did not show the presence of target analytes above the reporting limit.



-10 0 10 20 30 40 50 FEET

SCALE

REV	DATE		APPROVED
1	11/17/99	ADDED CONSTRUCTION AREA	

MORRISON KNUDSEN CORPORATION
ENVIRONMENTAL SERVICES

SOURCE: MSE CORPORATION, 1996

HIGHWAY 58
DUMPSITE A
NSWC CRANE
CRANE, INDIANA

FIGURE 4-1
SAMPLE LOCATIONS

DWG DATE: 11/20/98 | FILE NAME: DUMPA.DWG

TABLE 4-1
Analytes with reporting limits exceeding the Interim Measures Cleanup Levels

SAMPLE #	INTERIM	Sample ID	25/07D-001	25/07D-002	25/07D-003	25/07D-004	25/07D-005	25/07D-006	25/07D-007	25/07D-006	25/07D-007
SAMPLE DATE	MEASURES	Sample Date	7/28/95	7/18/95	11/16/95	11/16/95	11/16/95	11/17/95	11/17/95	3/12/96	3/12/96
TYPE	CLEANUP	Medium	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
COMPOUND	LEVEL ug/kg										
1,2-Dibromoethane	19							1100			
1,2-Dichloroethane	840							1100			
1,4-Dioxane	32000									62000	60000
2-Hexanone	50							11000			
2-Methylnaphthalene	660								760	1000	980
2-Nitrophenol	300		460	340						750	
3,3-Dimethylbenzidine	93		460	340						550	
3-Chloropropene	5										18
4,4'-DDT	8				84*	40*	92*				41*
4-Bromophenyl phenyl ether	660									910	880
4-Chlorophenyl phenyl ether	660									730	700
4-Nitrophenol	190		460	340						840	810
Acenaphthylene	660								760	810	790
Acrylonitrile	260		1600	1300	1300		1400	220000	2300		
alpha-BHC	2.01		2.6		42*	20*	46*	2.9	3.8		12*
Aroclor 1016	110				840*	400*	920*				230*
Aroclor 1221	110				1700*	790*	1800*		150		230*
Aroclor 1232	110				840*	400*	920*				230*
Aroclor 1242	110				840*	400*	920*				230*
Aroclor 1248	110				840*	400*	920*				230*
Aroclor 1254	110				840*	400*	920*				230*
Aroclor 1260	110				840*	400*	920*				230*
Benzo(a)anthracene	660								760	800	770
Benzo(a)pyrene	660								760		
benzo(b)fluoranthene	660								760	930	900
Benzo(g,h,i)perylene	660								760	750	730
Benzo(k)fluoranthene	660								760	750	730
Beryllium	400								450		
beta-BHC	4.02				42*	20*	46*				12*
bis(2-chloroethoxy)methane	660									810	790
bis(2-Chloroethyl)ether	150		460	340						340	330
Carbon Tetrachloride	920							1100			
Chlordane	660				840*		920*				
Chloroform	960							1100			
cis-1,3-Dichloropropene	1000							1100			
delta-BHC	6.03				42*	20*	46*				12*
Dibenzo(a,h)anthracene	120			340	420*	390*	460*	570	760	220	210
Dibenzofuran	660								760	840	810
Dieldrin	53				84*	40*	92*				
Endosulfan Sulfate	44.2				84*	40*	92*				
Endrin Aldehyde	15.4				84*	40*	92*				
Ethyl cyanide	100									720	690
gamma-BHC (Lindane)	2.68		5.2	4.1	84*	40*	92*	5.8	7.5		12
Hexachlorobenzene	530									930	900
Iodomethane	5		8.1	6.3	6.3	6	6.9	1100	11	12	12*
Kepone	47		52		837*	397*	917*	58	7.5		
n-Nitrosodibutylamine	160		460	340						180	180
n-Nitrosodiethylamine	5.7		460	340						270	260
n-Nitrosodimethylamine	17		460	340						320	300
n-Nitrosomethylethylamine	39		460	340						290	280
Pentachloroethane	10							1100	11		
Phenanthrene	660								760	750	730
Silvex	100								112		
Toxaphene	770				4200*	2000*	4600*				
trans-1,3-Dichloropropene	1000							1100			
trans-1,4-Dichloro-2-butene	15							1100			18

* denotes reporting limits increased due to dilutions

TABLE 4-1
Analytes with reporting limits exceeding the Interim Measures Cleanup Levels

SAMPLE #	INTERIM	Sample ID	25/07D-008	25/07D-009	25/07D-010	25/07D-011	25/07D-012	25/07D-013	25/07D-014	25/07D-015	25/07D-016
SAMPLE DATE	MEASURES	Sample Date	3/12/96	3/12/96	3/12/96	3/12/96	3/12/96	3/12/96	3/12/96	3/12/96	3/12/96
TYPE	CLEANUP	Medium	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
COMPOUND	LEVEL ug/kg										
1,2-Dibromoethane	19										
1,2-Dichloroethane	840										
1,4-Dioxane	32000		59000	60000	63000	59000	62000	60000	61000	60000	62000
2-Hexanone	50										
2-Methylnaphthalene	660		980	980	1000	970	1000	980	990	990	1000
2-Nitrophenol	300				770	720	760	730	730	730	760
3,3-Dimethylbenzidine	93				560	520	550	530	530	530	550
3-Chloropropene	5		18	18	19	17	18	18	18	18	18
4,4'-DDT	8										
4-Bromophenyl phenyl ether	660		880	880	930	870	910	880	890	880	910
4-Chlorophenyl phenyl ether	660		700	700	740	690	730	700	710	710	730
4-Nitrophenol	190		810	810	850	800	840	810	820	810	840
Acenaphthylene	660		790	790	830	770	820		790	790	820
Acrylonitrile	260										
alpha-BHC	2.01										
Aroclor 1016	110										
Aroclor 1221	110										
Aroclor 1232	110										
Aroclor 1242	110										
Aroclor 1248	110										
Aroclor 1254	110										
Aroclor 1260	110										
Benzo(a)anthracene	660					760	800		780	780	800
Benzo(a)pyrene	660										
benzo(b)fluoranthene	660								910	910	940
Benzo(g,h,i)perylene	660					720	760		730	730	760
Benzo(k)fluoranthene	660								730	730	760
Beryllium	400										
beta-BHC	4.02										
bis(2-chloroethoxy)methane	660		790	790	830	770	820	790	790	790	820
bis(2-Chloroethyl)ether	150		330	330	350	320	340	330	330	330	340
Carbon Tetrachloride	920										
Chlordane	660										
Chloroform	960										
cis-1,3-Dichloropropene	1000										
delta-BHC	6.03										
Dibenzo(a,h)anthracene	120		210	210	220	210	220		210	210	220
Dibenzofuran	660		810	810	850	800	840	810	820	810	840
Dieldrin	53										
Endosulfan Sulfate	44.2										
Endrin Aldehyde	15.4										
Ethyl cyanide	100		680	690	730	690	720	690	700	690	720
gamma-BHC (Lindane)	2.68										
Hexachlorobenzene	530		900	900		890	940		910	910	940
Iodomethane	5		11	12	12	12	12	12	12	12	12
Kepone	47										
n-Nitrosodibutylamine	160		180	180	190	170	180	180	180	180	180
n-Nitrosodiethylamine	5.7		260	260	280	260	270	260	270	260	270
n-Nitrosodimethylamine	17		300	300	320	300	320	300	310	310	320
n-Nitrosomethylethylamine	39		280	280	300	280	290	280	280	280	290
Pentachloroethane	10										
Phenanthrene	660		730		770	720	760		730	730	760
Silvex	100										
Toxaphene	770										
trans-1,3-Dichloropropene	1000										
trans-1,4-Dichloro-2-butene	15		17	18	19	17	18	18	18	18	18

* denotes reporting limits increased due to dilutions

5.0
SUMMARY AND CONCLUSIONS

Debris was removed from Dump Site A using hand and machine methods. Metal detectors were used to verify that all metallic debris was removed. Metal debris was detected and removed from depths of two feet below ground surface. Approximately 240 tons of debris, including non-friable asbestos material (transite), were removed from SWMU 25/07D. Materials were loaded into trucks using a skid steer loader and transported to the Southside Landfill in Indianapolis, Indiana. Photographs of the site before, during, and after the IM activities are provided in Appendix A.

All analyses were performed following EPA SW846 methodologies. As shown in Table 3-1, characterization samples were analyzed for Appendix IX compounds as well as RCRA/TCLP. Confirmation samples were also analyzed for the Appendix IX list to verify that all contaminants were below cleanup levels. Comparison of Table 3-3 (confirmation sample results) and Table 3-2 (characterization sample results) shows that contaminants were removed to below cleanup levels except for arsenic, beryllium, and cobalt, which appear in levels as high as 22,500 ppb, 580 ppb, and 7,000 ppb, respectively. Samples collected from off-site virgin soil borrow sources confirmed that levels of arsenic, beryllium, and cobalt above the established cleanup levels are naturally present in soils in the surrounding area. Table 3-4 summarizes the background samples BP/BF-001 thru BP/BF-004 collected at the onsite borrow pit and BP/BF-005 and -006 collected off-site. Other SWMU sites found similar heavy metal concentrations of the same metals (MK, 1996). The confirmation sampling results met the required IM cleanup criteria, and the site restoration has been accepted by NSWC Crane personnel.

The Interim Measure project at SWMU #25/07D was terminated. The confirmatory samples showed no contamination levels above the cleanup objectives, and all visible signs of transite and "strange" debris have been removed. Additional debris discovered during this interim measure was left in place since it may have been used as backfill to support the road (Highway 58). It is recommended that SWMU #25/07D revert back to the RFI process beginning with soil borings under the road to determine the need for further remediation.

6.0
REFERENCES

Morrison Knudsen Corporation, (MK) 1995a. *Work Plan for Interim Measures Cleanup at Solid Waste Management Units #23/00, #25/07D, and #26/08D,* Revision B, as amended, dated August 25, 1995.

Morrison Knudsen Corporation, (MK) 1995b. *Task-Specific Site Safety and Health Plan, Supplement to Work Plan for Solid Waste Management Units #23/00/ #25/07D, and #26/08D,* Revision B, dated August 25, 1995.

Morrison Knudsen Corporation, (MK) 1995c. *Quality Control Plan for Interim Measures Cleanup, NSWC Crane, Crane, Indiana,* Revision C, August 1995.

Morrison Knudsen Corporation, (MK) 1995d. *Quality Assurance Project Plan for RCRA Corrective Action Interim Measures Cleanup, NSWC Crane, Crane, Indiana,* Revision C, August 1995.

Morrison Knudsen Corporation, (MK) 1995e. *Waste Management Plan for Interim Measures Cleanup, NSWC Crane, Crane, Indiana,* Revision C, August 1995.

Morrison Knudsen Corporation, (MK) 1995f. *Sampling and Analysis Plan for Interim Measures Cleanup, NSWC Crane, Crane, Indiana,* Revision C, August 1995.

Morrison Knudsen Corporation, (MK) 1995g. *Environmental Protection Plan Interim Measures Cleanup, NSWC Crane, Crane, Indiana,* Revision C, August 1995.

Morrison Knudsen Corporation, (MK) 1996. *Interim Measure Report, SWMU 23/00 Battery Shop, Naval Surface Warfare Center Crane, Crane, Indiana,* Draft, September 1996.

Naval Energy and Environmental Support Activity, (NEESA) 1983. *Initial Assessment Study of Naval Weapons Support Center Crane, Indiana.* NEESA 13-003, May.

U. S. Environmental Protection Agency (USEPA) 1994. *RCRA Corrective Action Guidance Human Data Quality Levels for RFI Projects.* June 18, 1994.

APPENDIX A

PHOTOGRAPHS

ROLL: 1
FRAME: 3
DATE: 11 MAY 95
PHOTOGRAPHER: **J. SMITH**
DESCRIPTION: **Possible access along the sampling wells north and bottom of the dump site hill.**

ROLL: 3
FRAME: 7A
DATE: 12 MAY 95
PHOTOGRAPHER: **J. SMITH**
DESCRIPTION: **Access from highway H58 that passes by the above sampling wells.**

PHOTO 1a & 1b

ROLL: 1
FRAME: 1
DATE: 11 MAY 95
PHOTOGRAPHER: J. SMITH
DESCRIPTION: **Example of trash; transite siding.**

ROLL: 1
FRAME: 4
DATE: 11 MAY 95
PHOTOGRAPHER: J. SMITH
DESCRIPTION: **Example of trash; transite pipe.**

PHOTO 2a & 2b

ROLL: 1
FRAME: 8A
DATE: 11 MAY 95
PHOTOGRAPHER: **J. SMITH**
DESCRIPTION: **Concrete blocks various thickness 8' to 10".**

ROLL: 1
FRAME: 9A
DATE: 11 MAY 95
PHOTOGRAPHER: **J. SMITH**
DESCRIPTION: **Concrete pipe, cinder blocks, electrical porcelain insulators, metal pipe metal sheeting.**

PHOTO 3a & 3b

ROLL: 1
FRAME: 6A
DATE: 11 MAY 95
PHOTOGRAPHER: J. SMITH
DESCRIPTION: **Roofing tar blocks with smaller pieces below leaves.**

ROLL: 1
FRAME: 7A
DATE: 11 MAY 95
PHOTOGRAPHER: J. SMITH
DESCRIPTION: **Buried metal cylinders.**

PHOTO 4a & 4b

ROLL: 1
FRAME: 4A
DATE: 11 MAY 95
PHOTOGRAPHER: J. SMITH
DESCRIPTION: **Concrete pipe attached to 10' of concrete header.**

ROLL: 1
FRAME: 5A
DATE: 11 MAY 95
PHOTOGRAPHER: J. SMITH
DESCRIPTION: **Metal caps with more covered by dead leaves.**

PHOTO 5a & 5b

ROLL: 23
FRAME: 06
DATE: 2/ 5/96
SWMU: 25/07D
BY: B. Kemp
TIME: 10:05
DESCRIPTION:
Looking south, road above into bank.

ROLL: 23
FRAME: 17
DATE: 2/ 5/96
SWMU: 25/07D
BY: B. Kemp
TIME: 10:10
DESCRIPTION:
Looking down and north from the road.

PHOTO 6a & 6b

ROLL: 23
FRAME: 09
DATE: 2/ 5/96
SWMU: 25/07D
BY: B. Kemp
TIME: 10:06
DESCRIPTION:
Looking north down at excavation

ROLL: 23
FRAME: 10
DATE: 2/ 5/96
SWMU: 25/07D
BY: B. Kemp
TIME: 10:07
DESCRIPTION:
Looking north down at excavation

PHOTO 7a & 7b

PHOTO 8

PHOTO 9

PHOTO 10

APPENDIX B

CORRESPONDENCE

APPENDIX B

CORRESPONDENCE

- Construction Interface Documents (CIDs) and backup (7 pages)
- Inter-Office Correspondence from John Berggren to the file, concerning Explosive Ordinance Buried at Dump Site "A" (2 pages)
- Letter from Robert Brown of Brown Associates to MK's Contract Administrator Willard McCumbers regarding close-out of their contract (1 page).

CONSTRUCTION INTERFACE DOCUMENTS (CIDS)

NAVY AND EPA CORRESPONDENCE

CONSTRUCTION INTERFACE DOCUMENT

MORRISON KNUDSEN CORPORATION
ENGINEERING, CONSTRUCTION & ENVIRONMENTAL GROUP

DATE: 1/16/96

MK CID NO: 034-009

COPY

DELIVERY ORDER NO.
4324-0024-031-30

SUBCONTRACT NO.
SC-4324-034

ORIGINATOR PROBLEM NO.
MK-016

SUBCONTRACTOR:
U.S. Tech Group Inc.

TO:
Steve Downey

PROJECT DESCRIPTION:
NSWC Crane - SWMU #25/07 D

FROM:
Marvin G. Chidester Jr.

REFERENCE: WORK PLAN/DRAWINGS/SPECIFICATIONS
N/A

SUBJECT:
Excavation and Removal of Special Waste

ATTACHMENTS: YES [X] NO [ ]
Dump Sites "A" & "B" Scope of Additional Remediation
CID-033-001

PROBLEM / DEFICIENCY

CLARIFICATION [ ] CHANGE [X] INFORMATION [ ]

CID-033-001 was written to Contract SC-4324-033 for pricing of out of scope work. This work was also issued to another contractor for competitive pricing. The successful pricing contractor is working under Contract SC-4324-034. The original CID has to be replaced or superceeded.

ADDITIONAL COSTS	SCHEDULE CHANGE	PROPOSAL
YES [X] NO [ ]	YES [X] NO [ ]	YES [X] NO [ ]

RECOMMENDED SOLUTION

The original CID is attached along with the detailed scope of work. The subcontractor shall price the work described in the scope of work in accordance with the specifications attached. This CID is written to superceed the previously issued CID.

CONSTRUCTION INTERFACE DOCUMENT

MORRISON KNUDSEN CORPORATION
ENGINEERING, CONSTRUCTION
& ENVIRONMENTAL GROUP

DATE: 12/22/95

MK CID NO: 033-001

COPY

DELIVERY ORDER NO. 4324-0009-007-30	SUBCONTRACT NO. SC-4324-033
ORIGINATOR PROBLEM NO. MK-011	SUBCONTRACTOR: R.J. Brown Associates
TO: Steve Downey	PROJECT DESCRIPTION: NSWC Crane - SWMU #25/07 D
FROM: Marvin G. Chidester Jr.	REFERENCE: WORK PLAN/DRAWINGS/SPECIFICATIONS N/A
SUBJECT: Excavation and Removal of Special Waste	ATTACHMENTS: YES [X] NO [ ] Dump Sites "A" & "B" Scope of Additional Remediation

PROBLEM / DEFICIENCY — CLARIFICATION [ ] CHANGE [X] INFORMATION [ ]

Dump Site "A" has been found to be contaminated with pieces of varing sizes of Transite (asbestos containing material). The contamination levels found do not exceed the TCLP limits.

ADDITIONAL COSTS	SCHEDULE CHANGE	PROPOSAL
YES [X] NO [ ]	YES [X] NO [ ]	YES [X] NO [ ]

RECOMMENDED SOLUTION

An area approximately 100' x 20' will require excavation. The contamination extends to depths of approximately 2'. The removed material will be measured by weight. The total weight of the excavated material to removed and transported to an off-site disposal facility is estimated to be approximately 220 tons. If the sample analysis indicate further contamination, additional excavation may be required prior to backfill. After removal of contaminated material, the resulting hole will be backfilled to the original grade.

CID DISPOSITION REPORT

MORRISON KNUDSEN CORPORATION
ENGINEERING, CONSTRUCTION & ENVIRONMENTAL GROUP

DATE: 12/22/95

MK CID NO: 033-001

DELIVERY ORDER NO. 4324-0009-007-30

SUBCONTRACT NO. SC-4324-033

ORIGINATOR PROBLEM NO. MK-011

SUBCONTRACTOR: R.J. Brown Associates

DISPOSITION CATEGORIES

- [ ] Request for Info/Clarification
- [ ] Work Plan Change
- [ ] Design Change (Design Eng. Approval req'd)
- [X] Subcontract Scope Change
- [ ] Delivery Order Scope Change

- [ ] No cost/schedule impact
- [X] Cost/schedule impact
  - [X] Cost increase/decrease
  - [ ] _____ (estimate)
  - [X] Schedule impact: _____ days
  - [X] Engineering estimate attached?
    - Yes [ ] No [X]
  - [ ] Requisition # _____

DETAILED DISPOSITION

Dispositioned by: **Date:** **Title:**

APPROVALS

Hans H. Christ 12/22/95
MK Project Engineer Date

MK Contract Admin. Mgr. Date

Robert Bartz 12-22-95
MK Project Manager Date

MK Program Manager (over $5000) Date

MK Sr. Project Manager (over $5000) Date

MK Project Controls Manager Date

MK Quality Control Manager (Work Plan or Design Changes only) Date

PROPOSAL FOR COMPLETION OF ADDITIONAL REMEDIATION WORK AT SWMU's 25/07D & 26/08D DUMP SITES "A" and "B"

ITEM #	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	SWMU #25/07D (Dump Site A)				
1	Mobilization/Demobilization	1	Lump sum	N/A	
2	Excavation, transportation, disposal and backfill (Special Waste)	220	Tons		
	SWMU #26/08D (Dump Site B)				
3	Mobilization/Demobilization	1	Lump sum	N/A	
4	Excavation, transportation, disposal and backfill (Hazardous Waste)	450	Tons		
	TOTAL PRICE				

SWMU's 25/07D and 26/08D
DUMP SITES "A" & "B"
SCOPE OF ADDITIONAL REMEDIATION

SWMU #25/07D

Dump Site "A" (SWMU #25/07D) is located along the north side of Hwy. 58, west of the Crane Salvage Yard. It has been found to be contaminated with pieces of varying sizes of Transite (asbestos containing material). This material has been determined to be non-friable in its current state. No other contaminants have been found above the TCLP limits. The primary area for removal is approximately 100' X 20' and the contamination extends to depths of approximately 2'. The removed material will be measured by weight. Total weight to be removed and transported to an off-site disposal facility is estimated to be 220 tons. After removal of contaminated material, the resulting hole will be backfilled to the original grade. The backfill material shall be placed in one foot lifts and compacted to 85% relative density. This material will be available from the Crane borrow pit located about five miles from the dump site. There may be a delay of up to two weeks between completion of excavation and approval to backfill to allow for sampling and analysis. If the sample analyses indicate further contamination, additional excavation may be required prior to backfill.

SWMU #26/08D

Dump Site "B" (SWMU #26/08D) is located just North of Hwy. 58, east of the Crane Salvage Yard. It has been found to be contaminated with pieces of varying sizes of Transite (asbestos containing material). This material has been determined to be non-friable in its current state. The soil in this area is also considered to be hazardous due to levels of Barium and Lead reported above TCLP limits (analysis results attached). The primary area for removal is approximately 100' X 20' and the contamination extends to depths of approximately 4'. The removed material will be measured by weight. Total weight to be removed and transported to an off-site disposal facility is estimated to be 440 tons. After removal of contaminated material, the resulting hole will be backfilled to the original grade. The backfill material shall be placed in one foot lifts and compacted to 85% relative density. This material will be available from the Crane borrow pit located about six miles from the dump site. There may be a delay of up to two weeks between completion of excavation and approval to backfill to allow for sampling and analysis. If the sample analyses indicate further contamination, additional excavation may be required prior to backfill.

	SWMU 25/07D									
Compound	Sample Date TCLP Regulatory Level (Mg/L)	16-Nov 003		16-Nov 004		16-Nov 005		17-Nov 006		17-Nov 007	
1,1-Dichloroethene / 1,1-Dichloroethylene	.7	LT	.7	LT	.7	LT	.7	LT	.7	LT	.7
1,2-Dichloroethane	0.5	LT	0.5	LT	0.5	LT	0.5	LT	0.5	LT	0.5
1,4-Dichlorobenzene	7.5	LT	7.5	LT	7.5	LT	7.5	LT	7.5	LT	7.5
2,4,5-Trichlorophenol	400	LT	400	LT	400	LT	400	LT	400	LT	400
245TP / Silvex / 2-(2,4,5-Trichlorophenoxy)propion	1	LT	1	LT	1	LT	1	LT	1	LT	1
2,4,6-Trichlorophenol	2	LT	2	LT	2	LT	2	LT	2	LT	2
2,4-Dichlorophenoxyacetic acid / 2,4-D	10	LT	10	LT	10	LT	10	LT	10	LT	10
2,4-Dinitrotoluene	.13	LT	.13	LT	.13	LT	.13	LT	.13	LT	.13
Silver	5	LT	5	LT	5	LT	5	LT	5	LT	5
Arsenic	5	LT	5	LT	5	LT	5		6***	LT	5
Barium	100	LT	100	LT	100	LT	100	LT	100	LT	100
Chloroethene / Vinyl chloride	.2	LT	.2	LT	.2	LT	.2	LT	.2	LT	.2
Benzene	.5	LT	.5	LT	.5	LT	.5	LT	.5	LT	.5
Carbon tetrachloride	.5	LT	.5	LT	.5	LT	.5	LT	.5	LT	.5
Cadmium	1	LT	1	LT	1	LT	1	LT	1	LT	1
Chloroform	6	LT	6	LT	6	LT	6	LT	6	LT	6
Hexachlorobenzene	.13	LT	.13	LT	.13	LT	.13	LT	.13	LT	.13
Hexachloroethane	3	LT	3	LT	3	LT	3	LT	3	LT	3
Chlorobenzene / Monochlorobenzene	100	LT	100	LT	100	LT	100	LT	100	LT	100
Chlordane	.03	LT	.03**	LT	.03	LT	.03	LT	.03	LT	.03
Chromium	5	LT	5	LT	5	LT	5	LT	5	LT	5
*CRESOLS	200	LT	200	LT	200	LT	200	LT	200	LT	200
Endrin	.02	LT	.02	LT	.02	LT	.02	LT	.02	LT	.02
FLASH POINT		GT	203	GT	203	GT	203	GT	203	GT	203
Hexachlorobutadiene / Hexachloro-1,3-butadiene	.5	LT	.5	LT	.5	LT	.5	LT	.5	LT	.5
Mercury	.2	LT	.2	LT	.2	LT	.2	LT	.2	LT	.2
Heptachlor	.008	LT	.008	LT	.008	LT	.008	LT	.008	LT	.008
Heptachlor epoxide	.008	LT	.008	LT	.008	LT	.008	LT	.008	LT	.008
Lindane / gamma-Benzenehexachloride	.4	LT	.4	LT	.4	LT	.4	LT	.4	LT	.4
2-Butanone / Methyl ethyl ketone	200	LT	200	LT	200	LT	200	LT	200	LT	200
Methoxychlor / Methoxy-DDT	10	LT	10	LT	10	LT	10	LT	10	LT	10
Nitrobenzene	2	LT	2	LT	2	LT	2	LT	2	LT	2
Lead	5	LT	5	LT	5	LT	5	LT	5	LT	5
Pentachlorophenol	100	LT	100	LT	100	LT	100	LT	100	LT	100
*PH			7.6		8.4		8.6		7.2		7.7
Pyridine	5	LT	5	LT	5	LT	5	LT	5	LT	5
Selenium	1	LT	1	LT	1	LT	1	LT	1	LT	1
Tetrachloroethylene / Ankilostin / Ethylene tetrac	.7	LT	.7	LT	.7	LT	.7	LT	.7	LT	.7
Trichloroethylene / Algylen / Chloryien / Gemalgen	.5	LT	.5	LT	.5	LT	.5	LT	.5	LT	.5
Toxaphene / Alltox / Chlorinated camphene / Camphe	.5	LT	.5	LT	.5	LT	.5	LT	.5	LT	.5

* Maximum TCLP sample analytical results are calculated from total analyses.
** Arsenic TCLP leach results will likely be below 5 Mg/L if leach is performed.
*** Sample did not have a hit, however, reporting limits above limit.

CONSTRUCTION INTERFACE DOCUMENT

MORRISON KNUDSEN CORPORATION ENGINEERING, CONSTRUCTION & ENVIRONMENTAL GROUP	DATE: 2/2/96 MK CID NO: 034-011
DELIVERY ORDER NO. 4324-0009-007-30	SUBCONTRACT NO. SC-4324-034
ORIGINATOR PROBLEM NO. MK-018	SUBCONTRACTOR: U.S. Tech Group, Inc.
TO: Steve Downey	PROJECT DESCRIPTION: NSWC Crane - SWMU #25/07 D
FROM: Marvin G. Chidester Jr.	REFERENCE: WORK PLAN/DRAWINGS/SPECIFICATIONS N/A
SUBJECT: Excavation and Removal of Additional Special Waste	ATTACHMENTS: YES [X] NO [ ] Dump Sites "A" Scope of Additional Remediation

COPY

PROBLEM / DEFICIENCY

CLARIFICATION [ ] CHANGE [X] INFORMATION [ ]

The amount of contaminated material will exceed the defined scope of work approved previously. The amount of material which will exceed the scope of work is estimated to be approximately 850 tons. This will bring the total amount of soil requiring removal to approximately 1070 tons.

ADDITIONAL COSTS	SCHEDULE CHANGE	PROPOSAL
YES [X] NO [ ]	YES [X] NO [ ]	YES [X] NO [ ]

RECOMMENDED SOLUTION

An area approximately 100' x 15' will require excavation. The contamination extends to depths of approximately 10'. The removed material will be measured by weight. The total weight of the excavated material to removed and transported to an off-site disposal facility is estimated to be approximately 850 tons. If the sample analysis indicate further contamination, additional excavation may be required prior to backfill. After removal of contaminated material, the resulting hole will be backfilled to the original grade.

10.024.GD0006\.F
13.050.055F
15.350.035F

RECOMMENDED SOLUTION

OTHER CORRESPONDENCE

MORRISON KNUDSEN CORPORATION
ENGINEERING, CONSTRUCTION & ENVIRONMENTAL GROUP

INTER-OFFICE CORRESPONDENCE

DATE: June 5, 1995

TO: File

FROM: John Berggren

LOCATION: 4324-0009

LOCATION: 4324-0009; Crane, IN

SUBJECT: EXPLOSIVE ORDNANCE BURIED AT DUMP SITE "A"

The attached sketch was received from Tom Brent, Site Representative NSWC-Crane, today at approximately 1:00PM. The sketch shows the configuration of disposed ordnance buried at Dump Site "A" (SWMU #25) along Highway H-58. The number of pallets is unknown. A detail not shown of the 7.2 P.C. Rocket Heads is that the "rockets" are without "tails." The tails were removed before buried.

File: 11.011.F
10.304.F
18.001.F

NSWC - CRANE 4324-0009			
PROJECT MEMBER	ACT	INFO	INIT
PROJECT MANAGER		✓	
PROJECT ENGINEER			
GNL SUPT	HAS COPY		
SAFETY AND HEALTH	HAS COPY		
QA/QC SUPERVISOR	HAS COPY		
PROJECT CONTROLS			MC
FIELD ENGINEERING			
PMO-CHARLESTON		X	GOT
FILE:			
FILE:			
FILE:			

PROCEDURE NO. CN-0000-G-241

Dump Site "A", H-58

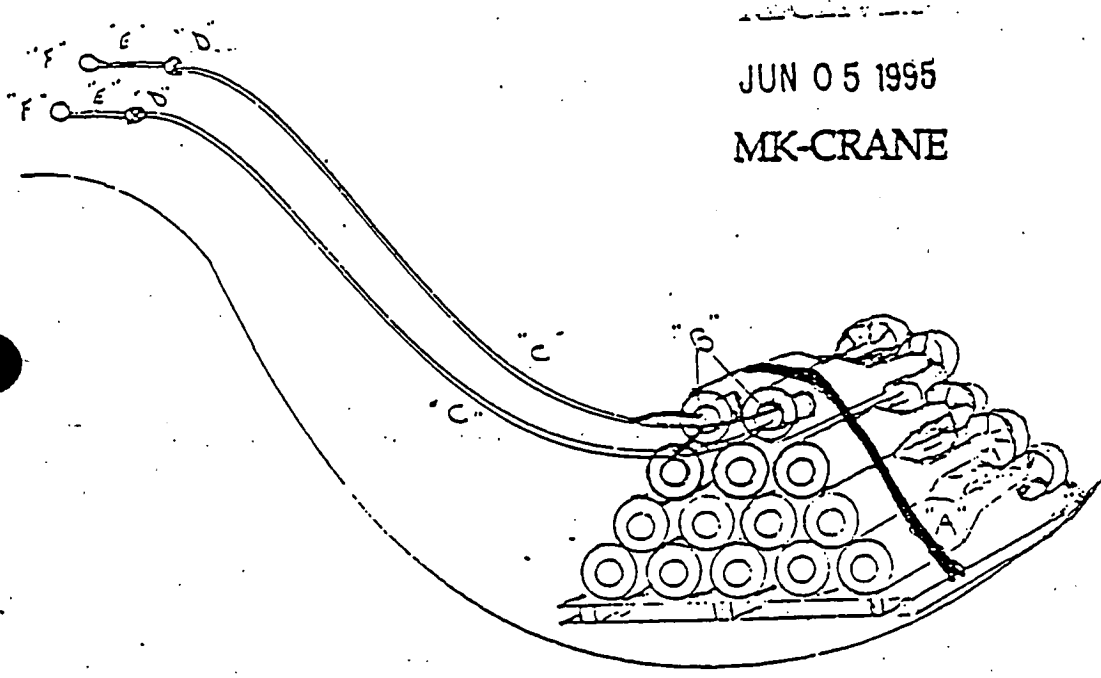
ROUTINE ORDNANCE DETONATION (ROD) ADVISORY PROCEDURE SHEET (RODAPS) SKETCH AND OR PHOTOGRAPH OF HOLE LAYOUT WITH AEOA SHOWN

DET / PRIMACORD TYPE Plastic, Type I, Class E NO. FEET REQ'D. Variable

INITIATING EXPLOSIVES (TYPE) Composition C-4 or equivalent

FUZING USED (TYPE) Time Fuse Plastic Type 3, Class 2 60 sec.; Non-Electric Blasting Caps, Fuse Igniter M2/M60

NET EXPLOSIVE WEIGHT PER SHOT (TOTAL) 426 POUNDS



JUN 05 1995

MK-CRANE

NSWC - CRANE 4324-0009			
PROJECT MEMBER	ACT	INFO	INIT
PROJECT MANAGER			
PROJECT ENGINEER			
GNL SUPT			
SAFETY AND HEALTH			
QA/CC SUPERVISOR			
PROJECT CONTROLS			
FIELD ENGINEERING			
PMO-CHARLESTON			
FILE:			
FILE:			
FILE:			

A - 7.2 P.C. Rocket Head with tails, 14 heads pyramid stacked and banded to pallet
B - Initiating Explosive - Composition C-4 or equivalent.
C - Detonating cord firing system, dual primed
D - Blasting caps, non-electric
E - Blasting Time Fuse
F - Fuse Igniter, M2/M60

NOTE: Place approximately 1-3 lbs. of C-4 into top 2 rocket heads. Place det cord into eac end of C-4 and pack into the cavity using a wooden dowel rod or equivalent. Cover rocket heads with approxmiately 6-10 feet of dirt prior to installing blasting caps.

BROWN
ASSOCIATES

OILS-LUBRICANTS-CHEMICALS
SALES-RECLAMATION-DISPOSAL

R.J. BROWN ASSOCIATES, INC.
1946 N. 13th ST.–SUITE 437
TOLEDO, OHIO 43624
OFFICE: (419) 244-0010
FAX: (419) 244-0515

January 23, 1996

Morrison Knudsen Corporation
Attn: Willard D. McCumbers
2420 Mall Drive
North Charleston, SC 29406

Reference: Subcontract No., 4324-033
Completion of project at SWMU's #23/00, #25/07D, and 26/08D
NSWC Crane, IN

As a result of the changed conditions at the project sites in Crane, it is our opinion that it would be cost effective to all parties involved to close out the project as complete. There is retainage on the contract primarily for demobilization that needs your consideration.

Any additional work would be handled through a separate line item under the new contract. We acknowledge that closing out this contract is beneficial to us and feel it makes good sense to Morrison Knudsen and the Navy. We trust this action in no way reflects negatively with Morrison Knudsen or the government.

If this is agreeable, we would prefer to complete the minimal remaining requirements of the project. Please advise.

Sincerely,

Robert J. Brown

Robert J. Brown,
President

RJB/sdc

cc: Steve Downey/MK Crane

APPENDIX C

APPROVALS, PERMITS AND REGULATORY INFORMATION

APPENDIX C

APPROVALS, PERMITS AND REGULATORY INFORMATION

- Work Plan Approval/Sign-Off page for Solid Waste Management Units #23/00, #25/07D, and #26/08D, Dated: August 25,1995, Revision B (1 page)
- Letter from Brent Robertson to MK, Dated: 30May95, Contract N62467-93-D-1106, Environmental RAC Contract 4324-0009 NSWC-CRANE, Discussing EOD Clearance for the Remedial site (3 pages)
- Letter from MK Project Manager Steven Downey to Jerry Langlois at Jacobs Engineering Tech, Inc., Final Inspection and acceptance Reports D.O. #0009, S.O.W. #007 (4 pages)

NAVAL SURFACE WARFARE CENTER
CRANE WORK PLAN

SOLID WASTE MANAGEMENT UNITS
#23/00, #25/07D, AND #26/08D

NSWC CRANE
CRANE, INDIANA

August 25, 1995
Revision B

CONTRACT N62467-93-D-1106
DELIVERY ORDER #0009
STATEMENT OF WORK #0007

Prepared by:

MORRISON KNUDSEN CORPORATION
2420 MALL DRIVE
CORPORATE SQUARE 1 - SUITE 211
NORTH CHARLESTON, SOUTH CAROLINA 92406

APPROVALS:

William Piispanen — 26-Sep-95
MK Safety and Health Program Manager — Date

26-Sep-95
MK Quality Program Manager — Date

26 Sep 95
MK Sr. Project Manager — Date

26 Sept 95
MK Program Manager — Date

ACCEPTANCE

27 Sept 95
U.S. Navy Responsible Authority — Date

DEPARTMENT OF THE NAVY
OFFICER IN CHARGE OF
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACTS
CRANE DIVISION, NAVAL SURFACE WARFARE CENTER
BUILDING 2516
CRANE, INDIANA 47522-5082

4330
OICC
30 May 95

RECEIVED
MAY 31 1995
MK-CRANE

Morrison Knudsen Corp.
CTR 12
NSWC Crane In
Crane, IN 47522

Subj: Contract N62467-93-D-1106, ENVIRONMENTAL RAC CONTRACT 4324-0009 NSWC-CRANE

Encl: NSWC Memo code 067 dtd. 22 May 95.

Gentlemen:

Enclosed is the EOD clearance for the remedial sites as requested. Should you have any questions, please call me at 812-854-3318.

Sincerely,

Brent Robertson
Navy Technical Representative

cc: Caryl Hickel; SDIV Code 0514 w/o enlc.
Jimmy Jones; SDIV Code 18011 w/o encl.
Adrienne Wilson; SDIV Code 1864 w/o encl.
File

NSWC - CRANE 4324-0009			
PROJECT MEMBER	ACT	INFO	INIT
PROJECT MANAGER			
PROJECT ENGINEER			
GNL SUPT		X	
SAFETY AND HEALTH		X	
QA/QC SUPERVISOR		X	
PROJECT CONTROLS			
FIELD ENGINEERING			
PMO-CHARLESTON		X	
FILE: 11.011.F			
FILE:			
FILE:			

10.302.F
10.304.F
10.305.F
10.306.F
10.307.F

DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO:
8020
067
22 May 95

MEMORANDUM

From: Explosives Safety Officer
To: Officer in Charge of NAVFAC Contracts

Subj: CONSTRUCTION CONTRACT N62467-93-C-1106, ENVIRONMENTAL RESPONSE ACTION CONTRACT

Ref: (a) OIC for NAVFAC Contracts memo OIC 4330 of 12 May 95

1. In response to reference (a), the following information is provided regarding the known history of the sites making up the various work areas:

a. Lithium Battery Burial Site - This area has no history of ordnance dumping being only a designated land fill for inert materials.

b. PCB Capacitor Burial Site - This dump site is fairly new and no historical information exists to suggest it being used for any dumping except inert materials.

c. Battery Shop - The area and the type of work conducted in the area suggests no involvement with explosive ordnance.

d. Highway 58 Dump site A - The location of this site to ordnance functions may make the presence of "ordnance looking" material possible. In reviewing the way materials were disposed of through the years, there is no strong evidence to suggest live ordnance was "dumped" as opposed to being processed through the Detonation Range. This is so because the Detonation Range has been a viable alternative for the destruction of ordnance materials since 1946. There has been inert (concrete filled) hardware dumped at various sites throughout the years because no other alternative was available. Such hardware as 12.75" warheads (Hedgehog) were found dumped near some of the buildings and used as filler to prevent land erosion. These items caused quite a stir when first uncovered until a check was made as to their make-up and purpose.

e. Highway 58 Dump site B - Same comment as for Dump site A.

f. Dye Burial Ground - Though not much is known about this burial plot, the only evidence that exists illustrates that bulk dye was dumped in open trenches and that hardware (especially containing explosives) was not a factor.

Subj: CONSTRUCTION CONTRACT N62467-93-C-1106, ENVIRONMENTAL RESPONSE ACTION CONTRACT

g. Bioremediation Facility Area - This area was identified because of the land configuration (flat with minimal explosives safety quantity distance controls) and no record exists in this office regarding its use as a dumping ground.

h. Cast High Explosives/Incinerator Building - As a cast high explosives area, the probability of uncovering unexploded ordnance is minimal. As the Incinerator Building, there is a probability that ordnance parts (fuze bodies, small caliber projectiles etc.) can be found in the area surrounding the Building 146 facility.

i. Sludge Drying Beds A & B - There is no risk of unexploded ordnance or ordnance looking hardware being in these two beds.

j. Rockeye - There is no reason to believe unexploded ordnance exists in this area.

k. Ammunition Burning Ground - There is evidence that ordnance looking hardware could be found in this area. Of all the excavation that has been conducted for the purpose of cleaning up ash pits and so on, there has been minimal active explosive material found.

l. Mine Fill A - There is no evidence to suggest that unexploded ordnance was ever dumped in this area.

m. Mine Fill B - Same comment as for Mine Fill B.

2. Point of contact is Dale Groh, Code 067, Building 12, Extension 3601.

D. L. GROH

MORRISON KNUDSEN CORPORATION
ENGINEERING, CONSTRUCTION
& ENVIRONMENTAL GROUP

P.O. BOX 408
CRANE VILLAGE, IN 47522
PHONE: (812) 854-6941
FAX: (812)854-6944

31 Jul 96

4324-0009-169

Jerry Langlois
Jacobs Engineering Tech, Inc.
4949 Essen Lane
Baton Rouge, LA 70898

Subject: Final Inspection and Acceptance Reports
D.O. #0009, S.O.W. #007
Contract No. N62467-93-0-1106

Dear Jerry:

For your records and information, enclosed are Final Inspection and Acceptance Reports for SWMUs #16/16, #24/00, and #25/07.

These reports are provided for your use in completing the Interim Measures Report for these SWMUs.

Very truly yours,
Morrison Knudsen Corporation

for

Steven T. Downey

STD:jlw

File: 12.082.09.F
12.082.05.F
13.050.07.F

MORRISON KNUDSEN CORPORATION
ENVIRONMENTAL AND GOVERNMENT DIVISION

RECEIVED
JUL 12 1996
MK-CRANE

SWMU ACCEPTANCE AND TURNOVER

DATE: July 12, 19967

TO: Steven Downey, Proj. Mgr.

FROM: W.M. Kemp Jr., QCS

LOCATION: NSWC

LOCATION: NSWC

SUBJECT: Final inspection and acceptance by the ROICC

The final inspection for the Solid Waste Management Unit Interim Measures Cleanup for the physical work completed at SWMU-16/~~00~~ 68 EMR was conducted on 7-11-96. The completed physical work was accepted by the ROICC on 7-11-96 establishing the beneficial date.

MORRISON KNUDSEN CORPORATION

Signature W.M. Kemp Jr. Date 7-11-96
Signature [illegible] Date 7-12-96
Signature _____ Date _____

ROICC

Signature [illegible] Date 7/11/96
Signature [illegible] Date 7/12/96

The completion and acceptance of the Interim Measures Report will complete this closure at a later date.

cc: Greg Jones PMO
Brent Robertson ROICC
File

NSWC - CRANE			
4324-0009			
PROJECT MEMBER	ACT	INFO	INIT
PROJECT MANAGER			SJO
PROJECT ENGINEER			
GNL SUPT			
SAFETY AND HEALTH			
[illegible]			
PROJECT CONTROLS			
FIELD ENGINEERING			
PAC-CHARLESTON		X	
Jacobs	X		
FILE: 11.096.F			
FILE: 12.082.09.F			
FILE: 18.900.01.F			
12.050.07.F			

MORRISON KNUDSEN CORPORATION
ENVIRONMENTAL AND GOVERNMENT DIVISION

RECEIVED
JUL 12 1996
MK-CRANE

SWMU ACCEPTANCE AND TURNOVER

DATE: July 12, 19967

TO: Steven Downey, Proj. Mgr.

FROM: W.M. Kemp Jr., QCS

LOCATION: NSWC

LOCATION: NSWC

SUBJECT: Final inspection and acceptance by the ROICC

The final inspection for the Solid Waste Management Unit Interim Measures Cleanup for the physical work completed at SWMU-24/00 was conducted on 7-11-96. The completed physical work was accepted by the ROICC on 7-11-96 establishing the beneficial date.

MORRISON KNUDSEN CORPORATION

Signature W.M. Kemp Jr. Date 7-11-96
Signature R. W. Porto Date 7-12-96
Signature _____ Date _____

ROICC

Signature T. A. Lyon Date 7/11/96
Signature B. W. Porto Date 7/12/96

The completion and acceptance of the Interim Measures Report will complete this closure at a later date.

cc: Greg Jones PMO
Brent Robertson ROICC
File

NSWC - CRANE
4324-0009

PROJECT MEMBER	ACT	INFO	ENT
PROJECT MANAGER			
PROJECT ENGINEER			
GNL SUPT			
SAFETY AND HEALTH			
QA/QC SUPERVISOR			
PROJECT CONTROLS			
FIELD ENGINEERING			
PMO-CHARLESTON			
Jacobs	X	X	

FILE: 11.096.05
FILE: 12.092.05
FILE: 12.900.015
13.050.075

MORRISON KNUDSEN CORPORATION
ENVIRONMENTAL AND GOVERNMENT DIVISION

SWMU ACCEPTANCE AND TURNOVER

DATE: July 12, 19967

TO: Steven Downey, Proj. Mgr.

FROM: W.M. Kemp Jr., QCS

LOCATION: NSWC

LOCATION: NSWC

SUBJECT: Final inspection and acceptance by the ROICC

The final inspection for the Solid Waste Management Unit Interim Measures Cleanup for the physical work completed at SWMU-25/~~00~~ 8 LB was conducted on 7-11-96. The completed physical work was accepted by the ROICC on 7-11-96 establishing the beneficial date.

MORRISON KNUDSEN CORPORATION

Signature Wm Kemp Jr. Date 7-11-96
Signature [illegible] Date 7-12-96
Signature _____ Date _____

ROICC

Signature [illegible] Date 7/11/96
Signature [illegible] Date 7/12/96

The completion and acceptance of the Interim Measures Report will complete this closure at a later date.

cc: Greg Jones PMO
Brent Robertson ROICC
File

NSWC - CRANE			
4324-0009			
PROJECT MEMBER	ACT	INFO	INIT
PROJECT MANAGER			
PROJECT ENGINEER			
GNL SUPT			
SAFETY AND HEALTH			
QA/QC SUPERVISOR			
PROJECT CONTROLS			
FIELD ENGINEERING			
PMO-CHARLESTON		X	
Jacobs	X		
FILE: 11.0916.05			
FILE: 12.0822.05			
FILE: 18.900.015			

13.050.075