WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary
Gloria L. McCutcheon, Regional Director

Southeast Region Annex
4041 N. Richards Street, Box 12436
Milwaukee, WI 53212-0436
TELEPHONE 414-229-0800
FAX 414-229-0810

March 6, 1997

United States Army Corps of Engineers
801 Pine Street, Suite B
Hastings, Minnesota 55033

Clear closure
∴ did not open
LUST file

SUBJECT: Request for closure of a 4,000 gallon diesel fuel underground storage tank, former NIKE Battery M-86 Launch area, N84 W220060 Menomonee Avenue, Menomonee Falls, Wisconsin. BRR-~~ERP~~ LUST FID#268328940.

To whom it may concern:

We have reviewed your environmental consultant's recent request for closure of the above referenced site. Based on the information presented, we concur with your environmental consultant's recommendation, and require no further action in connection with the referenced former underground storage tank. However, we reserve the right to reopen this case pursuant to s. NR 726.09, Wisconsin Administrative Code (WAC), should additional information regarding site conditions indicate that contamination on or from the site poses a threat to public health, safety or welfare or the environment.

You should note that this letter does not constitute departmental certification under s. 144.765(2) (a) 3, Stats., as created by 1993 Wisconsin Act 453 (May 12, 1994). Persons who meet the definition of purchaser in s.144.765(1)(c) must receive department pre-approval prior to conducting a site investigation in order to be eligible for the liability exemption under s. 144.765, Stats.

If you have any questions regarding this letter, you may contact me at the above address or at (414) 229-0839.

Sincerely,

Gina Keenan

Gina Keenan
Hydrogeologist

c: Key Environmental Services, Inc.
SED case file

FID 268328940 LUST/ERR
UID 0268000047

Key ENVIRONMENTAL SERVICES, INC.

RECEIVED

JAN 06 1997

D.N.R. SED Hqtrs.
Milwaukee, WI

January 2, 1997

Wisconsin Department of Natural-Southeast District
4041 North Richards Street
Post Office Box 12436
Milwaukee, Wisconsin 53212

Reference: Underground Storage Tank Site Assessment/Closure Report
Former NIKE Battery M-86 Launch Area
N84 W22060 Menomonee Avenue
Menomonee Falls, Wisconsin 53051

KEY ENVIRONMENTAL SERVICES, INC.
File No. 0602003

To Whom It May Concern:

Please find enclosed a copy of the *Underground Storage Tank Site Assessment/Closure Report* for the above referenced site. This report is being submitted to the Wisconsin Department of Natural Resources (WDNR) by Key Environmental Services, Inc. (KEY) on behalf of Energy & Environmental Technology Company and the United States Army Corps of Engineers.

Based on the field observations and soil sample laboratory analytical results from the 4,000-gallon diesel fuel underground storage tank (UST) closure, WDNR case closure is appropriate. The report details applicable site background information, UST closure activities, sampling, conclusions and recommendations.

If you have any questions regarding this report, please feel free to call us.

Sincerely,

KEY ENVIRONMENTAL SERVICES, INC.

Alex L. Rossebo KL

Alex L. Rossebo, E.I.T.
Staff Professional

Gregory L. Johnson

Gregory L. Johnson, P.G., P.E.
Manager of Technical Services

ALR/kar

cc: Energy & Environmental Technology Company
U.S. Army Corps of Engineers

F:\PROJECTS\0602003\REPORT\623-M86L.WPD

Key ENVIRONMENTAL SERVICES, INC.

W66 N215 Commerce Court, Cedarburg, WI 53012 • (414) 375-4750 • (800) 645-7365 • Fax (414) 375-9680
6220C Washington Avenue, Racine, WI 53406 • (414) 886-4439 • Fax (414) 886-4675

UNDERGROUND STORAGE TANK SITE ASSESSMENT/ CLOSURE REPORT

FORMER NIKE BATTERY M-86 LAUNCH AREA
N84 W22060 MENOMONEE AVENUE
MENOMONEE FALLS, WISCONSIN

January 2, 1997

PREPARED FOR:

ENERGY & ENVIRONMENTAL TECHNOLOGY COMPANY
17117 WEST NINE MILE ROAD, SUITE 537
SOUTHFIELD, MICHIGAN 48075

UNITED STATES ARMY CORPS OF ENGINEERS
801 PINE STREET, SUITE B
HASTINGS, MINNESOTA 55033

UNDERGROUND STORAGE TANK SITE ASSESSMENT/ CLOSURE REPORT

FORMER NIKE BATTERY M-86 LAUNCH AREA
N84 W22060 MENOMONEE AVENUE
MENOMONEE FALLS, WISCONSIN

January 2, 1997

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HASTINGS, MINNESOTA 55033

KEY ENVIRONMENTAL SERVICES, INC.

Alex L. Rossebo KK

Alex L. Rossebo, E.I.T.
Staff Engineer

Gregory L. Johnson

Gregory L. Johnson, P.E., P.G.
Manager of Technical Services

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1.0 INTRODUCTION

Key Environmental Services, Inc. (KEY) was retained by Energy & Environmental Technology Company (EETCO) to conduct an underground storage tank (UST) site assessment of one (1) 4,000-gallon diesel fuel UST from the Former NIKE Battery M-86 Launch Area located at N84 W22060 Menomonee Avenue, Menomonee Falls, Wisconsin. KEY monitored the UST closure activities, conducted the UST closure assessment, and prepared this *Underground Storage Tank Site Assessment/Closure Report*.

The UST site assessment and closure were conducted in accordance with Wisconsin Department of Industry, Labor and Human Relations (WDILHR), Chapter ILHR 10, *Flammable and Combustible Liquids* and Wisconsin Department of Natural Resources (WDNR) *Site Assessments for Underground Storage Tanks Technical Guidance* (PUBL-SW-175 93). This report details applicable site background information, UST closure activities, sampling, and conclusions and recommendations.

1.1 Scope of Work

The Scope of Work performed by KEY at the site consisted of the following:

- Prepared a "*Closure and Contingency Plan*" in accordance with applicable Occupational Safety and Health Administration (OSHA) guidance.
- Arranged for the clearance of underground utilities prior to beginning on-site activities, provided all required notifications, and obtained permits for conducting the UST closure.
- Documented the UST removal and closure activities and conducted field screening and soil sampling.
- Monitored proper UST uncovering, venting, removal, cleaning, surplus product management, disposal of tank residue and disposal of the UST.

2.0 SITE BACKGROUND INFORMATION

This section provides site background information including: the property owner, the UST system owner, site location, site description, a summary of site and UST history, and a brief summary of the site geology and hydrogeology.

2.1 Underground Storage Tank System Owner

The subject site is owned and operated by Mr. Mike Mitchell. The UST system is owned by the United States Army Corps of Engineers.

Property Owner:
Mr. Mike Mitchell
403 North 91st Street
Milwaukee, Wisconsin 53226
(414) 229-4951

UST System Owner:
U.S. Army Corps of Engineers
801 Pine Street, Suite B
Hastings, Minnesota 55033
(612) 438-3076

2.2 Site Location

The site is located at N84 W22060 Menomonee Avenue, Menomonee Falls, Wisconsin. The property is situated in the southwest ¼, of the northwest ¼, of Section 8, Township 8 North, Range 20 East. The location of the property is illustrated on Figure 1.

2.3 Site Description

The subject site consists of several structures including a former generator building, a former missile assembly building, a former ready building and launch magazines. The site is bound to the south by Menomonee Avenue and to the north, west and east by open grassy areas.

The site is privately owned by Mr. Mike Mitchell. The 4,000-gallon diesel fuel UST was located to the west of the former generator building. Two (2) fill pipes, a manway, disconnected and capped pump piping and a 3 foot by 3 foot concrete slab were located above the UST. A vent pipe was attached to the former generator building. The site layout is depicted on Figure 2.

2.4 Underground Storage Tank and Site History

Aerial photographs of the subject site and vicinity were not available for review of prior land use and historical changes.

The UST is believed to have contained diesel fuel. There was no information regarding UST tightness testing, past system leaks or repairs, or previous site investigations. The date of the UST installation is unknown.

On July 23, 1996, EETCO documented in a daily quality control report the collection of three samples of the UST contents. It was noted that there was 7-½ inches of contents inside the UST.

KEY conducted an in-house registered UST records search for the subject site using communications software to access the Wisconsin Department of Workforce Development (WDWD) on-line UST database. The search results indicated that there were no USTs registered at the subject site.

2.5 Site Geology and Hydrogeology

The general soil present on the subject site is identified as Ozaukee, Morley & Blount Silt Loam (Soils of Wisconsin Map, 1968). Glacial materials consisting of ground moraine deposits or glacial till underlie the soils (Glacial Deposits of Wisconsin Map, 1976). The ground moraine deposits are generally composed of clay, silt, sand and gravel.

Bedrock in the vicinity of the subject site generally consists of Silurian age dolomite (Mudrey, *et.* al, 1983). The depth to bedrock in the subject site area is between 50 and 100 feet below the ground surface (bgs) (Trotta, L.C. and Cotter, R.D., 1973).

The groundwater flow direction in the water table aquifer would appear to be to the southeast towards the Fox River. Depth to groundwater is estimated to be approximately 50 feet below the subject site (Gonthier, 1972). The Fox River is approximately ¾- miles east of the subject site and is approximately 60 feet lower in elevation than the subject site. Local conditions, such as water supply wells, buried utility lines and tunnels, roadways and building foundations may affect the local groundwater flow direction.

3.0 UNDERGROUND STORAGE TANK SYSTEM CLOSURE

This section identifies the site assessor, UST removal contractor, and inspector and details the methods of UST closure including: surplus product management; UST excavation, cleaning, removal, and details UST closure soil sampling and analysis for the 4,000-gallon diesel fuel UST.

3.1 Underground Storage Tank Closure Site Assessor, Contractor and Inspector

The certified site assessor and UST removal contractor were KEY and EETCO, respectively.

Certified Site Assessor:
Mr. James Treul
Cert. No. 06800
Key Environmental Services, Inc.
W66 N215 Commerce Court
Cedarburg, Wisconsin 53012
(414) 375-4750

UST Removal Contractor:
Mr. Chris Frayer
Energy & Environmental Technology Co.
17117 West Nine Mile Road, Suite 537
Southfield, Michigan 48075-4512
(810) 569-8604

The UST closure was inspected by Lt. Donald Schulteis of Menomonee Falls Fire Department.

Inspector:
Lt. Donald Schulteis
Cert. No. TI00209
Menomonee Falls Fire Department
Fire Prevention Bureau
Post Office Box 100
Menomonee Falls, Wisconsin 53052-0100
(414) 255-3340

3.2 Tank Contents Management

Approximately 175 gallons of diesel fuel and water were removed from the 4,000-gallon UST by National Tank Service of Wisconsin, Inc., on October 10, 1996 prior to beginning the UST closure activities. Copies of the liquid disposal receipts are presented in Appendix 1.

Surplus Product Management:
National Tank Service of Wisconsin, Inc.
1813 South 73rd Street
West Allis, Wisconsin 53214
(414) 257-0030

3.3 Underground Storage Tank System Tank Cleaning and Removal

On October 10, 1996, one (1) 4,000-gallon diesel fuel UST was uncovered and cleaned. The UST was subsequently removed on October 10, 1996 and documented as closed by removal. KEY observed, documented and conducted the closure assessment activities for the UST. Copies of the photographs taken during the tank closure procedures are included in Appendix 2. All proper confined space entry procedures were implemented throughout the UST closure activities.

A circular hole was cut in the side of the UST for cleaning purposes. The UST was constructed of coated steel with a capacity of 4,000-gallons and contained diesel fuel. The 4,000-gallon UST was 5-feet 3-inches in diameter and 24-feet 4-inches long. No holes or cracks were observed in the UST. After the UST cleaning, the UST was transported to Waukesha Iron & Metal Inc. by EETCO for disposal. Following removal of the UST, the cavity was backfilled with clean backfill material and graded to its previous elevation.

The waste generated from the cleaning of the UST was placed in a 55-gallon drum and transported by National Tank Service of Wisconsin on October 15, 1996, to Milwaukee Solvents & Chemicals in Menomonee Falls, Wisconsin. A copy of the uniform hazardous waste manifest is included in Appendix 3. The disposal of the 55-gallon drum of waste was also documented on the liquid disposal receipt included in Appendix 1.

The UST has been registered "Closed by Removal." Copies of the completed "Checklist for Underground Tank Closure" and ILHR 10 Notification Record for the UST are included in Appendix 4.

3.4 Soil Sampling and Analysis

Three (3) soil samples were collected from beneath the 4,000-gallon UST at 9 feet bgs on October 10, 1996. The soil samples were collected at the north (CSN), south (CSS), and center (CSC) of the UST cavity. In addition, a duplicate sample (DUP) was also collected at the north end of the tank cavity. Also, a soil sample (CSP) was collected along the UST pipe run to the former generator building. Soil sampling activities and procedures were observed by Lt. Donald Schulteis of the Menomonee Falls Fire Department. The confirmation sample locations are depicted on Figure 3.

The soil samples were collected using decontaminated sampling tools, while wearing new, latex gloves. The samples were placed in new laboratory approved jars with Teflon® lined lids, preserved as specified in appropriate state agency analytical guidance documents and stored on ice in a cooler during shipment to MVTL Laboratories (Wisconsin Certification #241340550). The sample containers were labeled with the analysis requested, sample identification or name, project number, project name, time and date, and initials of the individual sampler. A chain of custody form was completed which accompanied the samples to the laboratory.

The soil samples were submitted to MVTL for analysis of gasoline range organics (GRO) and diesel range organics (DRO) in accordance with WDNR *Leaking Underground Storage Tank (LUST) and Petroleum Analytical and Quality Assurance Guidance* and WDNR Modified GRO and

DRO Methods for Determining Gasoline Range Organics and Diesel Range Organics. The soil samples were screened for total organic vapors using a photoionization detector (PID) equipped with a 10.6 eV lamp in accordance with WDNR *Field Screening Procedures.*

The soils encountered consisted of silty sand. There was no petroleum odors, staining or free product associated with the soil samples collected or within the soils below the UST. Groundwater was not encountered at any time during the closure process.

The laboratory analytical results indicated that GRO concentrations for the soil samples CSN, CSS, CSC, CSP, and DUP were all <1.0 milligrams per kilogram (mg/kg). The DRO concentrations for the soil samples CSN, CSS, CSC, CSP, and DUP were 1.5 mg/kg, 1.9 mg/kg, 2.1 mg/kg, <1.2 mg/kg, and 1.2 mg/kg, respectively. These concentrations are significantly less than the WDNR screening level for further investigation of the 10 mg/kg and the NR 720 generic residual contaminant level (RCL) of 100 mg/kg for the protection of groundwater. The field screening results for all of the soil samples indicated detections of <2 instrument units (i.u.) of total organic vapors in the samples collected. The results of the laboratory analysis are presented on Table 1. The MVTL Analytical Report and chain of custody form are provided in Appendix 5.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the UST closure site assessment olfactory and visual observations and soil sample field screening and analytical data, a significant petroleum release from the 4,000-gallon diesel fuel UST has not occurred; therefore, no further investigation related to the UST is warranted and WDNR case closure is appropriate.

5.0 GENERAL QUALIFICATIONS

This report was prepared under constraints of cost, time, and scope, and reflects a limited review and evaluation rather than a total, complete or extensive assessment and evaluation.

Our study was performed using the degree of care and skill ordinarily exercised under similar circumstances, by environmental consultants practicing in this or similar localities. No other warranty or guarantee, expressed or implied, is made as to the conclusions and recommendations included in this report.

The findings of this report, to the best of knowledge, are valid as of the date of this study. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, from the broadening of knowledge, or from other reasons. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control.

Specified information contained in this report has been obtained from publicly available sources and other secondary sources of information produced by entities other than Key Environmental Services, Inc. Although care has been taken by Key Environmental Services, Inc., in compiling this information, Key Environmental Services, Inc., disclaims any and all liability for any errors, omissions, or inaccuracies of the third parties in such information and data.

This report was conducted for Mr. Mike Mitchell, the U.S. Army Corps of Engineers and Energy & Environmental Technology Company. The report is the property of the U.S. Army Corps. of Engineers, Energy & Environmental Technology Company and Key Environmental Services, Inc., and cannot be used without written consent from all parties.

6.0 REFERENCES

Field Screening Procedures, PUBL-SW-176-92, Wisconsin Department of Natural Resources, 1992.

Flammable and Combustible Liquids, Chapter ILHR 10, Department of Industry, Labor, and Human Relations, Wisconsin Administrative Code.

Glacial Deposits of Wisconsin, Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension, State Planning Office, Wisconsin Department of Administration, 1976.

Gonthier, Joseph B., Water Table Map of Waukesha County, Wisconsin, December 1972, Groundwater Resources of Waukesha County, Wisconsin, U.S. Geological Survey, Information Circular No. 29, 1975.

Leaking Underground Storage Tank (LUST) and Petroleum Analytical and Quality Assurance Guidance, PUBL-SW-130 93, Wisconsin Department of Natural Resources, 1993.

Mudrey, M.G., Brown, B.A., Jr., and Greenburg, J.K. Bedrock Geologic Map of Wisconsin, Wisconsin Geological and Natural History Survey, 1983.

Site Assessments for Underground Storage Tanks Technical Guidance, PUBL-SW-175 93, Wisconsin Department of Natural Resources, September 1992.

Soils of Wisconsin, Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension, Hanson, G.F., 1968.

Sussex, Wisconsin 7.5 Minute Quadrangle, United States Department of the interior Geological Survey, Wisconsin Geological and Natural History Survey, University of Wisconsin Extension, 1959, Revised 1994.

Trotta, L.C., and Cotter, R.D., Depth to Bedrock in Wisconsin, United States Geological Survey, University of Wisconsin-Extension, Wisconsin Geological and Natural History Survey, 1973.

Wisconsin Administrative Code, Chapter NR 720 Soil Cleanup Standards, Wisconsin Department of Natural Resources.

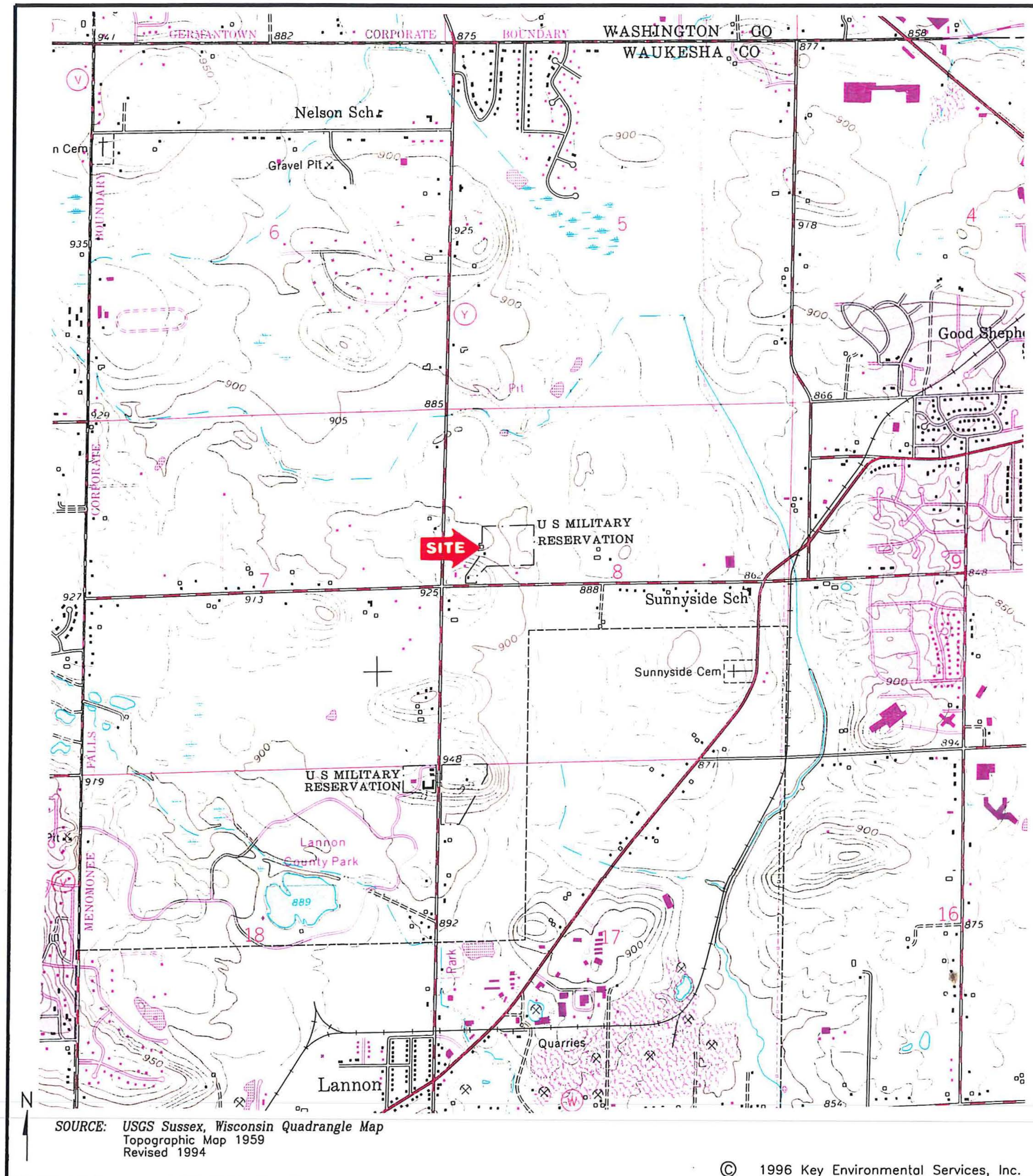
TABLE 1

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS

UST SITE ASSESSMENT/CLOSURE REPORT
FORMER NIKE BATTERY M-86 LAUNCH AREA
N84 W22060 Menomonee Avenue
Menomonee Falls, Wisconsin

SAMPLE ID	**CSN**	**CSS**	**CSP**	**CSC**	**DUP**
GRO (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
DRO (mg/kg)	1.5	1.9	<1.2	2.1	1.2

Notes:
GRO - gasoline range organics
DRO - diesel range organics
mg/kg - milligrams per kilogram



SOURCE: *USGS Sussex, Wisconsin Quadrangle Map*
Topographic Map 1959
Revised 1994

DATE	REVISIONS	INI.

0 1000 2000

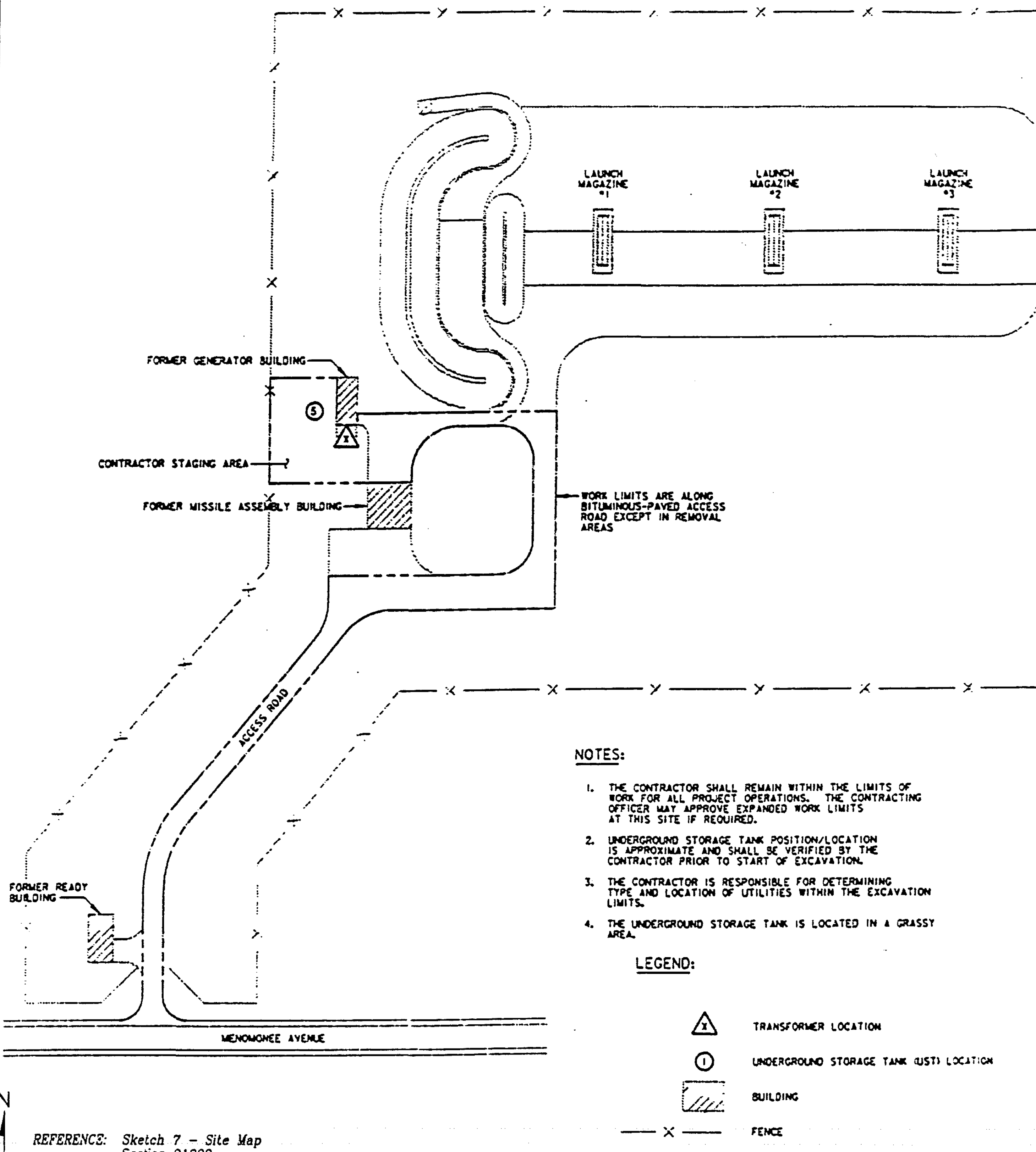
SCALE: 1"=2000'

FIGURE 1
SITE LOCATION MAP

UST SITE ASSESSMENT/CLOSURE REPORT
FORMER NIKE BATTERY M-86 LAUNCH AREA
N84 W22060 MENOMONEE AVENUE
MENOMONEE FALLS, WISCONSIN

DRN. BY:	A.L.R.	DATE:	12/16/96
DSN. BY:	A.L.R.	FILE NO.:	0602003-3
CHK. BY:	G.L.J.	DWG. NO.:	06020031
REV. BY:	K.W.W.	SHEET NO.:	1

Key *ENVIRONMENTAL SERVICES, INC.*
W66 N215 Commerce Court • Cedarburg, WI 53012 • (414) 375-4750
6216 Washington Ave. • Racine, WI 53406 • (414) 886-4439



NOTES:

1. THE CONTRACTOR SHALL REMAIN WITHIN THE LIMITS OF WORK FOR ALL PROJECT OPERATIONS. THE CONTRACTING OFFICER MAY APPROVE EXPANDED WORK LIMITS AT THIS SITE IF REQUIRED.
2. UNDERGROUND STORAGE TANK POSITION/LOCATION IS APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO START OF EXCAVATION.
3. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING TYPE AND LOCATION OF UTILITIES WITHIN THE EXCAVATION LIMITS.
4. THE UNDERGROUND STORAGE TANK IS LOCATED IN A GRASSY AREA.

LEGEND:

TRANSFORMER LOCATION

UNDERGROUND STORAGE TANK (UST) LOCATION

BUILDING

FENCE

REFERENCE: *Sketch 7 – Site Map*
Section 01000
Solicitation, Offer & Award Document

DATE	REVISIONS	INI.

NO SCALE

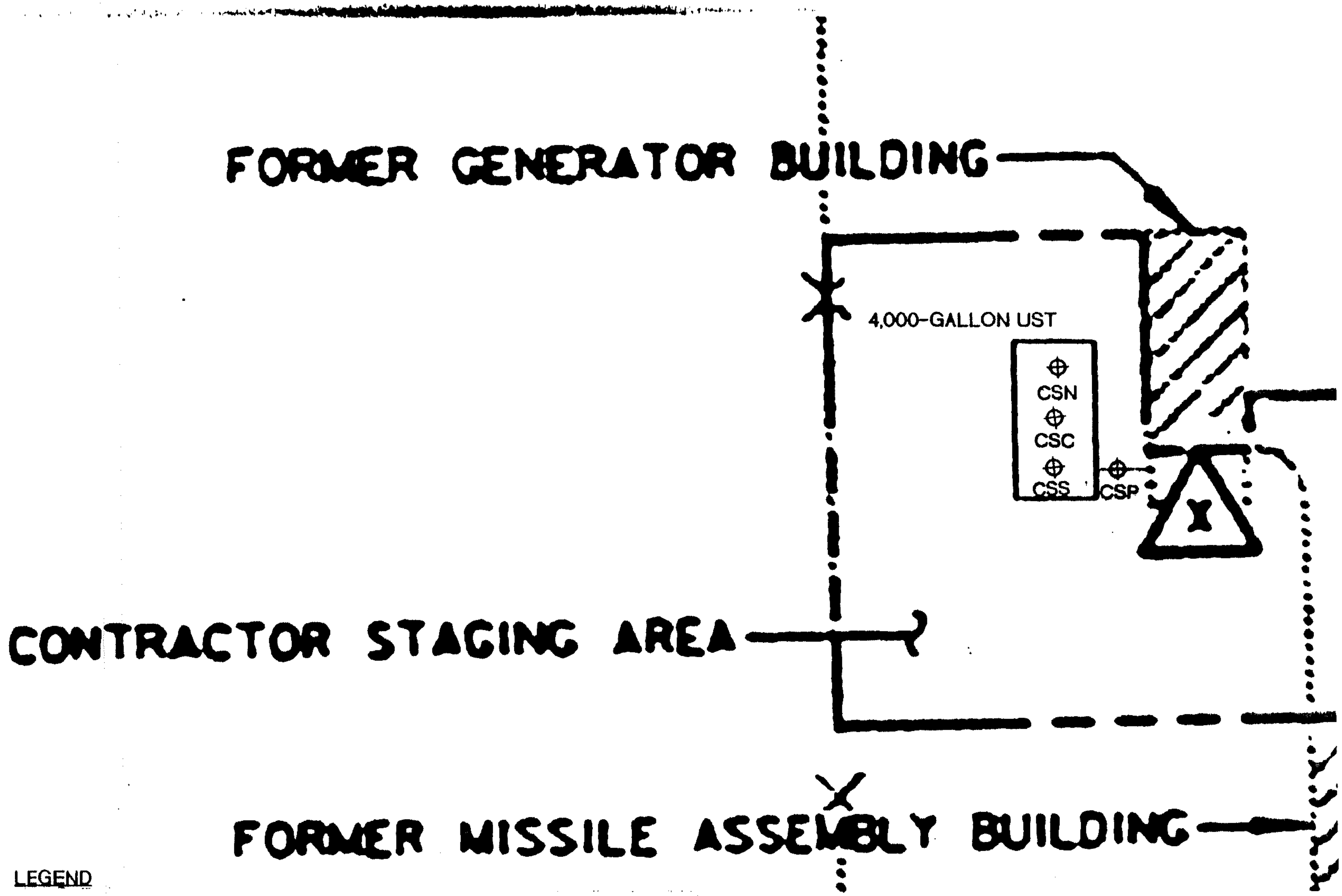
FIGURE 2
SITE LAYOUT MAP

UST SITE ASSESSMENT/CLOSURE REPORT
FORMER NIKE BATTERY M-86 LAUNCH AREA
N84 W22060 MENOMONEE AVENUE
MENOMONEE FALLS, WISCONSIN

DRN. BY:	S.L.G.	DATE:	12/13/96
DSN. BY:	A.L.R.	FILE NO.:	C602C03-3
CHK. BY:	A.L.R.	DWG. NO.:	C6020032
REV. BY:	G.L.J.	SHEET NO.:	2

Key ENVIRONMENTAL SERVICES, INC.

W66 N215 Commerce Court · Cedarburg, WI 53012 · (414) 375-4750
6216 Washington Ave. · Racine, WI 53406 · (414) 386-4439



LEGEND

⊕ CONFIRMATION SAMPLE LOCATION

DATE	REVISIONS	INI.

N

NOT TO SCALE

FIGURE 3
CONFIRMATION SAMPLE LOCATIONS

UST SITE ASSESSMENT/CLOSURE REPORT
FORMER NIKE BATTERY M-86 LAUNCH AREA
N84 W22080 MENOMONEE AVENUE
MENOMONEE FALLS, WISCONSIN

DRN. BY:	A.L.R.	DATE:	12/16/96
DSN. BY:	A.L.R.	FILE NO.:	0602003-3
CHK. BY:	G.L.J.	DWG. NO.:	06030033
REV. BY:	K.W.W.	SHEET NO.:	3

Key ENVIRONMENTAL SERVICES, INC.
W66 N215 Commerce Court • Cedarburg, WI 53012 • (414) 376-4750
6216 Washington Ave. • Racine, WI 53406 • (414) 886-4439

National Tank Service
of Wisconsin, Inc.
1813 South 73rd Street
WEST ALLIS, WISCONSIN 53214

(414) 257-0030

INVOICE

#9956- 36852

DATE	ORDER NO.
Oct. 31, 1996	Kevin

SHIP TO
Menomonee Park - Nike Site
Menomonee Avenue
Menomonee Falls, WI

TO
Aker Companies, Inc.
4025 Holt Road
Holt, MI 48842

SALESPERSON	DATE SHIPPED	SHIPPED VIA	F.O.B. POINT	TERMS
Oct. 15	Oct. 10, & Oct. 15&16, 1996	Our Truck		Net 30 Days

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
Oct. 10,	Pumped out and disposed of 175 gals. of fuel oil and		
	water from underground storage tank @ .30/gal. --------	52.50	
	Man and equipment for 2 hours @ $59.00/hour -----------	118.00	
Oct. 15,	Picked up 1-barrel of waste for final disposal as follows:		
	1-barrel of waste @ $350.00/each ------------------	350.00	
	1-Lab analysis fee ------------------------------	256.00	
	Pick-up fee ----------------------------------	35.00	
			$811.50
	Disposed of at Milwaukee Solvents & Chemicals; N59-W14776		
	Bobolink Ave.; Menomonee Falls, WI. EPA #WID023350192		
	Manifest #WI J687548		

ORIGINAL

Thank You!

STRAIGHT BILL OF LADING – SHORT FORM – Original – Not Negotiable

Shipper's No. ____

(Carrier) NATIONAL TANK SERVICE OF WI, INC. SCAC. ____ Carrier's No. #9956

Received, subject to the classifications and tariffs in effect on the date of this Bill of Lading:

at ____, date OCT. 10, 1996 from ____

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained (as specified in Appendix B to Part 1035) which are hereby agreed to by the shipper and accepted for himself and his assigns.

TO: (Mail or street address of consignee for purposes of notification only.)	FROM:
Consignee NATL TANK SERV 1813 S.73	Shipper AKER CO/OLD NIKE SITE MENOMONEE AVE
Street WEST ALLIS WI.	Street MENO FALLS WI
Destination Zip	Origin Zip
Route:	

Delivering Carrier	Trailer Initial/Number	U.S. DOT Hazmat Reg. Number
	38	051096-004-021E

No.	HM	Description and exceptions	Hazard Class	I.D. Number	Packing Group	Weight	Rate	Charges	Check column
1TT	X	Fuel oil Solution	3	NA 1993	III	175	GALS		
		ERG # 128							
		PUMPED OUT FREE LIQUIDS ONLY NO SLUDGE TAKEN							

Remit C.O.D. to:
Address:
City: State: Zip:

COD AMT: $

Charges Advanced $

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

C. O. D. FEE: Prepaid ☐ Collect ☐ $

FREIGHT CHARGES ☐ Prepaid ☐ Collect

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

PLACARDS REQUIRED 3 1993

PLACARDS SUPPLIED ☐ YES ☒ NO - FURNISHED BY CARRIER

DRIVER'S SIGNATURE: BJ

SPECIAL INSTRUCTIONS:

SHIPPER: AKER CO/Old NIKE SITE K.R. CARRIER: NATL TANK SERV

PER: [signature] DATE: 10/10/96 PER: [signature] DATE 10/10/96

EMERGENCY RESPONSE TELEPHONE NUMBER: (414)588-0501

Permanent post office address of shipper.

Monitored at all times the Hazardous Material is in transportation including storage incidental to transportation.

PHOTOGRAPH 1:

Removal of 4,000 gallon diesel fuel UST. Viewing south.

PHOTOGRAPH 2:

Removal of UST pipe line. Viewing northwest.

PHOTOGRAPH 3:

Cleaned 4,000 gallon diesel fuel UST ready for disposal.

#50552

SEE INSTRUCTIONS ON REVERSE SIDE OF COPY 6.

STATE OF WISCONSIN
Chapter 144, Wis. Stats.
Form 4400-68P Rev. 5-95

ALL COPIES MUST BE LEGIBLE, PLEASE TYPE

State of Wisconsin
Department of Natural Resources
Bureau of Solid and Hazardous Waste Mgt.
Box 8094
Madison, Wisconsin 53708

FOR DNR USE ONLY

Form designed for use on elite (12-pitch) typewriter.

Form Approved. OMB No. 2050-0039. Expires 9-30-9

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. WIR000018218 | Manifest Document No. 87546 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Army Corp - N-86 Launch Site
810 Pine St. Ste B Hastings, MN 55033-
Site Location If Different: Menomonee Park

4. Generator's Phone (810) 569-8604

[redacted]

5. Transporter 1 Company Name: National Tank Service of WI.
6. US EPA ID Number: WID073838880

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
Milwaukee Solvents & Chemicals
N59 W16776 Bobolink Ave
Menomonee Falls, WI 53051-
10. US EPA ID Number: WID023350192

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. RQ Hazadrous Waste Liquid N.O.S., Contains(Fuel Oil), 9, NA3082, PG III, (D018), (171)	1	DM	400	P
b.				
c.				
d.				

[redacted]

15. Special Handling Instructions and Additional Information
MilSolv #1F1496B
EMERGENCY PHONE : (414) 588-0501 EMERGENCY CONTACT : Natl. Tank Servic

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations and according to the requirements of the Wisconsin Department of Natural Resources. If I am a large quantity generator, I also certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment;

OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name & Position Title: [illegible] | Signature: [illegible] | Date Month Day Year: [illegible]

17. TRANSPORTER 1 Acknowledgement of Receipt of Materials
Printed/Typed Name & Position Title: [illegible] James Driver | Signature: [illegible] | Date Month Day Year: 10 15 96

18. TRANSPORTER 2 Acknowledgement of Receipt of Materials
Printed/Typed Name & Position Title: [illegible] | Signature: [illegible] | Date Month Day Year: 10 16 96

19. Discrepancy Indication Space

20. FACILITY OWNER OR OPERATOR: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name & Position Title: Judy Nuke Manager | Signature: Judy Nuke | Date Month Day Year: 10 16 96

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

Copy Distribution: 1 — Generator send to Wis. DNR; 2 — Generator retain; 3 — Facility send to Wis. DNR; 4 — Facility retain; 5 — Facility send to Generator; 6 — Transporter retain

Emergency 24 Hour Assistance Telephone Number In Wisconsin (608) 266-3232

COPY 6-

Wisconsin Department of Industry, Labor and Human Relations

Complete one form for each site closure.

CHECKLIST FOR UNDERGROUND TANK CLOSURE

The information you provide may be used by other government agency programs [Privacy Law, s. 15.04 (1) (m)].

RETURN COMPLETED CHECKLIST TO:
Safety & Buildings Division
Fire Prevention & Underground Storage Tank Section
P. O. Box 7969, Madison, WI 53707

A. IDENTIFICATION: (Please Print) Indicate whether closure is for: [X] Tank System [ ] Tank Only [ ] Piping Only

1. Site Name: NI-86 LAUNCH AREA
2. Owner Name: ARMY CORPS OF ENGINEER

Site Street Address (not P.O. Box): N84W 22060 MENOMONEE AVE
Owner Street Address: 801 PINE ST (B)

[ ] City [X] Village [ ] Town of: MENOMONEE FALLS
[X] City [ ] Village [ ] Town of: HASTINGS State: MN Zip Code: 55033

State: WI Zip Code: County: WAUKESHA
County: DAKOTA Telephone No. (include area code): (612) 290-5438

3. Closure Company Name (Print): ENERGY & ENVIRONMENTAL TECHNOLOGY/CO
Closure Company Street Address: 17117 W. NINE MILE RD., SUITE 537
Closure Company Telephone No. (include area code): (810) 569-8604
Closure Company City, State, Zip Code: SOUTHFIELD, MI 48075

4. Name of Company Performing Closure Assessment: KEY ENVIRONMENTAL
Assessment Company Street Address, City, State, Zip Code: W66N215 COMMERCE CT CEDARBURG WI 53012

Telephone # (include area code): (414) 375-4750
Certified Assessor Name (Print): JAMES J TREUL
Assessor Signature:
Assessor Certification No.: ~~06800~~ 06800

Tank ID #	Closure	Temp. Closure	Closure In Place	Tank Capacity	Contents *	Closure Assessment
1. UNK	[X]	[ ]	[ ]	4000	01	[X] Y [ ] N
2.	[ ]	[ ]	[ ]			[ ] Y [ ] N
3.	[ ]	[ ]	[ ]			[ ] Y [ ] N
4.	[ ]	[ ]	[ ]			[ ] Y [ ] N
5.	[ ]	[ ]	[ ]			[ ] Y [ ] N
6.	[ ]	[ ]	[ ]			[ ] Y [ ] N

* Indicate which product by numeric code: 01-Diesel; 02-Leaded; 03-Unleaded; 04-Fuel Oil; 05-Gasohol; 06-Other; 09-Unknown; 10-Premix; 11-Waste oil; 13-Chemical (indicate the chemical name(s) or numbers(s) ______ ______ ______; 14-Kerosene; 15-Aviation.

Written notification was provided to the local agent 15 days in advance of closure date. [X] Y [ ] N [ ] NA
All local permits were obtained before beginning closure. [X] Y [ ] N [ ] NA

Check applicable box at right in response to all statements in Sections B - E.

B. TEMPORARILY OUT OF SERVICE

	Remover Verified	Inspector Verified	NA
Written inspector approval of temporary closure obtained, which is effective until (provide date) ______	[ ] Y [ ] N	[ ]	[ ]
1. Product Removed			
a. Product lines drained into tank (or other container) and resulting liquid removed, AND	[ ] Y [ ] N	[ ]	[ ]
b. All product removed to bottom of suction line, OR	[ ] Y [ ] N	[ ]	[ ]
c. All product removed to within 1" of bottom.	[ ] Y [ ] N	[ ]	[ ]
2. Fill pipe, gauge pipe, tank truck vapor recovery fittings, and vapor return lines capped.	[ ] Y [ ] N	[ ]	[ ]
3. All product lines at the islands or pumps located elsewhere are removed and capped, OR	[ ] Y [ ] N	[ ]	[ ]
4. Dispensers/pumps left in place but locked and power disconnected.	[ ] Y [ ] N	[ ]	[ ]
5. Vent lines left open.	[ ] Y [ ] N	[ ]	[ ]
6. Inventory form filed indicating temporary closure.	[ ] Y [ ] N	[ ]	[ ]

C. CLOSURE BY REMOVAL

	Remover Verified	Inspector Verified	NA
1. Product from piping drained into tank (or other container).	[X] Y [ ] N	[ ]	[ ]
2. Piping disconnected from tank and removed.	[X] Y [ ] N	[ ]	[ ]
3. All liquid and residue removed from tank using explosion proof pumps or hand pumps.	[X] Y [ ] N	[ ]	[ ]
4. All pump motors and suction hoses bonded to tank or otherwise grounded.	[X] Y [ ] N	[ ]	[ ]
5. Fill pipes, gauge pipes, vapor recovery connections, submersible pumps and other fixtures removed.	[X] Y [ ] N	[ ]	[ ]
NOTE: DROP TUBE SHOULD NOT BE REMOVED IF THE TANK IS TO BE PURGED THROUGH THE USE OF AN EDUCTOR.			
6. Vent lines left connected until tanks purged.	[X] Y [ ] N	[ ]	[ ]
7. Tank openings temporarily plugged so vapors exit through vent.	[X] Y [ ] N	[ ]	[ ]
8. Tank atmosphere reduced to 10% of the lower flammable range (LEL) - see Section F.	[X] Y [ ] N	[ ]	[ ]
9. Tank removed from excavation after **PURGING/INERTING**, placed on level ground and blocked to prevent movement.	[X] Y [ ] N	[ ]	[ ]
10. Tank cleaned before being removed being removed from site.	[X] Y [ ] N	[X]	[ ]

- CONTINUE ON NEXT PAGE -

	Remover Verified	Inspector Verified	NA
C. CLOSURE BY REMOVAL (continued)			
11. Tank labeled in 2" high letters after removal but before being moved from site.	☒ Y ☐ N	☑	☐
NOTE: COMPLETE TANK LABELING SHOULD INCLUDE WARNING AGAINST REUSE; FORMER CONTENTS; VAPOR STATE; VAPOR FREEING TREATMENT; DATE.			
12. Tank vent hole (1/8 th " in uppermost part of tank) installed prior to moving the tank from site.	☒ Y ☐ N	☑	☐
13. Inventory form filed by owner with Safety and Buildings Division indicating closure by removal.	☒ Y ☐ N	☐	☐
14. Site security is provided while the excavation is open.	☒ Y ☐ N	☐	☐
D. CLOSURE IN PLACE			
NOTE: CLOSURES IN PLACE ARE ONLY ALLOWED WITH THE PRIOR WRITTEN APPROVAL OF THE DEPARTMENT OF INDUSTRY, LABOR AND HUMAN RELATIONS OR LOCAL AGENT.			
1. Product from piping drained into tank (or other container).			
2. Piping disconnected from tank and removed.	☐ Y ☐ N	☐	☐
3. All liquid and residue removed from tank using explosion proof pumps or hand pumps.	☐ Y ☐ N	☐	☐
4. All pump motors and suction hoses bonded to tank or otherwise grounded.	☐ Y ☐ N	☐	☐
5. Fill pipes, gauge pipes, vapor recovery connections, submersible pumps and other fixtures removed.	☐ Y ☐ N	☐	☐
NOTE: DROP TUBE SHOULD NOT BE REMOVED IF THE TANK IS TO BE PURGED THROUGH THE USE OF AN EDUCTOR - EDUCTOR OUTPUT 12 FT ABOVE GRADE.			
6. Vent lines left connected until tanks purged.	☐ Y ☐ N	☐	☐
7. Tank openings temporarily plugged so vapors exit through vent.	☐ Y ☐ N	☐	☐
8. Tank atmosphere reduced to 10% of the lower flammable range (LEL) - see Section F.	☐ Y ☐ N	☐	☐
9. Tank properly cleaned to remove all sludge and residue.	☐ Y ☐ N	☐	☐
10. Solid inert material (sand, cyclone boiler slag, pea gravel recommended) introduced and tank filled.	☐ Y ☐ N	☐	☐
11. Vent line disconnected or removed.	☐ Y ☐ N	☐	☐
12. Inventory form filed by owner with Safety and Buildings Division indicating closure in place.	☐ Y ☐ N	☐	☐
E. CLOSURE ASSESSMENTS			
NOTE: DETERMINE IF A CLOSURE ASSESSMENT IS REQUIRED BY REFERRING TO ILHR 10.			
1. Individual conducting the assessment has a closure assessment plan (written) which is used as the basis for their work on the site.	☒ Y ☐ N	☐	☐
2. Do points of obvious contamination exist?	☐ Y ☒ N	☑	☐
3. Are there strong odors in the soils?	☐ Y ☒ N	☑	☐
4. Was a field screening instrument used to pre-screen soil sample locations?	☒ Y ☐ N	☐	☐
5. Was a closure assessment omitted because of obvious contamination?	☐ Y ☒ N	☑	☐
6. Was the DNR notified of suspected or obvious contamination? Agency, office and person contacted:	☐ Y ☒ N	☑	☐
7. Contamination suspected because of: ☐ Odor ☐ Soil Staining ☐ Free Product ☐ Sheen On Groundwater ☐ Field Instrument Test			

F. METHOD OF ACHIEVING 10% LEVEL DESCRIPTION

☐ Educator Or Diffused Air Blower

Eductor driven by compressed air, bonded and drop tube left in place; vapors discharged minimum of 12 feet above ground. Diffused air blower bonded and drop tube removed. Air pressure not exceeding 5 psig.

☐ Dry Ice

Dry ice introduced at 1.5 pounds per 100 gallons of tank capacity. Dry ice crushed and distributed over the greatest possible tank area. Dry ice evaporated before proceeding.

☐ Inert Gas (CO/2 or N/2) **NOTE: INERT GASSES PRODUCE AN OXYGEN DEFICIENT ATMOSPHERE. THE TANK MAY NOT BE ENTERED IN THIS STATE WITHOUT SPECIAL EQUIPMENT**

Gas introduced through a single opening at a point near the bottom of the tank at the end of the tank opposite the vent. Gas introduced under low pressure not to exceed 5 psig to reduce static electricity. Gas introducing device grounded.

☒ Tank atmosphere monitored for flammable or combustible vapor levels.

Calibrate combustible gas indicator. Drop tube removed prior to checking atmosphere. Tank space monitored at bottom, middle and upper portion of tank. Readings of 10% or less of the lower flammable range (LEL) obtained before removing tank from ground.

G. NOTE SPECIFIC PROBLEMS OR NONCOMPLIANCE ISSUES BELOW

H. REMOVER/CLEANER INFORMATION

Remover Name (print)	Remover Signature	Remover Certification No.	Date Signed
James Trful	[signature]	06800	10-10-96

I. INSPECTOR INFORMATION

Inspector Name (print)	Inspector Signature	Inspector Certification No.
Lt Donald Schultheis	[signature]	TI 00209

FDID # For Location Where Inspection Performed	Inspector Telephone Number	Date Signed
67032	(414) 255-3340	10/10/96

REMOVER

ILHR 10 Notification Record

TO: _______________ OFFICE LOCATION: _______________

LOCATION / IDENTIFICATION (Please Print or Type)

Site Name		Owner Name		
M-86 LAUNCH		MIKE Mitchel		
Site Street Address		Owner Street or PO Address		
N84W22060 Menomonee AVE		403 N 91ST		
☒ City ☐ Village ☐ Town of		☒ City ☐ Village ☐ Town of		
Menomonee Falls		MILWAUKEE		
County	Zip Code	State	Zip Code	Telephone
WAUKESHA	53051	WI	53226	(414) 229-4951

Fire Department Providing Fire Protection Coverage:

Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04 (1)(m)].

Name of Contractor: KEY ENVIRONMENTAL

Address of Contractor: W66N215 Commerce CT

City/Town: CEDARBURG WI 53012

Telephone Number: (414) 375-4750 FAX Number: (414) 375-9680

Date work is to begin: 4-15-96

ILHR 10 Certified project supervisor: JAMES J TROUL 06800

Project will involve:

	Number of tanks UST	AST	Plan Approval No.	Appr. Date
Tank Installation	☐	☐		
Piping Installation	☐	☐		
Piping Upgrade	☐	☐		
Leak Detection Upgrade	☐	☐		
Spill/Overfill Protection	☐	☐		
Stage II Vapor Recovery	☐	☐		
Tank Closure	■	☐		

Remarks: 1 - 3000 gallon Diesel

State of Wisconsin
Dept. of Industry, Labor & Human Relations
Safety & Buildings Division
Storage Tank, Permit & Registration Section

SBDP-9198 (R.04/95)

MVTL LABORATORIES, Inc.
140 E. Ryan Road, Oak Creek, WI 53154-4599
414-764-7005 • FAX 414-764-0486 • 1-800-422-2195
WE ARE AN EQUAL OPPORTUNITY EMPLOYER

MEMBER ACIL

Final Report : 10/16/96

Report:	10/16/96
Project Number:	00261758
Lab ID:	96-0015039
Lab Matrix:	sl
Account Number:	30515-30515
Date Collected:	10/10/96 14:00
Collected By:	Client
Date Received:	10/11/96 08:10
C of C Number:	22643
Temperature:	Received on Ice.

Attention: Chris Frayer
Energy & Env. Technology Company
17117 W. Nine Mile Road
Suite 537
Southfield MI 48075-4512

Sample Desc: CSN/Soil/M-86 Launch 0602003

Container Integrity: Meets Standard, Sample Integrity: Meets Standard

	Wet Result	Dry Result	Unit	MDL	PQL	Procedure	Test Date
INORGANIC							
LUST							
% moisture	19		%	0.10	0.10	SW 5030	10/14/96
ORGANIC							
LUST							
Diesel Range Organics	1.2 J	1.5	mg/kg	1.2	4.9	WIMODDRO	10/14/96
Gasoline Range Organics	<0.82	<1.0	mg/kg	1.0	6.2	WIMODGRO	10/15/96

Approved By:
Signatory

All soil and water samples will be disposed of by MVTL 60 days following date of receipt.
All waste samples (non-water, non-soil) will be returned 60 days following date of receipt.
N/T = Not Tested, N/A = Not Applicable, N/D = Not Detected
D = Detected below the PQL. J = Estimated below the PQL
Elevated Detection Limits:
@ = Due to matrix interference. # = Due to sample concentration.
$ = Due to sample quantity. + = Due to extract volume.

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140 E. Ryan Road, Oak Creek, WI 53154-4599
414-764-7005 • FAX 414-764-0486 • 1-800-422-2195
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MEMBER ACIL

Final Report : 10/16/96

Report:	10/16/96
Project Number:	00261758
Lab ID:	96-0015040
Lab Matrix:	sl
Account Number:	30515-30515
Date Collected:	10/10/96 14:05
Collected By:	Client
Date Received:	10/11/96 08:10
C of C Number:	22643
Temperature:	Received on Ice.

Attention: Chris Frayer
Energy & Env. Technology Company
17117 W. Nine Mile Road
Suite 537
Southfield MI 48075-4512

Sample Desc: CSS/Soil/M-86 Launch 0602003

Container Integrity: Meets Standard, Sample Integrity: Meets Standard

	Wet Result	Dry Result	Unit	MDL	PQL	Procedure	Test Date
INORGANIC							
LUST							
% moisture	20		%	0.10	0.10	SW 5030	10/14/96
ORGANIC							
LUST							
Diesel Range Organics	1.5 J	1.9	mg/kg	1.2	5.0	WIMODDRO	10/14/96
Gasoline Range Organics	<0.82	<1.0	mg/kg	1.0	6.2	WIMODGRO	10/15/96

Approved By:
TGB
Signatory

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All waste samples (non-water, non-soil) will be returned 60 days following date of receipt.
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D = Detected below the PQL. J = Estimated below the PQL
Elevated Detection Limits:
@ = Due to matrix interference. # = Due to sample concentration.
$ = Due to sample quantity. + = Due to extract volume.

MEMBER ACIL

MVTL LABORATORIES, Inc.

140 E. Ryan Road, Oak Creek, WI 53154-4599
414-764-7005 • FAX 414-764-0486 • 1-800-422-2195
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Final Report : 10/16/96

Report:	10/16/96
Project Number:	00261758
Lab ID:	96-0015041
Lab Matrix:	sl
Account Number:	30515-30515
Date Collected:	10/10/96 14:10
Collected By:	Client
Date Received:	10/11/96 08:10
C of C Number:	22643
Temperature:	Received on Ice.

Attention: Chris Frayer
Energy & Env. Technology Company
17117 W. Nine Mile Road
Suite 537
Southfield MI 48075-4512

Sample Desc: CSP/Soil/M-86 Launch 0602003

Container Integrity: Meets Standard, Sample Integrity: Meets Standard

	Wet Result	Dry Result	Unit	MDL	PQL	Procedure	Test Date
INORGANIC							
LUST							
% moisture	19		%	0.10	0.10	SW 5030	10/14/96
ORGANIC							
LUST							
Diesel Range Organics	<1.0	<1.2	mg/kg	1.2	4.9	WIMODDRO	10/14/96
Gasoline Range Organics	<0.82	<1.0	mg/kg	1.0	6.2	WIMODGRO	10/15/96

Approved By:
Signatory

All soil and water samples will be disposed of by MVTL 60 days following date of receipt.
All waste samples (non-water, non-soil) will be returned 60 days following date of receipt.
N/T = Not Tested, N/A = Not Applicable, N/D = Not Detected
D = Detected below the PQL. J = Estimated below the PQL
Elevated Detection Limits:
@ = Due to matrix interference. # = Due to sample concentration.
$ = Due to sample quantity. + = Due to extract volume.

MVTL LABORATORIES, Inc.
140 E. Ryan Road, Oak Creek, WI 53154-4599
414-764-7005 • FAX 414-764-0486 • 1-800-422-2195
WE ARE AN EQUAL OPPORTUNITY EMPLOYER

MEMBER ACIL

Final Report : 10/16/96

Report:	10/16/96
Project Number:	00261758
Lab ID:	96-0015042
Lab Matrix:	sl
Account Number:	30515-30515
Date Collected:	10/10/96 14:15
Collected By:	Client
Date Received:	10/11/96 08:10
C of C Number:	22643
Temperature:	Received on Ice.

Attention: Chris Frayer
Energy & Env. Technology Company
17117 W. Nine Mile Road
Suite 537
Southfield MI 48075-4512

Sample Desc: CSC/Soil/M-86 Launch 0602003

Container Integrity: Meets Standard, Sample Integrity: Meets Standard

	Wet Result	Dry Result	Unit	MDL	PQL	Procedure	Test Date
NORGANIC							
LUST							
% moisture	19		%	0.10	0.10	SW 5030	10/14/96
RGANIC							
LUST							
Diesel Range Organics	1.7 J	2.1	mg/kg	1.2	4.9	WIMODDRO	10/14/96
Gasoline Range Organics	<0.82	<1.0	mg/kg	1.0	6.2	WIMODGRO	10/15/96

Approved By:

Signatory

All soil and water samples will be disposed of by MVTL 60 days following date of receipt.
All waste samples (non-water, non-soil) will be returned 60 days following date of receipt.

N/T = Not Tested, N/A = Not Applicable, N/D = Not Detected
D = Detected below the PQL. J = Estimated below the PQL

Elevated Detection Limits:
@ = Due to matrix interference. # = Due to sample concentration.
$ = Due to sample quantity. + = Due to extract volume.

MVTL LABORATORIES, Inc.
140 E. Ryan Road, Oak Creek, WI 53154-4599
414-764-7005 • FAX 414-764-0486 • 1-800-422-2195
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MEMBER ACIL

Final Report : 10/16/96

Report: 10/16/96
Project Number: 00261758
Lab ID: 96-0015043
Lab Matrix: sl
Account Number: 30515-30515
Date Collected: 10/10/96 14:25
Collected By: Client
Date Received: 10/11/96 08:10
C of C Number: 22643
Temperature: Received on Ice.

Attention: Chris Frayer
Energy & Env. Technology Company
17117 W. Nine Mile Road
Suite 537
Southfield MI 48075-4512

Sample Desc: DUP/Soil/M-86 Launch 0602003

Container Integrity: Meets Standard, Sample Integrity: Meets Standard

	Wet Result	Dry Result	Unit	MDL	PQL	Procedure	Test Date
INORGANIC							
LUST							
% moisture	20		%	0.10	0.10	SW 5030	10/14/96
ORGANIC							
LUST							
Diesel Range Organics	1.0 J	1.2	mg/kg	1.2	5.0	WIMCDDRO	10/14/96
Gasoline Range Organics	<0.82	<1.0	mg/kg	1.0	6.2	WIMCDGRO	10/15/96

Approved By:
Signatory

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All waste samples (non-water, non-soil) will be returned 60 days following date of receipt.
N/T = Not Tested, N/A = Not Applicable, N/D = Not Detected
D = Detected below the PQL. J = Estimated below the PQL
Elevated Detection Limits:
@ = Due to matrix interference. # = Due to sample concentration.
$ = Due to sample quantity. + = Due to extract volume.

MEMBER ACIL

MVTL LABORATORIES, Inc.
140 E. Ryan Road, Oak Creek, WI 53154-4599
414-764-7005 • FAX 414-764-0486 • 1-800-422-2195
WE ARE AN EQUAL OPPORTUNITY EMPLOYER

Final Report : 10/16/96

Report:	10/16/96
Project Number:	00261758
Lab ID:	96-0015044
Lab Matrix:	lw
Account Number:	30515-30515
Date Collected:	10/10/96 14:30
Collected By:	Client
Date Received:	10/11/96 08:10
C of C Number:	22643
Temperature:	Received on Ice.

Attention: Chris Frayer
Energy & Env. Technology Company
17117 W. Nine Mile Road
Suite 537
Southfield MI 48075-4512

Sample Desc: Meoh Blank/M-86 Launch 0602003

Container Integrity: Meets Standard, Sample Integrity: Meets Standard

	Wet Result	Dry Result	Unit	MDL	PQL	Procedure	Test Date
ORGANIC							
LUST							
Gasoline Range Organics	<0.82	N/A	ppm	0.82	5.0	WIMODGRO	10/15/96

Approved By:

Signatory

All soil and water samples will be disposed of by MVTL 60 days following date of receipt.
All waste samples (non-water, non-soil) will be returned 60 days following date of receipt.
N/T = Not Tested, N/A = Not Applicable, N/D = Not Detected
D = Detected below the PQL. J = Estimated below the PQL
Elevated Detection Limits:
@ = Due to matrix interference. # = Due to sample concentration.
$ = Due to sample quantity. + = Due to extract volume.

MVTL LABORATORIES, Inc. EETCO

Chain-of-Custody: 22643

THE PEOPLE WE SERVE . . CARE ABOUT THE ENVIRONMENT

Page ____ of ____

140 EAST RYAN ROAD•OAK CREEK•WISCONSIN•53154 •414-764-7005•1-800-422-2195•CLIENT SERVICES 414-768-7460•FAX 414-764-0486

(1) CLIENT: KEY ENVIRONMENTAL

PROJECT NAME/#: M-86 LAUNCH 0602003

PROJECT MANAGER: GREG JOHNSON

SAMPLER: James Treul

P.O. # ____

(3) UST STATE
WPDES
NPDES
RCRA
PECFA
OTHER

(5) MATRIX

(6) ANALYSIS REQUESTED (METHODS & DETECTION LIMITS)

LAB USE ONLY
WORK ORDER #: ____

ACCT # 30515
DATE 10/11/96
TEMP \ NR \ ROI
MVTL WORK ORDER #:

(2) SAMPLE IDENTIFICATION	DATE	TIME	(4) GRAB	COMPOSITE	# OF CONTAINERS	SOIL	GROUND WATER	WASTE	WASTEWATER	OTHER	PRESERVATION TYPE	GRO	DRO	%						(7) REMARKS
(1) CSN	10/10/96	1400 AM/PM	X		3	X					MeOH	X	X	X						15039
(2) CSS	10/10/96	1405 AM/PM	X		3	X					MeOH	X	X	X						15040
(3) CSP	10/10/96	1410 AM/PM	X		3	X					MeOH	X	X	X						15041
(4) CSC	10/10/96	1415 AM/PM	X		3	X					MeOH	X	X	X						15042
(5) DUP	10/10/96	1425 AM/PM	X		3	X					MeOH	X	X	X						15043
(6) MeOH BLANK	10/10/96	1430 AM/PM	X		1					X	MeOH	X								15044
(7)		AM/PM																		
(8)		AM/PM																		

TURNAROUND TIME IN WORKING DAYS
NORMAL *1 *2 *3 *4 *5 *6 *7 *8 *9 *10
* FOR EXPEDITED TURNAROUND TIME CALL CLIENT SERVICES TO CONFIRM AVAILABILITY AT 414-768-7460
EXPEDITED RESULTS TO BE TRANSMITTED VIA: FAX PHONE
FAX # (810) 569-8704 PHONE # (810) 569-8604
PAGER (810) 769-0421

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[signature]	10/10/96	1500 AM/PM	[signature]	10/10/96	1500 AM/PM
[signature]	10/11/96	0810 AM/PM	J. Larson	10/11/96	8:10 AM/PM
		AM/PM			AM/PM
		AM/PM			AM/PM
		AM/PM			AM/PM

DATA PACKAGE OPTIONS AVAILABLE FOR A FEE
(PLEASE CIRCLE IF REQUIRED) PACKAGE A B
SEE BACK FOR COMPLETE PACKAGE DESCRIPTIONS

OTHER SPECIAL INSTRUCTIONS: KEY ENVIRONMENTAL INC
W66N215 Commerce Ct
CEDARBURG WI 53012

IN CASE WE HAVE QUESTIONS WHEN SAMPLES ARRIVE, MVTL LABORATORIES, INC. SHOULD CALL:
NAME: GREG JOHNSON PHONE # 375-4750
SEND REPORTS TO KEY ENVIRONMENTAL

268328940

22 November 1996

To: Wisconsin Department of Natural Resources
Southeast District
2300 N. Dr. Martin Luther King Jr. Drive
Milwaukee, Wisconsin

From: Randy Sitton
U.S. Army Corps of Engineers
Oconomowoc Project Office
Ashippun, Wisconsin 53003

1. Enclosed for your information is a copy of Special Waste Manifest Disposal Ticket Number 524828 for contaminated soil that was transported from the Menomonee Falls NIKE Site to Waste Management of Wisconsin, W124 N8925 Boundary Road, Menomonee Falls, Wisconsin 53051.

2. If there are any questions, please call me at 414-474-4438.

Randy Sitton

Randy Sitton
Project Engineer

Copy Furnished: Arne Thomsen, Hastings Resident Office

SPECIAL WASTE MANIFEST DISPOSAL TICKET — 524828

ORCHARD RIDGE RECYCLING and DISPOSAL FACILITY

A Waste Management Company

W124 N8925
Boundary Road
Menomonee Falls, WI.
53051

BILL TO: Energy and Environmental Technology Company

TRANSPORTER: SAG Environmental

GENERATOR: Army Corp of Engineers

GENERATORS SIGNATURE: Randy W. Hilton 21 November 1996 Date

24.56 Tons (actual quantity)

WASTE DESCRIPTION: Contaminated Soil

PROFILE # BI057840

ACCEPTED BY: Y Bruner 11/21/96 Date

WDNR (EST 25TONS)

DRIVERS SIGNATURE: Craig Bl 11/21/96 Date TRUCK NO. 13264 ______ TONS/YARDS

WISCSB793 #301

WHITE & YELLOW - GENERATOR COPY / PINK - DISPOSAL SITE COPY / GOLD - TRANSPORTER COPY DCE-009-94

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
ARMY CORPS OF ENGINEERS CENTRE
190 FIFTH STREET EAST
ST. PAUL, MN 55101-1638

REPLY TO
ATTENTION OF

January 24, 1996

Management and Evaluation Branch
Engineering and Planning Division

Subject: Defense Environmental Restoration Program - Formerly Used Defense Sites (DERP-FUDS) in Wisconsin

Mr. John Krahling
Wisconsin Department of Natural Resources
Southeast District
P.O. Box 12436
4041 North Richards Street
Milwaukee, Wisconsin 53212

Dear Mr. Krahling:

Enclosed, in response to your January 23, 1996 telephone conversation with Lisa Hedin, is a table listing all of the DERP-FUDS sites identified to date in the State of Wisconsin. The table includes a brief discussion of the past and future activity at each site, as well as estimated dates for completion of known environmental restoration. Note that properties with identified underground storage tanks that have not yet been allocated funds have been identified.

Also enclosed are the analytical results from sampling completed on water contained in the missile launch silos at the former NIKE Battery M-86 located in Menomonee Falls, Wisconsin. The St. Paul District currently has a contract in place to remove two underground storage tanks and an electrical transformer identified at this site. The St. Paul District is considering modifying the contract to include disposal of the water contained in the launch bays. Spray irrigation on the site is the proposed disposal method. Please review the enclosed analytical test results and provide comments.

The environmental restoration at the former NIKE Battery M-86 is being fully coordinated with the current site owner:

Mr. Mike Mitchell
403 North 91st Street
Milwaukee, Wisconsin 53226.

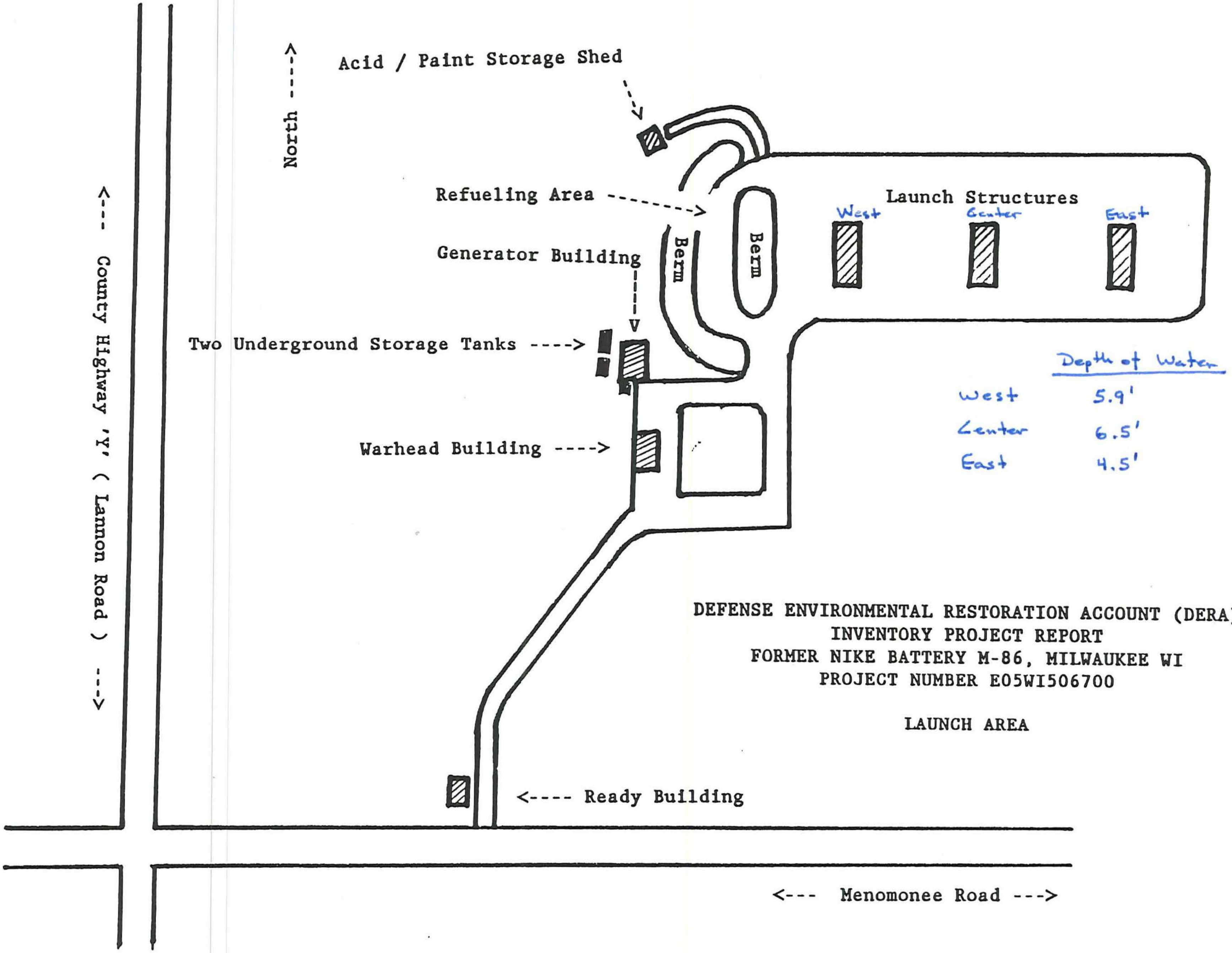
If you have any questions or comments, you may contact Lisa Hedin at (612) 290-5431.

Sincerely,

Charles E. Crist

Charles E. Crist
Chief, Management and Evaluation Branch
Engineering and Planning Division

Enclosures
1. DERP-FUDS Site Table
2. Analytical Results



DEFENSE ENVIRONMENTAL RESTORATION ACCOUNT (DERA)
INVENTORY PROJECT REPORT
FORMER NIKE BATTERY M-86, MILWAUKEE WI
PROJECT NUMBER E05WI506700

LAUNCH AREA

Encl 2

Hazleton
Environmental
Services, Inc.

HES, Inc.

525 SCIENCE DRIVE • MADISON, WISCONSIN 53711

U.S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT

NIKE BATTERY SITE M-86

ICP Results

Sample Number	Sample ID	Date Received	Date Analyzed	Analyte	Det. Limit (ug/L)	Result (ug/L)
50700554	M-86 MW-1	07/27/95	08/01/95	Barium	10.0	87.0
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700555	M-86 MW-1-D	07/27/95	08/01/95	Barium	10.0	87.3
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700556	M-86 MW-2	07/27/95	08/01/95	Barium	10.0	71.2
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700558	M-86 E. SILO	07/27/95	08/01/95	Barium	10.0	96.5
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700560	M-86 C. SILO	07/27/95	08/01/95	Barium	10.0	92.3
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700561	M-86 W. SILO	07/27/95	08/01/95	Barium	10.0	63.1
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700563	M-96 MW-1	07/27/95	08/01/95	Barium	10.0	66.7
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700564	M-96 MW-2	07/27/95	08/01/95	Barium	10.0	72.7
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
50700565	M-96 MW-3	07/27/95	08/01/95	Barium	10.0	71.4
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0
	BLANK		08/01/95	Barium	10.0	<10.0
				Cadmium	5.00	<5.00
				Chromium	10.0	<10.0
				Silver	10.0	<10.0

OK

Phone 608-232-3300

Fax 608-233-0502

Hazleton Environmental Services, Inc.

525 SCIENCE DRIVE • MADISON, WISCONSIN 53711

U.S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT

NIKE BATTERY SITE M-86

Arsenic Results

Sample Number	Sample ID	Date Received	Date Analyzed	Det. Limit (ug/L)	Result (ug/L)
50700554	M-86 MW-1	07/27/95	08/04/95	1.00	<1.00
50700555	M-86 MW-1-D	07/27/95	08/04/95	1.00	<1.00
50700556	M-86 MW-2	07/27/95	08/04/95	1.00	11.1
50700558	M-86 E. SILO	07/27/95	08/04/95	1.00	<1.00
50700560	M-86 C. SILO	07/27/95	08/04/95	1.00	<1.00
50700561	M-86 W. SILO	07/27/95	08/04/95	1.00	<1.00
50700563	M-96 MW-1	07/27/95	08/04/95	1.00	<1.00
50700564	M-96 MW-2	07/27/95	08/04/95	1.00	<1.00
50700565	M-96 MW-3	07/27/95	08/04/95	1.00	<1.00
	BLANK		08/04/95	1.00	<1.00

OK

Duplicate Analysis

Duplicated Sample	Sample Result	Duplicate Result	RPD*
50700565	<1.00	<1.00	N/A

Matrix Spike Analysis

Spiked Sample	Found in sample	Spike Added	Total Found	% Recovery
50700565	<1.00	40.0	32.3	80.8

* Relative Percent Difference

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U.S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT

NIKE BATTERY SITE M-86

Total Suspended Solids Results

ok

Sample Number	Sample ID	Date Received	Date Analyzed	Det. Limit (mg/L)	Result (mg/L)
50700558	M-86 E. SILO	07/27/95	08/02/95	5.00	<5.00
50700560	M-86 C. SILO	07/27/95	08/02/95	5.00	<5.00
50700561	M-86 W. SILO	07/27/95	08/02/95	5.00	<5.00
	BLANK		08/02/95	5.00	<5.00

Duplicate Analysis

Duplicated Sample	Sample Result	Duplicate Result	RPD*
50700565	<5.00	<5.00	N/A

* Relative Percent Difference

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Services, Inc.

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U.S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT

NIKE BATTERY SITE M-86

pH Results

Sample Number	Sample ID	Date Received	Date Analyzed	Det. Limit	pH
50700554	M-86 MW-1	07/27/95	08/02/95	0.50	7.03
50700555	M-86 MW-1-D	07/27/95	08/02/95	0.50	7.04
50700556	M-86 MW-2	07/27/95	08/02/95	0.50	7.02
50700558	M-86 E. SILO	07/27/95	08/02/95	0.50	8.78
ok 50700560	M-86 C. SILO	07/27/95	08/02/95	0.50	7.79
50700561	M-86 W. SILO	07/27/95	08/02/95	0.50	7.76
50700563	M-96 MW-1	07/27/95	08/02/95	0.50	7.22
50700564	M-96 MW-2	07/27/95	08/02/95	0.50	7.01
50700565	M-96 MW-3	07/27/95	08/02/95	0.50	7.10

Duplicate Analysis

Duplicated Sample	Sample Result	Duplicate Result	RPD*
50700565	7.10	7.10	N/A

* Relative Percent Difference

Phone 608-232-3300

Fax 608-233-0502

Hazleton
Environmental
Services, Inc.

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HES, Inc.

U.S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT

NIKE BATTERY SITE M-86

Mercury Results

Sample Number	Sample ID	Date Received	Date Analyzed	Det. Limit (ug/L)	Result (ug/L)
50700554	M-86 MW-1	07/27/95	08/03/95	0.20	<0.200
50700555	M-86 MW-1-D	07/27/95	08/03/95	0.20	<0.200
50700556	M-86 MW-2	07/27/95	08/03/95	0.20	<0.200
50700558	M-86 E. SILO	07/27/95	08/03/95	0.20	<0.200
50700560	M-86 C. SILO	07/27/95	08/03/95	0.20	<0.200
50700561	M-86 W. SILO	07/27/95	08/03/95	0.20	<0.200
50700563	M-96 MW-1	07/27/95	08/03/95	0.20	<0.200
50700564	M-96 MW-2	07/27/95	08/03/95	0.20	<0.200
50700565	M-96 MW-3	07/27/95	08/03/95	0.20	<0.200
	BLANK		08/03/95	0.20	<0.200

Duplicate Analysis

Duplicated Sample	Sample Result	Duplicate Result	RPD*
50700565	<0.200	<0.200	N/A

Matrix Spike Analysis

Spiked Sample	Found in sample	Spike Added	Total Found	% Recovery
50700565	<0.200	1.00	0.985	98.5

* Relative Percent Difference

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U.S. ARMY CORPS OF ENGINEERS

ST. PAUL DISTRICT

NIKE BATTERY SITE M-86

Selenium Results

Sample Number	Sample ID	Date Received	Date Analyzed	Det. Limit (ug/L)	Result (ug/L)
50700554	M-86 MW-1	07/27/95	08/07/95	2.00	<2.00
50700555	M-86 MW-1-D	07/27/95	08/07/95	2.00	<2.00
50700556	M-86 MW-2	07/27/95	08/07/95	2.00	<2.00
50700558	M-86 E. SILO	07/27/95	08/07/95	2.00	<2.00
ok 50700560	M-86 C. SILO	07/27/95	08/07/95	2.00	<2.00
50700561	M-86 W. SILO	07/27/95	08/07/95	2.00	<2.00
50700563	M-96 MW-1	07/27/95	08/07/95	2.00	<2.00
50700564	M-96 MW-2	07/27/95	08/07/95	2.00	<2.00
50700565	M-96 MW-3	07/27/95	08/07/95	2.00	2.50
	BLANK		08/07/95	2.00	<2.00

Duplicate Analysis

Duplicated Sample	Sample Result	Duplicate Result	RPD*
50700565	2.50	2.40	4.08

Matrix Spike Analysis

Spiked Sample	Found in sample	Spike Added	Total Found	% Recovery
50700565	2.50	10.0	12.1	96.0

* Relative Percent Difference

Phone 608-232-3300

Fax 608-233-0502

Hazleton Environmental Services, Inc.

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U.S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT

NIKE BATTERY SITE M-86

Lead Results

15 ES.

Sample Number	Sample ID	Date Received	Date Analyzed	Det. Limit (ug/L)	Result (ug/L)
50700554	M-86 MW-1	07/27/95	08/08/95	1.00	1.60
50700555	M-86 MW-1-D	07/27/95	08/08/95	1.00	1.00
50700556	M-86 MW-2	07/27/95	08/08/95	1.00	<1.00
50700558	M-86 E. SILO	07/27/95	08/08/95	1.00	2.40
50700560	M-86 C. SILO	07/27/95	08/08/95	1.00	2.80
50700561	M-86 W. SILO	07/27/95	08/08/95	1.00	1.90
50700563	M-96 MW-1	07/27/95	08/08/95	1.00	<1.00
50700564	M-96 MW-2	07/27/95	08/08/95	1.00	<1.00
50700565	M-96 MW-3	07/27/95	08/08/95	1.00	<1.00
	BLANK		08/08/95	1.00	1.30

Duplicate Analysis

Duplicated Sample	Sample Result	Duplicate Result	RPD*
50700565	<1.00	<1.00	N/A

Matrix Spike Analysis

Spiked Sample	Found in sample	Spike Added	Total Found	% Recovery
50700565	<1.00	20.0	16.9	84.5

* Relative Percent Difference

Phone 608-232-3300

Fax 608-233-0502

Oil & Grease

SAMPLE DATA SUMMARY PACKAGE

CLIENT US Army Corps of Engineers

PROJECT Nike Battery Site

MATRIX : WATER

CLIENT : U.S. ARMY CORPS OF ENGINEERS

DATE RECEIVED : 7/27/95
DATE EXTRACTED 8/1/95

HES ID	CLIENT ID	AMOUNT EXTRACTED (mls)	CLEAN FLASK WEIGHT (grams)	RESIDUE FLASK WEIGHT (grams)	DIFFERENCE OF WEIGHT (grams)	SPIKED AMOUNT (grams)	SAMPLE CONC. (mg/L)	METHOD DETECTION LIMIT (mg/L)	STANDARD REPORTING LIMIT (mg/L)	REPORTED CONC. (mg/L)	% RECV.
METHOD BLANK		1000	89.5826	89.5835	0.0009		0.9	1.4	5.0	< 5.0	
CONTROL SPIKE		1000	105.1937	105.2875	0.0938	0.1003	94	1.4	5.0	94	94%
C-SPIKE DUP.		1000	98.1037	98.1940	0.0903	0.1008	90	1.4	5.0	90	90%
50700558	M-86 ES	1000	106.2276	106.2285	0.0009		0.9	1.4	5.0	< 5.0	
50700559	M-86ES DUP	1000	102.6274	102.6298	0.0024		2.4	1.4	5.0	< 5.0	
50700560	M-86 CS	1000	90.6644	90.6681	0.0037		3.7	1.4	5.0	< 5.0	
50700561	M-86 WS	1000	102.4753	102.4701	-0.0052		-5.2	1.4	5.0	< 5.0	

PAH

SAMPLE DATA SUMMARY PACKAGE

CLIENT U.S. Army Corp. of Engineers

PROJECT Nike Battery Site

U.S. ARMY CORPS OF ENGINEERS
METHOD 8310 - POLYNUCLEAR AROMATIC ORGANICS
ANALYSIS DATA SHEET

Client No.

| M-86 EAST SILO |

Lab Name: HES Inc.

Contract:

SDG #

Matrix: (soil or water) : WATER

Lab Sample ID: 50700558

Samp wt/vol:1000 (g/ml) : ml

Lab File IDs: CH00PNA4040.RES
: CH07PNA4040.RES

% Moisture : 0.0 %

Extraction:(SepF/Cont/Sonc/Sohx): SepF

Date Sampled : 07-26-95

Concentrated Extract Volume:(ml): 1.0 ml

Date Recieved: 07-27-95

Injection Volume:20.0 (uL)

Date Extractd: 07-28-95

GPC Cleanup:(Y/N) N

Date Analyzed: Jul 30, 1995

Dilut. Factor : 1.0

Time Analyzed: 2127 9:27:09 pm

pmw 8/14/95

CAS No.	COMPOUND	CONC. UNITS: UG/L	Q	SRL UG/L	UNSPIKED CONC. UG/L	SPIKE CONC. UG/L	% REC.	AREA
91-20-3	.....Naphthalene	0.06	U	1.0				2168
208-96-8	.....Acenaphthylene	0.00	U	2.0				
90-12-0	......1-Methyl naphthalene	0.00	U	2.0				
91-57-6	......2-Methyl naphthalene	0.00	U	2.0				
83-32-9	......Acenaphthene	0.00	U	1.0				
86-73-7	......Fluorene	0.00	U	0.20				71
85-01-8	......Phenanthrene	0.02	U	0.10				4146
120-12-7	.....Anthracene	0.00	U	0.10				
206-44-0	.....Fluoranthene	0.01	U	0.02				29428
129-00-0	.....Pyrene	0.00	U	0.10				
92-94-4	......P-Terphenyl (surrogate)	8.6				10	86 %	5341597
56-55-3	......Benzo(a)anthracene	0.00	U	0.01				5813
218-01-9	.....Chrysene	0.00	U	0.10				
205-99-2	.....Benzo(b)fluoranthene	0.00	U	0.02				6086
207-08-9	.....Benzo(k)fluoranthene	0.00	U	0.01				3464
50-32-8	......Benzo(a)pyrene	0.00	U	0.01				4530
53-70-3	......Dibenzo(a,h)anthracene	0.00	U	0.02				
191-24-2	.....Benzo(ghi)perylene	0.00	U	0.02				
193-39-5	.....Indeno(1,2,3-cd)pyrene	0.00	U	0.05				

SRL = STANDARD REPORTING LIMIT
" U " INDICATES THE CONCENTRATION OF THE COMPOUND IS UNDER THE SRL.

U.S. ARMY CORPS OF ENGINEERS
METHOD 8310 - POLYNUCLEAR AROMATIC ORGANICS
ANALYSIS DATA SHEET

Client No.

M-86 EAST SILO-DUP
8/15/95

Lab Name: HES Inc.

Contract: SDG #

Matrix: (soil or water) : WATER Lab Sample ID: 50700559

Samp wt/vol: 990 (g/ml) : ml

Lab File IDs: CH00PNA4041.RES
: CH07PNA4041.RES

% Moisture : 0.0 %

Extraction:(SepF/Cont/Sonc/Sohx): SepF Date Sampled : 07-26-95

Concentrated Extract Volume:(ml): 1.0 ml Date Recieved: 07-27-95

Injection Volume:20.0 (uL) Date Extractd: 07-28-95

GPC Cleanup:(Y/N) N Date Analyzed: Jul 30, 1995

Dilut. Factor : 1.0 Time Analyzed: 10:30:05 pm 2230

OMW 8/14/95

CAS No.	COMPOUND	CONC. UNITS: UG/L	Q	SRL UG/L	UNSPIKED CONC. UG/L	SPIKE CONC. UG/L	% REC.	AREA
91-20-3	Naphthalene	0.04	U	1.0				1498
208-96-8	Acenaphthylene	0.00	U	2.0				
90-12-0	1-Methyl naphthalene	0.00	U	2.0				
91-57-6	2-Methyl naphthalene	0.00	U	2.0				
83-32-9	Acenaphthene	0.00	U	1.0				
86-73-7	Fluorene	0.00	U	0.20				
85-01-8	Phenanthrene	0.03	U	0.10				6869
120-12-7	Anthracene	0.00	U	0.10				1853
206-44-0	Fluoranthene	0.02		0.02				47135
129-00-0	Pyrene	0.02	U	0.10				9414
92-94-4	P-Terphenyl (surrogate)	8.2				10	81 %	5035043
56-55-3	Benzo(a)anthracene	0.01	U	0.01				31084
218-01-9	Chrysene	0.00	U	0.10				
205-99-2	Benzo(b)fluoranthene	0.00	U	0.02				10518
207-08-9	Benzo(k)fluoranthene	0.00	U	0.01				10923
50-32-8	Benzo(a)pyrene	0.00	U	0.01				10641
53-70-3	Dibenzo(a,h)anthracene	0.00	U	0.02				
191-24-2	Benzo(ghi)perylene	0.00	U	0.02				
193-39-5	Indeno(1,2,3-cd)pyrene	0.00	U	0.05				

SRL = STANDARD REPORTING LIMIT
" U " INDICATES THE CONCENTRATION OF THE COMPOUND IS UNDER THE SRL.

FORM I - LC EXT

U.S. ARMY CORPS OF ENGINEERS
METHOD 8310 - POLYNUCLEAR AROMATIC ORGANICS
ANALYSIS DATA SHEET

Client No.

| M-86 CENTRAL SILO |

Lab Name: HES Inc.

Contract: SDG #

Matrix: (soil or water) : WATER — Lab Sample ID: 50700560

Samp wt/vol:1000 (g/ml) : ml

Lab File IDs: CH00PNA4036.RES
: CH07PNA4036.RES

% Moisture : 0.0 %

Extraction:(SepF/Cont/Sonc/Sohx): SepF — Date Sampled : 07-26-95

Concentrated Extract Volume:(ml): 1.0 ml — Date Recieved: 07-27-95

Injection Volume:20.0 (uL) — Date Extractd: 07-28-95

GPC Cleanup:(Y/N) N — Date Analyzed: Jul 30, 1995

Dilut. Factor : 1.0 — Time Analyzed: 1715 5:15:21 pm

8mw 8/14/95

CAS No.	COMPOUND	CONC. UNITS: UG/L	Q	SRL UG/L	UNSPIKED CONC. UG/L	SPIKE CONC. UG/L	% REC.	AREA
91-20-3	Naphthalene	0.40	U	1.0				13393
208-96-8	Acenaphthylene	0.00	U	2.0				
90-12-0	1-Methyl naphthalene	1.7	U	2.0				68214
91-57-6	2-Methyl naphthalene	0.00	U	2.0				
83-32-9	Acenaphthene	0.00	U	1.0				
86-73-7	Fluorene	0.02	U	0.20				1785
85-01-8	Phenanthrene	0.02	U	0.10				5400
120-12-7	Anthracene	0.00	U	0.10				
206-44-0	Fluoranthene	0.03		0.02				56971
129-00-0	Pyrene	0.03	U	0.10				16075
92-94-4	P-Terphenyl (surrogate)	9.1				10	91 %	5646325
56-55-3	Benzo(a)anthracene	0.01		0.01				63639
218-01-9	Chrysene	0.01	U	0.10				2902
205-99-2	Benzo(b)fluoranthene	0.01	U	0.02				41393
207-08-9	Benzo(k)fluoranthene	0.01	U	0.01				44094
50-32-8	Benzo(a)pyrene	0.01	U	0.01				60616
53-70-3	Dibenzo(a,h)anthracene	0.00	U	0.02				
191-24-2	Benzo(ghi)perylene	0.01	U	0.02				22513
193-39-5	Indeno(1,2,3-cd)pyrene	0.01	U	0.05				6464

SRL = STANDARD REPORTING LIMIT
" U " INDICATES THE CONCENTRATION OF THE COMPOUND IS UNDER THE SRL.

FORM I - LC EXT

U.S. ARMY CORPS OF ENGINEERS
METHOD 8310 - POLYNUCLEAR AROMATIC ORGANICS
ANALYSIS DATA SHEET

Client No.

| M-86 WEST SILO |

Lab Name: HES Inc.

Contract: SDG #

Matrix: (soil or water) : WATER Lab Sample ID: 50700561

Samp wt/vol:1000 (g/ml) : ml

Lab File IDs: CH00PNA4037.RES
: CH07PNA4037.RES

% Moisture : 0.0 %

Extraction:(SepF/Cont/Sonc/Sohx): SepF Date Sampled : 07-26-95

Concentrated Extract Volume:(ml): 1.0 ml Date Recieved: 07-27-95

Injection Volume:20.0 (uL) Date Extractd: 07-28-95

GPC Cleanup:(Y/N) N Date Analyzed: Jul 30, 1995

1818

Dilut. Factor : 1.0 Time Analyzed: 6:18:20 pm

Omw 8/14/95

CAS No.	COMPOUND	CONC. UNITS: UG/L	Q	SRL UG/L	UNSPIKED CONC. UG/L	SPIKE CONC. UG/L	% REC.	AREA
91-20-3	Naphthalene	0.20	U	1.0				5558
208-96-8	Acenaphthylene	0.00	U	2.0				
90-12-0	1-Methyl naphthalene	0.00	U	2.0				
91-57-6	2-Methyl naphthalene	0.00	U	2.0				
83-32-9	Acenaphthene	0.00	U	1.0				
86-73-7	Fluorene	0.00	U	0.20				
85-01-8	Phenanthrene	0.01	U	0.10				1711
120-12-7	Anthracene	0.00	U	0.10				
206-44-0	Fluoranthene	0.01	U	0.02				24505
129-00-0	Pyrene	0.01	U	0.10				7801
92-94-4	P-Terphenyl (surrogate)	9.5				10	95 %	5840521
56-55-3	Benzo(a)anthracene	0.01		0.01				64679
218-01-9	Chrysene	0.01	U	0.10				2978
205-99-2	Benzo(b)fluoranthene	0.02		0.02				88973
207-08-9	Benzo(k)fluoranthene	0.01		0.01				86761
50-32-8	Benzo(a)pyrene	0.01		0.01				77086
53-70-3	Dibenzo(a,h)anthracene	0.00	U	0.02				
191-24-2	Benzo(ghi)perylene	0.01	U	0.02				38124
193-39-5	Indeno(1,2,3-cd)pyrene	0.02	U	0.05				15098

SRL = STANDARD REPORTING LIMIT
" U " INDICATES THE CONCENTRATION OF THE COMPOUND IS UNDER THE SRL.

FORM I - LC EXT

QC FORMS

PNA SURROGATE RECOVERIES

CLIENT: U.S ARMY CORPS OF ENGINEERS

ANALYSIS DATE: 07/30/95

HES ID #	CLIENT ID.	SURROGATE RECOVERY
METHOD BLANK-42	*************	92%
CONTROL SPIKE-42	*************	89%
CONTROL SPIKE DUP-42	*************	88%
50700558	M-86 EAST SILO	86%
50700559	M-86 EAST SILO-DUP	81%
50700560	M-86 CENTRAL SILO	91%
50700561	M-86 WEST SILO	95%

* SURROGATE RECOVERY OUTSIDE QC LIMITS

DL = SURROGATE DILUTED OUT

PNA WATER ANALYSIS CS/CSD SUMMARY SHEET

LABORATORY: HES, Inc. HES ID #: C-SPIKE-42 / C-SPIKE DUP-42

DATE ANALYZED: 07/30/95 CLIENT ID: N/A

CLIENT: U.S. ARMY CORPS OF ENGINEERS

COMPOUND	SPIKE ADDED ppb	SAMPLE CONC. ppb	CS CONC. ppb	CS %REC	QC LIMITS
NAPHTHALENE	5.0	0.00	3.7	74%	56% TO 103%
ACENAPHTHYLENE	10	0.00	8.1	81%	55% TO 105%
1-METHYL NAPHTHALENE	5.0	0.00	3.8	77%	58% TO 105%
2-METHYL NAPHTHALENE	5.0	0.00	3.8	75%	60% TO 102%
ACENAPHTHENE	5.0	0.00	4.0	80%	44% TO 118%
FLUORENE	1.0	0.00	0.81	81%	50% TO 117%
PHENANTHRENE	0.50	0.00	0.43	87%	43% TO 121%
ANTHRACENE	0.50	0.00	0.42	84%	48% TO 120%
FLUORANTHENE	1.0	0.00	0.88	88%	50% TO 116%
PYRENE	0.50	0.00	0.44	87%	34% TO 133%
P-TERPHENYL(SURR.)	10	0.00	8.9	89%	50% TO 114%
BENZO(A)ANTHRACENE	0.50	0.00	0.45	91%	41% TO 119%
CHRYSENE	0.50	0.00	0.46	93%	39% TO 127%
BENZO(B)FLUORANTHENE	1.0	0.00	0.90	90%	36% TO 124%
BENZO(K)FLUORANTHENE	0.50	0.00	0.45	90%	34% TO 125%
BENZO(A)PYRENE	0.50	0.00	0.44	88%	30% TO 134%
DIBENZO(A,H)ANTHRACENE	1.0	0.00	0.89	89%	41% TO 120%
BENZO(GHI)PERYLENE	1.0	0.00	0.90	90%	38% TO 124%
INDENO(1,2,3-CD)PYRENE	0.50	0.00	0.45	90%	28% TO 130%

COMPOUND	SPIKE ADDED ppb	CSD CONC ppb	CSD %REC	RPD	QC LIMITS
NAPHTHALENE	5.0	4.0	81%	9.0%	56% TO 103%
ACENAPHTHYLENE	10	8.5	85%	4.8%	55% TO 105%
1-METHYL NAPHTHALENE	5.0	4.1	83%	7.5%	58% TO 105%
2-METHYL NAPHTHALENE	5.0	4.1	81%	7.7%	60% TO 102%
ACENAPHTHENE	5.0	4.2	84%	4.9%	44% TO 118%
FLUORENE	1.0	0.84	84%	3.6%	50% TO 117%
PHENANTHRENE	0.50	0.45	89%	2.3%	43% TO 121%
ANTHRACENE	0.50	0.43	86%	2.4%	48% TO 120%
FLUORANTHENE	1.0	0.89	89%	1.1%	50% TO 116%
PYRENE	0.50	0.43	87%	0.0%	34% TO 133%
P-TERPHENYL(SURR.)	10	8.8	88%	1.1%	50% TO 114%
BENZO(A)ANTHRACENE	0.50	0.45	89%	2.2%	41% TO 119%
CHRYSENE	0.50	0.45	90%	3.3%	39% TO 127%
BENZO(B)FLUORANTHENE	1.0	0.89	89%	1.1%	36% TO 124%
BENZO(K)FLUORANTHENE	0.50	0.44	88%	2.2%	34% TO 125%
BENZO(A)PYRENE	0.50	0.43	86%	2.3%	30% TO 134%
DIBENZO(A,H)ANTHRACENE	1.0	0.88	88%	1.1%	41% TO 120%
BENZO(GHI)PERYLENE	1.0	0.88	88%	2.2%	38% TO 124%
INDENO(1,2,3-CD)PYRENE	0.50	0.44	88%	2.2%	28% TO 130%

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD BLANK SUMMARY

CLIENT: U.S. ARMY CORPS OF ENGINEERS

ANALYSIS DATE: 07/30/95

HES ID. #	DATE ANALYZED	HES ID. #s ASSOCIATED WITH THIS BLANK
METHOD BLANK-42	07/30/95	
	07/30/95	CONTROL SPIKE-42
	07/30/95	CONTROL SPIKE DUP-42
	07/30/95	50700558
	07/30/95	50700559
	07/30/95	50700560
	07/30/95	50700561

BLANK DATA

VARIOUS CLIENTS
METHOD 8310 - POLYNUCLEAR AROMATIC ORGANICS
ANALYSIS DATA SHEET

Client No.

METHOD BLANK-42

Lab Name: HES Inc.

Contract:

SDG #

Matrix: (soil or water) : WATER

Lab Sample ID: MB42LB1

Samp wt/vol:1000 (g/ml) : ml

Lab File IDs: CH00PNA4025.RES
: CH07PNA4025.RES

% Moisture : 0.0 %

Extraction:(SepF/Cont/Sonc/Sohx): SepF

Date Sampled :

Concentrated Extract Volume:(ml): 1.0 ml

Date Recieved:

Injection Volume:20.0 (uL)

Date Extractd: 07-28-95

GPC Cleanup:(Y/N) N

Date Analyzed: Jul 30, 1995

Dilut. Factor : 1.0

Time Analyzed: 5:42:54 am

CAS No.	COMPOUND	CONC. UNITS: UG/L	Q	SRL UG/L	UNSPIKED CONC. UG/L	SPIKE CONC. UG/L	% REC.	AREA
91-20-3	.....Naphthalene	0.01	U	1.0				172
208-96-8	.....Acenaphthylene	0.00	U	2.0				
90-12-0	.....1-Methyl naphthalene	0.00	U	2.0				
91-57-6	.....2-Methyl naphthalene	0.00	U	2.0				
83-32-9	.....Acenaphthene	0.00	U	1.0				
86-73-7	.....Fluorene	0.01	U	0.20				603
85-01-8	.....Phenanthrene	0.00	U	0.10				581
120-12-7	.....Anthracene	0.00	U	0.10				198
206-44-0	.....Fluoranthene	0.00	U	0.02				6745
129-00-0	.....Pyrene	0.00	U	0.10				1374
92-94-4	.....P-Terphenyl (surrogate)	9.2				10	92 %	5693113
56-55-3	.....Benzo(a)anthracene	0.00	U	0.01				17208
218-01-9	.....Chrysene	0.00	U	0.10				585
205-99-2	.....Benzo(b)fluoranthene	0.00	U	0.02				4319
207-08-9	.....Benzo(k)fluoranthene	0.00	U	0.01				4187
50-32-8	.....Benzo(a)pyrene	0.00	U	0.01				4584
53-70-3	.....Dibenzo(a,h)anthracene	0.00	U	0.02				
191-24-2	.....Benzo(ghi)perylene	0.00	U	0.02				
193-39-5	.....Indeno(1,2,3-cd)pyrene	0.00	U	0.05				

SRL = STANDARD REPORTING LIMIT
" U " INDICATES THE CONCENTRATION OF THE COMPOUND IS UNDER THE SRL.

268328940

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Green Bay ES Field Office
1015 Challenger Court
Green Bay, Wisconsin 54311-8331

August 3, 1995

Mr. Robert J. Whiting
Chief, Environmental Resources Section
Management and Evaluation Branch
St. Paul District, Corps of Engineers
190 Fifth Street East
St. Paul, Minnesota 55101-1638

re: Environmental Assessment
Environmental Restoration
Former NIKE Missile Battery M-86
Village of Menomonee Falls
Waukesha County, Wisconsin

Dear Mr. Whiting:

The U.S. Fish and Wildlife Service (Service) has received your letter dated July 18, 1995, requesting comments on the above-referenced Environmental Assessment (EA) and Finding of No Significant Impact. This project entails the removal of underground storage tanks and possible contaminated soil from two sites which were parts of a former anti-aircraft missile battery. We offer the following comments.

Based upon the information provided in your letter, we concur with your Finding of No Significant Impact to the environment from this proposed action.

Questions pertaining to these comments can be directed to Mr. Joel Trick at 414-433-3803.

Sincerely,

Janet M. Smith

Janet M. Smith
Field Supervisor

cc: U.S. EPA, Chicago, IL Attn: Bob Cvengros
Wisconsin DNR, Southeast District, Milwaukee, WI

6-23-92 TO: MARGARET GRAEFE
RE: RETESTING MENOMONEE FALLS
NIKE SITE M-86
FROM: TOM KELLS
4330 E. 79th PLACE
TULSA, OK 74136-1181
918-495-1181

(OWNER: MICHAEL MITCHELL
414-229-4951 (4693))

DEPT. OF ARMY
ROBERT DEMPSEY
612-220-0443
(ST. PAUL, MINN.)

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO
ATTENTION OF

CENCB-PE-HQ (1110)

MEMORANDUM FOR Commander, USACE, St. Paul District, ATTN: CENCS-PM (R. Dempsey), 1421 USPO & Custom House, 180 East Kellogg Boulevard, St. Paul, Minnesota 55101-1479

SUBJECT: Menomonee Falls, Wisconsin, Sampling Results (Former Nike Site M-86)

1. The complete sampling analyses conducted by ARDL, Incorporated, are enclosed. Please note that a re-analysis of lead was conducted.

2. A summary of the sampling results at Menomonee Falls, Wisconsin is found in Table 1. State and Federal guidelines are included for comparison purposes.

3. The data in Table 1 shows that the Wisconsin State Enforcement Standards are similar to the Federal Maximum Contaminant Levels (MCL's). State Enforcement Standards are exceeded for iron in MW-3 and for manganese in MW-1. The guidelines are established under the Public Welfare Groundwater Standards for these inorganics which are naturally-occurring and non-toxic compounds. The Wisconsin State Preventative Action Limits (PALs) represents a lesser concentration of the substance than the enforcement standard. The State PALs are exceeded for arsenic in MW-3, for barium in MW-1, MW-3, SW-2 and SW-3, for cadmium and chromium in possibly all samples, for iron in MW-3, for manganese in all samples except MW-3, and possibly all samples of selenium.

4. Also enclosed are guidelines for PALs. As highlighted in Appendix 1, one of the purposes of the PALs which is relevant to situations we encountered during the DERP-FUDS program is to serve as a "trigger" for remedial action. Only an exceedance of Enforcement Standards defines when a violation has occurred.

5. Appendix 2 contains the Wisconsin Groundwater Quality Standards. The areas of immediate concern are highlighted in Sections NR 140.14 and NR 140.24. In summary, the Wisconsin Groundwater Standards state that the owner or operator of a site shall notify the Department of Natural Resources (DNR) when monitoring data is submitted and indicates that a PAL has been attained or exceeded. A range of responses from DNR for exceedance of the PAL are indicated in Table 5 of NR 140.24.

CENCB-PE-HQ
SUBJECT: Menomonee Falls, Wisconsin, Sampling Results (Former Nike Site M-86)

6. The final monitoring data was sent to your office and also to the office of Tom Kells (Menomonee Falls, Wisconsin) in March 1992. It appears that contact with DNR regarding exceedance of PALs should be initiated by Mr. Kells. Assistance may be provided by the St. Paul District. A copy of this memorandum and enclosures has been sent to Mr. Kells for information.

7. A Chemical Contamination Summary for the Menomomee Falls, Wisconsin site is in the process of being prepared by Buffalo District personnel and should be completed by the end of July. This information will be forwarded to you and Mr. Kells at the the time of completion.

8. If you have any questions, please contact Mrs. Sophie Baj of my Water Quality Section at 716-879-4271 (Commercial/FTS).

Enclosures

fr Charles L. Gilbert
GEORGE B. BROOKS
Chief, Engineering & Planning Division

Summary of Groundwater and Silo Water Sampling
State of Wisconsin
Menomonee Falls

	State Enforcement Standards (ug/l)	State PAL (ug/l)	Federal MCL (ug/l)	RMCL (ug/l)	MCLG (ug/l)	MW-1 (ug/l)	MW-3 (ug/l)	SW-1 (ug/l)	SW-2 (ug/l)	SW-3 (ug/l)	Method	Detection Limit
Total Metals												
Arsenic	50	5	50	50	--	3	14	< 3	< 3	< 3	7060	3
Barium	1,000	200	1,000	1,500	2,000	280	350	180	310	260	6010	50
Cadmium	10	1	10	5	5	5	< 5	< 5	< 5	< 5	6010	5
Chromium	50	5	50	120	100	10	< 10	< 10	< 10	< 10	6010	10
Iron	300	150**	300	--	--	50	5400***	< 50	50	80	6010	50
Lead	50	5	50	20	0	< 2	< 2	< 2	< 2	< 2	7421	2
Manganese	50	25**	50	--	--	610***	< 15	30	31	34	6010	15
Mercury	2	0.2	2	3	2	<.2	<.2	<.2	<.2	<.2	7470	.2
Selenium	10	1	10	45	50	< 3	< 3	< 3	< 3	< 3	7740	3
Silver	50	10	50	--	--	< 10	< 10	< 10	< 10	< 10	6010	10
Sodium	--	--	--	--	--	12000	4600	5300	6400	9200	6010	5000
TOTAL PETROLEUM HYDROCARBONS* (ppm)	--	--	--	--	--	--	--	< 0.10	< 0.10	< 0.20	418.1	.10

** Public welfare related groundwater standards.
*** Exceeds the Federal and State enforcement standards.

ARDL REPORT NO.: 6008
CORPS OF ENGINEERS - BUFFALO DISTRICT
MEN FALLS , WI REANALYSIS

VOLUME 1

ARDL, Inc.

CHEMISTRY — BIOLOGY — PHYSIOLOGY — ENGINEERING
ENVIRONMENTAL ANALYSIS

P. O. BOX 1566
1801 FOREST STREET
MT. VERNON, ILLINOIS 62864
TELEPHONE (618) 244-3236

INORGANIC ANALYSIS DATA PACKAGE

US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK Date: 03/15/92
Contract No. DACW49-D-0003

Lab Name: ARDL, Inc. ARDL Report No: 6008
Samples Received at ARDL: 09/28/91
Project Name: MEN FALLS, WI

CASE NARRATIVE

Sample ID No.	Date Collected	Lab ID No.	Analyses Requested
MW-01	09/25/91	6008-1	Lead - Reanalysis
MW-03	09/25/91	6008-2	Lead - Reanalysis
SW-01	09/25/91	6008-3	Lead - Reanalysis
SW-02	09/25/91	6008-4	Lead - Reanalysis
SW-03	09/25/91	6008-5	Lead - Reanalysis

The above samples were originally analyzed by Method 6010 (ICP). After evaluation, the client requested lower detection limits which required reanalysis by Method 7421 (GFAA).

The quality control data are summarized as follows:

LABORATORY CONTROL SAMPLES

Percent recovery of the LCS was within control limits.

MATRIX SPIKES

Percent recovery of the matrix spike was outside of control limits. ARDL analyzed an additional analytical spike in the dissolved matrix to determine if laboratory procedures or matrix interferences were responsible for the poor spike recovery. The poor recovery of this analytical spike indicates the presence of matrix interferences.

DUPLICATES

RPD on all duplicate analyses were within control limits.

Release of the data contained in this package has been authorized by the Technical Services Manager or his designee as verified by the following signature.

Daniel J. Gillespie

Daniel J. Gillespie
Technical Services Manager

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 Date Collected: 09/25/91

Parameter	ARDL No: / Customer No:	6008-1 / MW-01	Method	Notation
Lead	(Total)	0.017	7421	
	(Dissolved)	<0.0020	7421	

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 Date Collected: 09/25/91

Parameter		ARDL No: 6008-2 Customer No: MW-02	Method	Notation
Lead	(Total)	0.026	7421	
	(Dissolved)	<0.0020	7421	

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91

Date Collected: 09/25/91

Parameter		ARDL No: 6008-3 Customer No: SW-01	Method	Notation
Lead	(Total)	0.0032	7421	
	(Dissolved)	<0.0020	7421	

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91

Date Collected: 09/25/91

Parameter	ARDL No: / Customer No:	6008-4 / SW-02	Method	Notation
Lead	(Total)	0.0044	7421	
	(Dissolved)	<0.0020	7421	

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 Date Collected: 09/25/91

Parameter		ARDL No: 6008-5 Customer No: SW-03	Method	Notation
Lead	(Total)	0.0051	7421	
	(Dissolved)	<0.0020	7421	

QC RESULTS
SPIKE SAMPLE RECOVERY

CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Parameter		Control Limit	Spiked Sample Result	Sample Result	Spike Added	%R	Sample Number
Lead	(Total)	75-125	0.023	0.017	0.020	30*	6008-1
	(Dissolved)**	75-125	0.061	<0.0020	0.020	30*	6008-1

* = Out of control
** = Analytical spike - see Case Narrative.

QC RESULTS
DUPLICATES

CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Parameter		Control Limit	Sample	Duplicate	RPD	Sample No.
Lead	(Total)	20%	0.017	0.016	6.1	6008-1
	(Dissolved)	±0.0030	<0.0020	<0.0020	NC	6008-1

NC = Not calculable

QC RESULTS
LABORATORY CONTROL SAMPLE

CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Parameter	Control Limit	True	Found	% Recovery
Lead	80-120	0.010	0.0096	96

ANALYSIS RESULTS

CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Parameter	Method	Detection Limit
Lead	7421	0.0020

ARDL ID NO.: 6008
CORPS OF ENGINEERS - BUFFALO DISTRICT
SITE: Nike Battery M-86
Menomonee Falls, WI

DATE SUBMITTED: 11/08/91

ARDL, Inc.

CHEMISTRY — BIOLOGY — PHYSIOLOGY — ENGINEERING
ENVIRONMENTAL ANALYSIS

P. O. BOX 1566
1801 FOREST STREET
MT. VERNON, ILLINOIS 62864
TELEPHONE (618) 244-3236

ARDL Inc. Contract BNYCC Lab No. ______

SDG# ______ SAS# ______ Case ______

BNYCE # 6008

MEN falls, WI
(P.O. 8)

Received: 09-28-91
0930

Due Date: 11-02-91

ARDL #	CUST. #	WATER		TOTAL + DISS METALS*	TRPH (418.1)												Collected
6008-1	MW-01	✓		✓													9/25
2	MW-03	✓		✓													
3	SW-01	✓		✓	✓												
4	SW-02	✓		✓	✓												
5	SW-03	✓		✓	✓												✓

* Hg. As. Se. Ag. Ba. Cd. Cr. Pb. Ni. Cu. Zn. Na. Fe. Mn

Received by Donna Cockrum Date 09-28-91 Page 1 of 1

SCOPE OF WORK
NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN
WORK ORDER NO. 18

1.0 SCOPE

Resampling of two groundwater monitoring wells and the water in three silos.

2.0 BACKGROUND

International Technology was contracted by the U.S. Army Corps of Engineers (COE) Buffalo District to conduct a confirmation study and prepare a report addressing hazardous and toxic wastes at the former Nike Battery M-86 near Menomonee Falls, Wisconsin. Recommendations of the final report include resampling of the two groundwater monitoring wells installed and the water from the three silos on site.

3.0 SITE LOCATION

The former Nike Battery M-86 is located in north central Waukesha County near Menomonee Falls, Wisconsin. The launch area is just northeast of the intersection of Lannon Road and Menomonee Avenue, approximately 1.5 miles west of Menomonee Falls.

4.0 SITE OWNERSHIP AND USE

The site is presently privately owned. The contact person is Tom Kells. The right-of-entry to the site will be obtained through the St. Paul District.

5.0 SCOPE OF WORK

The Contractor will provide all the personnel, labor, materials, equipment, and laboratory facilities to sample and obtain sufficient groundwater and/or soil samples, and provide chemical testing as described in the following paragraphs under the provisions of contract no. DAWC49-91-D-0003. The Contractor shall review all information provided and adhere to all necessary field & laboratory, and health & safety guidelines established for ARDL. Samples collected and prepared in the field shall include groundwater samples, soil samples, and associated interval quality control samples (duplicates, rinsates, blanks). All sample collection and subsequent sample handling procedures shall be in accordance with an established Chemical Data Acquisition Plan prepared by ARDL, Inc. and included in the Contract. After samples have been collected, they should immediately be chilled to 4°C, preserved (if necessary), and stored in a secured refrigerated or chilled area until shipped. Samples should not be held on-site for more than 24 hours. Appropriate chain of custody forms shall be used when samples are delivered to the laboratories.

5.1 Groundwater Samples

The two groundwater monitoring wells shall be sampled once. Metal analyses are to be performed on both unfiltered and filtered (0.45 micron) samples. Filtration will be performed in the field with a differential pressure system.

5.2 Soil Samples

No soil samples will be taken.

5.3 Soil Water Samples

Samples will be taken once at the three silos. Metal analyses are to be performed on both filtered and unfiltered samples. Sampling for total petroleum hydrocarbons will also be conducted at the three silos.

6.0 ADDITIONAL INFORMATION

Site maps have been included. Keys for the monitoring wells are available. A cost estimate for this site is based on the assumption that this work will be done back to back with other similar sampling projects in the vicinity.

7.0 SCHEDULING AND REPORTING

Sample collection is to proceed before October 15, 1991. The Contractor will obtain approval of the Corps Contracting Officer for the sampling dates. Chemical testing should be completed within four (4) weeks of sample collection. A final report containing all test data, methods of analyses, and quality assurance data as required under Contract No. DACW49-91-D-0003 will be submitted to the Corps Project Officer within six (6) weeks of sample collection for approval as a final report. A copy of a previous report to serve as a format example is available through the Corps office. Once approved, five (5) copies are due 2 weeks later.

COST ESTIMATE
NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN WORK ORDER #8

A. Sampling

Item No.			
0009b	Sampling Personnel	1 day/2 people @ $400/person/day	$ 800.00
0010	Per Diem	1 day/2 people @ $75/person/day	$ 150.00
0012	Mileage	50 miles @ $.35/mile	$ 17.50
		Total Sampling	**$ 967.50**

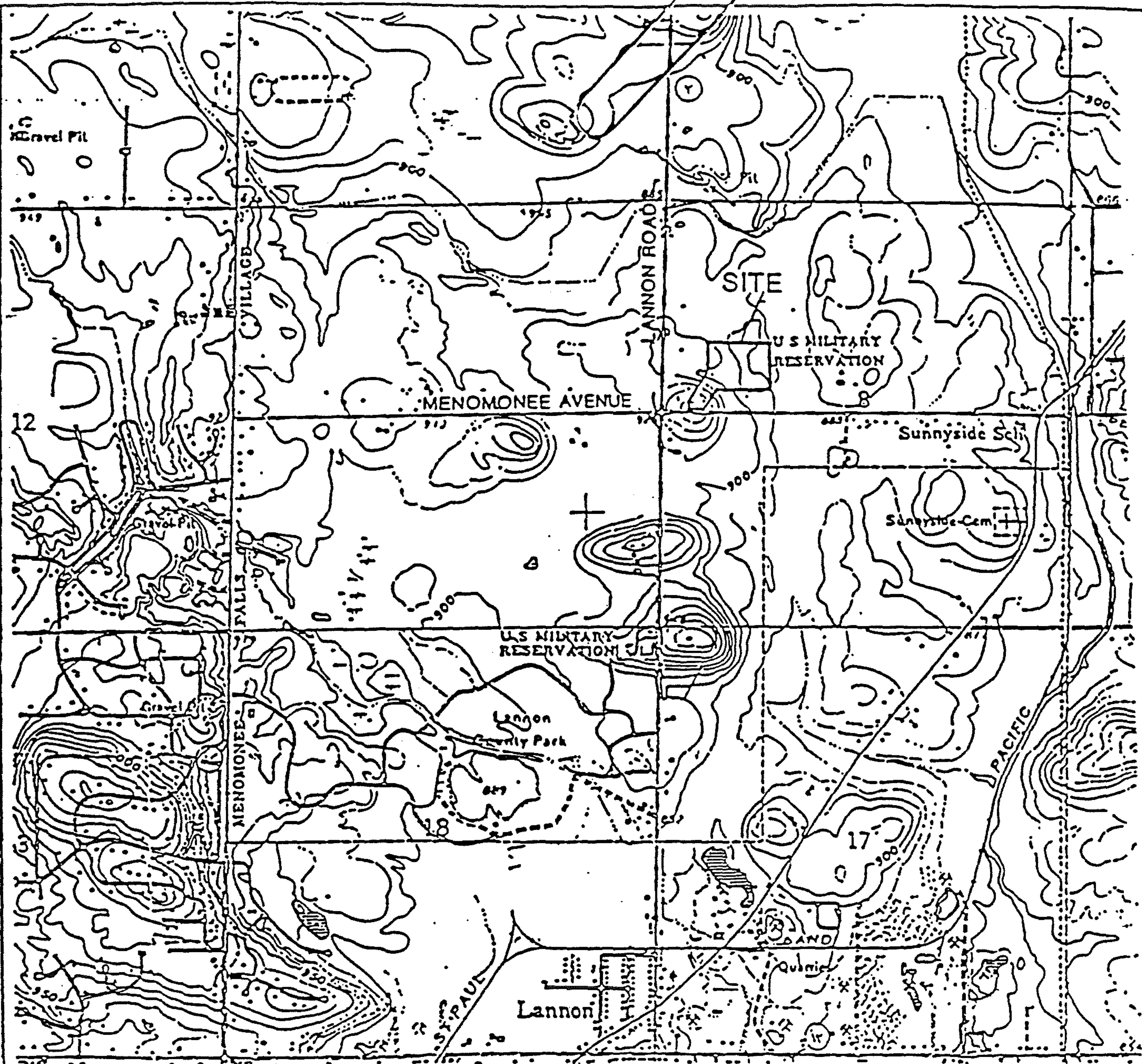
B. Bulk Chemical Analyses

Item No.			
0054b	Metals (groundwater) filtered-unfiltered	4 samples @ $75/sample	$ 300.00
0054b	Metals (silo water) filtered-unfiltered	6 samples @ $75/sample	450.00
0055a	TPHs (silo water)	3 samples @ $20/sample	60.00
		Total Bulk Chemistry	**$ 810.00**

Summary

A.	Sampling	$ 967.50
B.	Bulk Chemical Analyses	810.00
Total		**$1,777.50**

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
7/7/88	Y. S. 7/20/88	MEJ 7-11-90	302245-A10



0 1/4 1/2

SCALE IN MILES

N

FIGURE 1

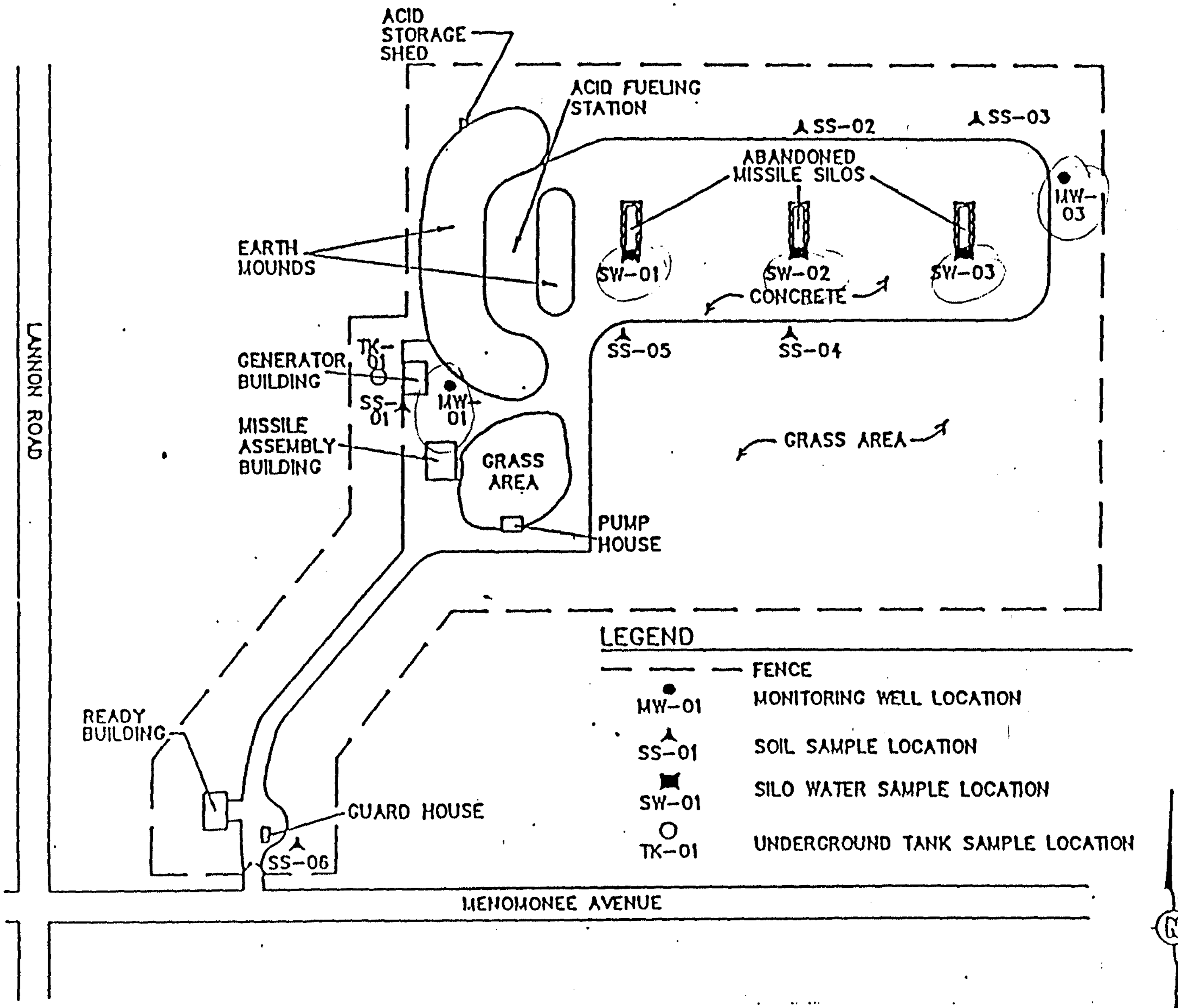
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN
SITE LOCATION MAP
PREPARED FOR
U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT

Source: Sussex Quadrangle
Wisconsin 7.5 Minute Series (topographic)
1959, Revised 1971

IT ...Creating a Safer Tomorrow

"Do Not Scale This Drawing"

DRAWN BY	Scc1 7/27/88	CHECKED BY	MKJ	4-17-90	DRAWING NUMBER 302245-A13
		APPROVED BY	GTF	4-17-90	



APPROXIMATE SCALE: 1 INCH = 175 FEET

FIGURE 2
FORMER NIKE BATTERY M-86
MENOMONEE FALLS SITE MAP
WITH MONITORING WELL
AND SAMPLING LOCATIONS

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT

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TABLE 2: REQUIRED ANALYSES AND APPROVED METHODS

Analysis	Soil/Waste/Sediment	Groundwater	Surface Water
Metals			
Ag	6010	6010	200.7
As	3050/7060	7060	206.2
Ba	6010	6010	200.7
Cd	6010	6010	200.7
Cr	6010	6010	200.7
Cu	6010	6010	200.7
Fe	6010	6010	200.7
Hg	7471	7470	245.1
Ni	6010	6010	200.7
Pb	3050/7421	3020/7421	239.2
Zn	6010	6010	200.7
Petroleum Hydrocarbons	418.1	418.1	418.1
Pesticides + PCB's	3550/8080	3520/8080	3520/8080
Explosives*	8330	8330	8330
Volatile Organics +10	8240	8240	8240
pH	9045	150.1	150.1
Cyanide, Total	9010/12	9010/12	9010/12
Residue, Total	160.3	160.3	160.3
Residue, Volatile	160.4	160.4	160.4
Residue, Nonfilterable	---	160.2	160.2
Residue, Filterable	---	160.1	160.1
Particle Size	D422-63	---	---
Total Sulfate**	---	9035	---
Nitrate Nitrogen**	---	9200	---
Chloride**	---	9250, 9251, 9252	same

*Test in area south of site #1 only
**Township wells only

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 Date Collected: 09/25/91

Parameter	ARDL No: / Customer No:	6008-1 MW-01	6008-2 MW-03	Method	Notation
Arsenic	(Total)	0.015	0.037	7060	
	(Dissolved)	<0.0030	0.014	7060	
Barium	(Total)	0.33	0.29	6010	
	(Dissolved)	0.28	0.35	6010	
Cadmium	(Total)	<0.0050	0.0090	6010	
	(Dissolved)	<0.0050	<0.0050	6010	
Chromium	(Total)	0.036	0.062	6010	
	(Dissolved)	<0.010	<0.010	6010	
Copper	(Total)	0.063	0.14	6010	
	(Dissolved)	<0.025	<0.025	6010	
Iron	(Total)	37	60	6010	
	(Dissolved)	<0.050	5.4	6010	
Lead	(Total)	0.078	<0.060	6010	
	(Dissolved)	<0.060	<0.060	6010	
Manganese	(Total)	4.0	2.7	6010	
	(Dissolved)	0.61	<0.015	6010	
Mercury	(Total)	0.00034	0.00027	7470	
	(Dissolved)	<0.00020	<0.00020	7470	
Nickel	(Total)	0.060	0.076	6010	
	(Dissolved)	<0.040	<0.040	6010	
Selenium	(Total)	<0.0030	<0.0030	7740	
	(Dissolved)	<0.0030	<0.0030	7740	
Silver	(Total)	<0.010	<0.010	6010	
	(Dissolved)	<0.010	<0.010	6010	
Sodium	(Total)	13	3.6	6010	
	(Dissolved)	12	4.6	6010	
Zinc	(Total)	0.21	0.24	6010	
	(Dissolved)	0.087	0.083	6010	

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 Date Collected: 09/25/91

Parameter	ARDL No: / Customer No:	6008-3 SW-01	6008-4 SW-02	Method	Notation
Arsenic	(Total)	<0.0030	<0.0030	7060	
	(Dissolved)	<0.0030	<0.0030	7060	
Barium	(Total)	0.064	0.19	6010	
	(Dissolved)	0.18	0.31	6010	
Cadmium	(Total)	<0.0050	<0.0050	6010	
	(Dissolved)	<0.0050	<0.0050	6010	
Chromium	(Total)	<0.010	<0.010	6010	
	(Dissolved)	<0.010	<0.010	6010	
Copper	(Total)	<0.025	<0.025	6010	
	(Dissolved)	<0.025	<0.025	6010	
Iron	(Total)	0.31	0.57	6010	
	(Dissolved)	<0.050	0.050	6010	
Lead	(Total)	<0.060	<0.060	6010	
	(Dissolved)	<0.060	<0.060	6010	
Manganese	(Total)	0.058	0.075	6010	
	(Dissolved)	0.030	0.031	6010	
Mercury	(Total)	<0.00020	<0.00020	7470	
	(Dissolved)	<0.00020	<0.00020	7470	
Nickel	(Total)	<0.040	<0.040	6010	
	(Dissolved)	<0.040	<0.040	6010	
Selenium	(Total)	<0.0030	<0.0030	7740	
	(Dissolved)	<0.0030	<0.0030	7740	
Silver	(Total)	<0.010	<0.010	6010	
	(Dissolved)	<0.010	<0.010	6010	
Sodium	(Total)	5.1	6.6	6010	
	(Dissolved)	5.3	6.4	6010	
Zinc	(Total)	0.21	0.048	6010	
	(Dissolved)	0.12	0.037	6010	
TRPH		<0.10	<0.10	418.1	

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 Date Collected: 09/25/91

Parameter	ARDL No: / Customer No:	6008-5 / SW-03	Method	Notation
Arsenic	(Total)	<0.0030	7060	
	(Dissolved)	<0.0030	7060	
Barium	(Total)	0.15	6010	
	(Dissolved)	0.26	6010	
Cadmium	(Total)	<0.0050	6010	
	(Dissolved)	<0.0050	6010	
Chromium	(Total)	<0.010	6010	
	(Dissolved)	<0.010	6010	
Copper	(Total)	<0.025	6010	
	(Dissolved)	<0.025	6010	
Iron	(Total)	0.38	6010	
	(Dissolved)	0.080	6010	
Lead	(Total)	<0.060	6010	
	(Dissolved)	<0.060	6010	
Manganese	(Total)	0.083	6010	
	(Dissolved)	0.034	6010	
Mercury	(Total)	<0.00020	7470	
	(Dissolved)	<0.00020	7470	
Nickel	(Total)	<0.040	6010	
	(Dissolved)	<0.040	6010	
Selenium	(Total)	<0.0030	7740	
	(Dissolved)	<0.0030	7740	
Silver	(Total)	<0.010	6010	
	(Dissolved)	<0.010	6010	
Sodium	(Total)	8.1	6010	
	(Dissolved)	9.2	6010	
Zinc	(Total)	0.049	6010	
	(Dissolved)	0.023	6010	
TRPH		<0.20	418.1	

QC RESULTS
DUPLICATES

CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Parameter		Control Limit	Sample	Duplicate	RPD	Sample No.
Arsenic	(Total)	±0.010	0.015	0.020	29	6008-1
	(Dissolved)	±0.010	<0.0030	<0.0030	NC	6008-1
Barium	(Total)	20%	0.33	0.36	8.7	6008-1
	(Dissolved)	20%	0.28	0.28	0.0	6008-1
Cadmium	(Total)	±0.0050	<0.0050	0.0060	NC	6008-1
	(Dissolved)	±0.0050	<0.0050	<0.0050	NC	6008-1
Chromium	(Total)	±0.010	0.036	0.041	13	6008-1
	(Dissolved)	±0.010	<0.010	<0.010	NC	6008-1
Copper	(Total)	±0.025	0.063	0.063	0.0	6008-1
	(Dissolved)	±0.025	<0.025	<0.025	NC	6008-1
Iron	(Total)	20%	37	42	13	6008-1
	(Dissolved)	±0.10	<0.050	<0.050	NC	6008-1
Lead	(Total)	±0.060	0.078	<0.060	NC	6008-1
	(Dissolved)	±0.060	<0.060	<0.060	NC	6008-1
Manganese	(Total)	20%	4.0	4.3	7.2	6008-1
	(Dissolved)	20%	0.61	0.60	1.7	6008-1
Mercury	(Total)	±0.00020	0.00034	0.00031	NC	6008-1
	(Dissolved)	±0.00020	<0.00020	<0.00020	NC	6008-1
Nickel	(Total)	±0.040	0.060	0.067	11	6008-1
	(Dissolved)	±0.040	<0.040	<0.040	NC	6008-1
Selenium	(Total)	±0.0050	<0.0030	<0.0030	NC	6008-1
	(Dissolved)	±0.0050	<0.0030	<0.0030	NC	6008-1
Silver	(Total)	±0.010	<0.010	<0.010	NC	6008-1
	(Dissolved)	±0.010	<0.010	<0.010	NC	6008-1
Sodium	(Total)	±5.0	13	14	7.4	6008-1
	(Dissolved)	±5.0	12	12	0.0	6008-1
Zinc	(Total)	20%	0.21	0.23	9.1	6008-1
	(Dissolved)	±0.020	0.087	0.087	0.0	6008-1
TRPH		±0.20	<0.20	<0.20	NC	6008-5

NC = Not calculable

QC RESULTS
LABORATORY CONTROL SAMPLE

CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Parameter	Control Limit	True	Found	% Recovery
Arsenic	80-120	0.020	0.023	115
Barium	80-120	1.0	0.98	98
Cadmium	80-120	2.0	2.2	110
Chromium	80-120	2.5	2.5	100
Copper	80-120	2.0	2.0	100
Iron	80-120	1.5	1.4	93
Lead	80-120	2.0	2.1	105
Manganese	80-120	1.0	1.0	100
Mercury	80-120	0.0050	0.0051	102
Nickel	80-120	5.0	5.3	106
Selenium	80-120	0.020	0.017	85
Silver	80-120	5.0	4.7	94
Sodium	80-120	50	51	102
Zinc	80-120	2.0	2.2	110
TRPH	80-120	22	21	95

ANALYSIS RESULTS

CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Parameter	Method	Detection Limit
Arsenic	7060/7061	0.0030/0.00090
Barium	6010/7080	0.050/0.20
Cadmium	6010/7031	0.0050
Chromium	6010/7191	0.010/0.0020
Copper	6010/7210	0.025
Iron	6010/7380	0.050/0.10
Lead	6010/7421/7420	0.060/0.0020/0.025
Manganese	6010/7460	0.015
Mercury	7470	0.00020
Nickel	6010/7520	0.040
Selenium	7740/7741	0.0030/0.00090
Silver	6010/7760	0.010
Sodium	6010/7770	5.0/0.50
Zinc	6010/7950	0.020
TRPH	418.1	0.10

CONTAMINATION EVALUATION
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN

CONTRACT NO. DACA 49-87-D-0012

PREPARED FOR:
U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT
BUFFALO, NEW YORK 14207-3199

PREPARED BY:
IT CORPORATION
333 PIERCE ROAD
ITASCA, ILLINOIS 60143

JANUARY 1991

PROJECT NO. 312021.03

INTERNATIONAL
TECHNOLOGY
CORPORATION

This Contamination Evaluation for the Former NIKE Battery M-86, Menomonee Falls, Wisconsin has been reviewed and approved by the undersigned Registered Professional Engineer.

MILWAUKEE
WI

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APPENDICES

1.0 EXECUTIVE SUMMARY

A contamination evaluation was performed at the former NIKE Battery M-86 site near Menomonee Falls, Wisconsin (Figure 1). The site is owned by Mr. Ford Carr, Sr. The contamination evaluation included a records review and visual site inspection, installation of two ground water monitoring wells, collection of ground water samples from each well, collection of soil samples, a background soil sample, collection of silo water samples and collection of a sample from an underground storage tank. Samples were analyzed for petroleum hydrocarbons, total metals and volatile organics.

Ground water was found to be at the surface of the bedrock. Analytical results from the soil sampling and ground water sampling program indicated the following: elevated amounts of cadmium, chromium and lead were found in the ground water, silo water and soil. An inactive underground storage tank was found which contained fuel oil. The size of the underground storage tank is unknown.

The source of these contaminants is thought to be from unauthorized dumping of material and leaking hydraulic equipment within the abandoned missile silos. Another source of contaminants could exist upgradient and off the site.

2.0 GENERAL

2.1 INTRODUCTION

The Department of the Army is responsible for administration of the Defense Environmental Restoration Account (DERA). The objective of the DERA program is to identify and remedy environmental concerns due to Department of Defense (DOD) activities at facilities formerly owned and operated by the DOD.

IT Corporation (IT) was asked as part of this program, under Contract No. DACA 49-87-D-0012, to perform a contamination evaluation at former NIKE Battery M-86 in Menomonee Falls, Wisconsin. The Scope of Work (SOW) (Appendix A) prepared by the U.S. Army Corps of Engineers (COE) detailed the tasks to be accomplished in order to complete this evaluation. These tasks included a review of pertinent records, followed by a site inspection to determine potential sources of contaminants and sampling locations. Following the site inspection, site specific plans were developed for Health and Safety, Sampling/Analysis - Quality Assurance/Quality Control, and Monitoring Well Installation. These latter two plans comprise the site specific work plan.

The site specific plans supplement the previously submitted Program Plans (Health and Safety, Sampling/Analysis - Quality Assurance/Quality Control, Monitoring Well Installation) which presented general program work procedures. Sampling and analysis were then carried out in accordance with the work and program plans.

The submission of this final report and the HRS Form (Appendix B) complete those tasks detailed in the SOW (Appendix A).

2.2 PROJECT OBJECTIVES

The objective of this Contamination Evaluation is to make a preliminary determination of the presence or absence of chemical contamination which may have been caused by the use of this site by the U. S. Army. To accomplish this objective, two ground water monitoring wells were installed and soil, silo water, ground water and underground storage tank samples were collected.

Normal operating practices at NIKE batteries involved the storage, handling, and disposal of missile components as well as solvents, fuels, hydraulic fluids and paints. Records for NIKE facilities across the country indicate the potential for contamination of ground water and/or subsurface soils by hazardous/toxic substances. Potential contaminants include volatile organics, solvents, gasoline, diesel fuel, fuel additives, paints and related substances and battery electrolytes.

2.3 SITE LOCATION AND GEOLOGY

Former NIKE Battery M-86 of the Milwaukee Defense Area is located in north-central Waukesha County near Menomonee Falls, Wisconsin (Figure 1). The launch area is just northeast of the intersection of Lannon Road and Menomonee Avenue, approximately 1.5 miles west of Menomonee Falls. The elevation of the study area ranges from 900 to 940 feet above mean sea level (MSL).

The geology of southeastern Wisconsin generally consists of a relatively thick sequence of unconsolidated glacial deposits uncomfortably overlying sedimentary bedrock. The glacial deposits in the immediate vicinity of former NIKE Battery M-86, however, are extremely thin due to relatively high bedrock elevations. The glacial material which is present in the area consists of till deposited during the Wisconsinan Stage of the Pleistocence in the form of ground moraine. The till is very heterogeneous and ranges from clay to sand and gravel. Underlying the thin layer of till is Silurian through Cambrian aged dolomites, shales, and sandstones. Precambrian igneous rocks are under this thick sedimentary sequence.

The glacial deposits range in thickness from one foot to 50 feet within a mile of the site. Residential well logs immediately surrounding the site, and within 500 feet of the site boundary, indicated bedrock is approximately 16 to 21 feet below ground surface. The uppermost bedrock unit is the Silurian Niagara dolomite. Bedrock in southeastern Wisconsin has a north-south strike and an easterly dip.

In southeastern Wisconsin there are two main aquifers utilized for industrial, residential, and municipal water sources. One aquifer is shallow and one is deep. The two aquifers are separated by an impermeable layer, the Maquoketa shale (Ordovician). The shallow aquifer exists in the glacial deposits, where they are sufficiently thick and permeable, and in the Niagara dolomite. In many areas of southeastern Wisconsin the glacial deposits and the dolomite are hydrologically connected. The shallow aquifer generally occurs under water table conditions and is the most susceptible to ground water contamination. The deep aquifer if referred to as the sandstone aquifer and consists of the St. Peter, Eau Claire, and Mt. Simon sandstone formation (Ordovician-Cambrian).

Well logs from within a mile of the site indicate that the Niagara dolomite of the shallow aquifer is used exclusively in the area. None of the nearby wells draw from the glacial deposits or the deeper sandstone aquifer.

This study is concerned with the uppermost permanent water bearing zone(s) underlying the site. The well logs available for the area were "driller's logs" which did not include information regarding shallow, near surface ground water but only the deeper ground water zones from which the wells produce. Because of this, little was known about very shallow ground water conditions near the site and the depth to ground water. During installation of the monitoring wells the ground water was observed to be within the glacial deposits at the surface of bedrock.

Based upon topography and surface drainage, ground water is assumed to be flowing to the east and northeast. The dolomite aquifer, in most of south-eastern Wisconsin, has a potentiometric surface slope of approximately 15 feet per mile to the east.

2.4 OWNERSHIP AND PRIOR USE

Former NIKE Battery M-86 of the Milwaukee Defense Area is located in north-central Waukesha County near Menomonee Falls, Wisconsin. The Army purchase the property on November 28, 1955 from Mr. Harry Johnson (9 acres), Mr. Elmer J. Rasmussen (4.5 acres), et al. and Mr. Peter J. Schneider, et al. (1.0 acres). The site was declared excess to GSA on March 9, 1962 and was sold to Milwaukee County on August 28, 1963. The county then conveyed the site back to the United States on July 19, 1964. Elmer J. Rasmussen purchased the site from the United States on June 16, 1965 and sold it to James Knodl on May 10, 1979. The facility was again sold on August 19, 1982 to John D. Hubber, who sold the site to Ford Carr, Sr. on May 13, 1983. Ford Carr, Sr. is the current owner of the launch facility of Nike M-86.

Three abandoned transformers are on the site which date back to the time when the DOD was actively using NIKE Battery M-86. All three are Westinghouse Hypercycle single phase class OA style 14R3886 transformers with serial numbers 55 H 12989, 55 H 12990 and 55 H 12991. IT Corporation contacted Gary Miller, Operations Coordinator for Westinghouse Electric Corporation, several times over a period of several months in order to determine if polychlorinated biphenyls (PCBs) were used in the transformers. Each time IT was told that it would be very difficult to find the information, but the company representative said he would look into it. IT still has not obtained this information.

3.0 SITE INVESTIGATION

3.1 INTRODUCTION

The first part of this section provides detailed information concerning well installation at NIKE M-86 including the locations of the wells and a rationale for these locations, a summary of the drilling and installation procedures, details of well development and hydraulic conductivity testing.

The second portion of this section discusses the sampling program including methods of sample collection, type of analyses performed on the samples, methods of shipment and laboratories that performed the analyses.

3.2 MONITORING WELL LOCATION AND INSTALLATION

3.2.1 Monitoring Well Locations

The two monitoring wells were placed in potential source areas for contamination. These areas included the former generator building, the former launch unit site and the former housing/administrative area (Figure 2).

Monitoring Well 01 (MW-01) was installed at a depth of 28.8 feet due east of the former generator building (Figure 2). This location was selected in order to intercept any contamination which may be caused by the underground storage tank located near the generator building.

A second well, Monitoring Well 03 (MW-03), was installed at a depth of 21.1 feet due east of the launch site silos/magazines. Potential contamination emanating from the silos/magazines and the entire launch pad area should be encountered in the soil and/or ground water samples from this well. This well should also detect any potential contamination from the warheading/fueling area andacid neutralization pits.

3.2.2 Drilling

Three soil borings were drilled at former NIKE Battery M-86 on March 7-8, 1989. The borings were completed using a $4\frac{1}{4}$ inch ID hollow stem auger. All cuttings were placed on a plastic sheet. No visual or instrumental (HNu) evidence of contamination was observed so the cuttings were spread over the site. The augers and drill rig were steam cleaned prior to drilling at each location and after drilling was completed. Water from steam cleaning was allowed to drain into the ground. The drilling subcontractor was Wisconsin Test Drilling, Inc. of Schofield, Wisconsin.

During drilling, continuous split spoon soil samples were collected to 10 feet and then at 5 foot intervals as was specified in the Program Plan. Detailed boring logs were compiled from the split spoon samples (Appendix C). Each boring log contains descriptions of each sample, a USCS (Unified Soil Classification System) designation, blow counts and an HNu and/or OVA reading.

Drilling of the three soil borings was terminated once bedrock was encountered. Water was penetrated at the top of bedrock in two of the three borings. Each of the borings was drilled through clay and gravel fill. M-86-SB-01 was drilled to 28.8' and encountered water at 24.8'. M-86-SB-02 was drilled to 18.5' and did not hit any water. M-86-SB-03 was drilled to 21.1' and encountered water at 10.8'.

3.2.3 Well Construction

Monitoring wells were installed in M-86-SB-01 and M-86-SB-03 (M-86-SB-02 did not encounter water so a well was not installed). Due to the fact that water was encountered at the top of bedrock, no sumps were placed at the bottom of the well in order that the screen be placed to intersect the water bearing zone. The COE approved this change. Two inch I.D. Schedule 40 PVC well riser pipe and screen (10 feet length, 0.010 inch slot size) were installed through the hollow stem augers. A sand pack was added between the borehole wall and the screen as the augers were slowly removed. Bentonite pellets and then a cement grout were placed above the sand pack. Figure 3 is a construction diagram of the two wells which shows the interval covered by the screens. Steel protective covers were installed over the wells. A steel bar with a bronze survey cap was set into the cement pad next to each well. After the wells were installed and later surveyed, ground water elevations were calculated and are presented in Table 1. Surveying calculations are presented in Appendix D.

3.2.4 Well Development

The two monitoring wells were developed on April 6, 1989 using a stainless steel bailer. Five volumes of water were removed from both wells as required by the Monitoring Well Installation Program Plan. The results are summarized in Table 1. The well development water was discharged to the ground surface.

3.2.5 Hydraulic Conductivity Testing

Hydraulic conductivity tests were performed on the two monitoring wells on April 7, 1989. The method of testing employed was a falling head test using a downhole pressure transducer and a Compaq field computer to collect the data. A capped off PVC slug filled with distilled water was used for each test. Two or three tests were run on each monitoring well to verify the results and ensure representative values could be calculated from the data. Before each test was begun, the pressure transducer was lowered into the column of water in the well. The slug was then added to the well while instantaneously starting the computer program. The computer then recorded the changing water pressure via the transducer as the head fell back to static level. From the rate of the falling head during each test the conductivity can be estimated. Table 7 presents the results of the tests and Appendix E contains the raw data from which the values were calculated and the calculations.

The results for the hydraulic conductivity testing were in the range for silty sand. MW-03 is set in silty sand (Appendix C) and the results are in agreement. Test number 1 for MW-03 gives a value for within the range for silty sand. Test number 2 for Mw-03 shows an anomalously high value. Test number 1 is probably representative. Data from test number 2 when analyzed showed a poor curve. MW-01, however, is set in silty clay and the estimated conductivity values are above that range. The values are within the range of silt. This may be due to the fact that this well is set just at the soil-bedrock interface and there are a large amount of rock fragments at the screened interval.

3.3 SAMPLING PROGRAM

The samples collected and analyzed as part of this investigation are shown in Figure 2.

3.3.1 Ground Water Sampling

The two monitoring wells and the water source used for drilling were sampled on April 6, 1989. Prior to sampling each well, a water level measurement was taken. The wells were purged of five times the volume of water present in the well or purged to dryness. All purge water was discharged to the ground surface. Wells MW-01 and MW-03 each had five volumes removed. Purging took place immediately before sample collection.

Stainless steel bailers with teflon check valves were used to collect the samples. Each bailer was properly decontaminated prior to using and prior to rinsate sample collection. The well number, sample number, date, time, pH, conductivity and temperature were recorded on the sample collection log for each sample and each QA and QC sample.

The ground water samples, water source samples and three QC samples were sent for analysis to the IT Analytical Services Laboratory in Export, Pennsylvania. Three additional QA samples were sent to the Corps of Engineers Missouri River Division Laboratory in Omaha, Nebraska.
All samples were packed in ice and shipped on the day of collection via overnight courier. Chain-of-Custody and Request for Analysis forms accompanied the samples. The samples were analyzed for volatile organics, total petroleum hydrocarbons and total metals.

3.3.2 Silo Water Sampling

The water that had accumulated in the three missile silos was sampled on April 6-7, 1989. Stainless steel bailers with teflon check valves were used to collect the samples. Each bailer was properly decontaminated prior to using and prior to rinsate sample collection. The well number, sample number, date, time, pH, conductivity and temperature were recorded on the sample collection log for each sample and each QA and QC sample.

The silo water samples and three QC samples were sent for analysis to the IT Analytical Services Laboratory in Export, Pennsylvania. Three additional QA samples were sent to the Corps of Engineers Missouri River Division Laboratory in Omaha, Nebraska.

All samples were packed in ice and shipped on the day of collection via overnight courier. Chain-of-Custody and Request for Analysis forms accompanied the samples. The samples were analyzed for volatile organics, total petroleum hydrocarbons and total metals.

3.3.3 Soil Sampling

Five soil samples were collected for chemical analysis. Two soil samples were collected for geotechnical analysis from the borings for the monitoring wells during drilling. Analytical parameters for each chemical soil sample included volatile organics, total petroleum hydrocarbons and total metals. The two geotechnical samples were analyzed for grain size distribution, Atterburg limits and moisture content. The geotechnical analysis is presented in Appendix F.

An additional soil sample was collected to serve as a background sample. This sample was collected near the guardhouse using a hand auger. The sample was taken here because the location was removed from possible contamination from the former NIKE site. The background sample was analyzed for the same chemical parameters as the other samples (Table 5).

The soil samples were analyzed by the IT Analytical Services Laboratory in Export, Pennsylvania. QC samples were also analyzed by IT Analytical Services Laboratory in Export, Pennsylvania. QA samples were analyzed by the Corps of Engineers Missouri River Division Laboratory in Omaha, Nebraska. All samples were shipped on the day of collection via overnight courier.

3.3.4 Underground Storage Tanks

Underground tank sampling was done on April 7, 1989. The cap on the standpipe on Tank 01 was removed and an HNu (11.7ev) reading of 15 to 20 ppm (over background) was recorded. A "sludge judge" was then lowered into the standpipe and a sample was collected. Only one phase of liquid existed in the tank. The underground storage tank samples and three QC samples were sent for analysis to the IT Analytical Services Laboratory in Export, Pennsylvania. Three additional QA samples were sent to the Corps of Engineers Missouri River Division Laboratory in Omaha, Nebraska.

All samples were packed in ice and shipped on the day of collection via overnight courier. Chain-of-Custody and Request for Analysis forms accompanied the samples. The samples were analyzed for volatile organics, total petroleum hydrocarbons and total metals.

4.0 ANALYTICAL RESULTS

4.1 INTRODUCTION

This section presents the results of the analyses performed in the laboratory and discusses the significance of the results. The complete analytical data package is presented in Appendix G.

4.2 GROUND WATER

The results of the inorganic analyses for ground water were compared to Maximum Contaminant Levels (MCL) which are enforceable standards for drinking water. MCLs are enforced as Primary Drinking Water Regulations. Table 3 contains a summary of the occurrence and concentration of metals which were detected and those that exceed MCLs in one or more wells.

Metals analysis revealed trace amounts of cadmium, chromium and lead in excess of the MCLs. Cadmium (0.01 mg/l MCL) was found in excess of the MCL in all samples, the highest being sample MW-01 (0.073 mg/l). Chromium (0.05 mg/l MCL) was also determined to be in excess of the MCL in all samples, the highest being sample MW-01 (0.37 mg/l). The MCL for chromium is based on the hexavalent chromium ion. Total chromium was analyzed in these samples and therefore the concentration of Cr^{+6} may be lower. Lead (0.05 mg/l MCL) was found in excess of the MCL in all samples, including the driller's source water (WS-01), the highest being MW-01 (0.56 mg/l). These samples were unfiltered samples; MCLs are generally applied to monitoring well samples that have been filtered through a 0.45 micron filter. Metals present may in part represent sorbed metals on sediments. Acidification of the samples may dissolve particles and release the metals into solution.

Total petroleum hydrocarbons were detected in one ground water sample. Sample MW-03 had a trace amount (0.3 mg/l both regular and duplicate analysis) just above the detection limit of 0.2 mg/l.

No volatile organic compounds were found in any of the ground water samples other than small amounts of acetone and carbon disulfide. These two chemicals are common laboratory contaminants and may not represent actual contamination.

The QC samples analyzed by IT include a rinsate from the ground water sampling equipment, a trip blank and a split sample. The rinsate (MW-04) contained a trace of chromium (0.01 mg/l in regular and duplicate analysis; the detection limit is 0.01 mg/l) and an insignificant amount of iron (0.57 mg/l and 0.65 mg/l in duplicate analysis). The trip blank (MW-06) contained a trace amount of acetone, which is a common laboratory contaminant and may not represent actual contamination. The split sample analyzed by IT (MW-05) is included in Table 3.

Three QA samples were sent to the Corps of Engineers Missouri River Division (MRD) laboratory in Omaha, Nebraska for analysis. These included a rinsate, a trip blank and a split sample. The rinsate (MW-07) contained a trace of a common laboratory contaminant, trichlorofluoromethane (0.0034 mg/l), and a trace amount of iron (0.1 mg/l). No total petroleum hydrocarbons were found. The trip blank (MW-09) contained a trace of the laboratory contaminant, trichlorofluoromethane (0.002 mg/l). The split sample (MW-08) contained lower concentrations of cadmium (<0.0043 mg/l), chromium (0.0194 mg/l) and lead (0.0384 mg/l) than was reported by the IT laboratory (0.075 mg/l, 0.38 mg/l and 0.59 mg/l, respectively). The MRD reported trace amount of total petroleum hydrocarbons (0.55 mg/l) compared to no detection for IT's sample. The MRD also found a trace of trichloroflouromethane (0.0064 mg/l), a laboratory contaminant. The report from the MRD laboratory has been included as Appendix H.

IT's sample analysis indicates that the ground water contains cadmium, chromium and lead in amounts above the Safe Drinking Water Act standards. The MRD reports the concentrations of these metals are below the standards. Trace amounts of total petroleum hydrocarbons were found in two of the samples, and no volatile organics were found other than common laboratory contaminants.

4.3 SILO WATER

The results of the inorganic analyses for silo water were compared to Maximum Contaminant Levels (MCL) which are enforceable standards for drinking water. MCLs are enforced as Primary Drinking Water Regulations. Table 4 contains a summary of the occurrence and concentration of metals which were detected and those that exceed MCLs in one or more samples.

Metals analysis revealed trace amounts of cadmium, chromium and lead in excess of the MCLs. Cadmium (0.01 mg/l MCL) was found in excess of the MCL in two samples, the highest being in sample SW-02 (0.046 mg/l). Chromium (0.05 mg/l MCL) was also determined to be in excess of the MCL in one sample, SW-02 (0.07 mg/l). The MCL for chromium is based on the hexavalent chromium ion. Total chromium was analyzed in these samples and therefore the concentration of Cr^{+6} may be lower. Lead (0.05 mg/l MCL) was found in excess of the MCL in all samples, the highest being in sample SW-02 (3.2 mg/l). These samples are unfiltered samples; MCLs are generally applied to samples filtered through a .45 micron filter. Metals present may in part represent sorbed metals on sediments. Acidification of the samples may dissolve particles and release the metals into solution.

Total petroleum hydrocarbons were detected in two silo water samples, SW-01 (10 mg/l) and SW-02 (910 mg/l). No volatile organic compounds were found in any of the silo water samples other than small amounts of acetone and carbon disulfide. These two chemicals are common laboratory contaminants and may not represent actual contamination.

The QC samples analyzed by IT include a rinsate from the silo water sampling equipment, a trip blank and a split sample. The rinsate (SW-04) contained a trace of iron (0.07 mg/l). The trip blank (SW-06) contained a trace amount of acetone, which is a common laboratory contaminant. The split sample analyzed by IT (SW-05) is included in Table 4. Two QA samples were sent to the Corps of Engineers Missouri River Division in Omaha, Nebraska for analysis. These included a rinsate and a split sample. The rinsate (SW-07) contained a trace of the laboratory contaminant, trichlorofluoromethane (0.0032 mg/l), and a trace of iron (0.0254 mg/l) and sodium (0.056 mg/l). The split sample (SW-08) contained similar amounts of cadmium (0.0322 mg/l), chromium (0.041 mg/l) and lead (1.69 mg/l) when compared to IT's analysis (0.028 mg/l, 0.09 mg/l and 1.7 mg/l, respectively). The MRD reported a smaller amount of total petroleum hydrocarbons (0.646 mg/l) compared to IT's analysis (2.4 mg/l). The MRD reported a small amount of laboratory contaminant, trichlorofluoromethane. The report from the MRD laboratory has been included as Appendix H.

The above analysis indicates that the silo water contains cadmium, chromium and lead in excess of drinking water standards. One sample contained an elevated amount of total petroleum hydrocarbons. No volatile organic compounds were detected other than laboratory contaminants.

4.4 SOILS

A summary of the soil analysis is presented in Table 5. Concentrations of metals found in the soil samples were compared to average concentrations of elements in U.S. soils as reported by Shacklette, et al. (1984). Arsenic, barium, cadmium, chromium, lead and silver were detected in trace amounts in all five soil samples. The background sample (SS-06) contained all of these metals in roughly equal concentrations. Lead and cadmium in all samples were within range of the average U.S. soil concentrations (20 mg/kg for lead and 0.66 mg/kg for cadmium). The highest value for lead was 47 mg/kg in sample SS-04 and for cadmium was 5 mg/kg in samples SS-01 and SS-04.

All samples contained trace amounts of total petroleum hydrocarbons except for sample SS-01. Sample SS-03 had the greatest value, 150 mg/kg (150 mg/kg in the duplicate).

No volatile organic compounds were found in any of the soil samples.

The QC samples analyzed by IT include a rinsate from the soil sampling equipment, a trip blank and a split sample. The rinsate (SS-07) was found to have detectable amounts of barium, chromium, iron, lead, manganese, silver and sodium. These metals were found at amounts just above the detection limits. They only other chemical found in SS-07 was a trace of the laboratory contaminant, chloroform. The trip blank (SS-09) did not have any detectable contamination. The split sample analyzed by IT (SS-08) is included in Table 5.

Three QA samples were sent to the COE MRD laboratory for analysis. These included a rinsate, a trip blank and a split sample. The rinsate (SS-10) contained trace amounts of iron and sodium and contaminants attributable to the laboratory. The MRD did not test SS-10 for total petroleum hydrocarbons. The trip blank (SS-12) did not contain any contaminants. The split sample (SS-11) contained values for cadmium (<0.0043 mg/kg), chromium (3.3 mg/kg) and lead (3.1 mg/kg) that are lower than IT's analysis (4 mg/kg, 23 mg/kg and 32 mg/kg, respectively). The MRD reported total petroleum hydrocarbons (<20 mg/kg) as lower than IT's analysis (83 mg/kg). Variations of this magnitude are possible with soil samples composited and split in the field. The MRD did not detect any volatile organic compounds. The report from the MRD laboratory has been included as Appendix H.

Based on the above analysis, elevated amounts of lead and cadmium were detected in the soil. Low levels of total petroleum hydrocarbons were found and no volatile organic compounds were reported other than laboratory contaminants.

4.5 UNDERGROUND STORAGE TANKS

A summarý of the analysis of the underground storage tank is presented in Table 6. The only detectable metal was a trace amount of iron (37 mg/l in the regular sample and 22 mg/l in the duplicate). A high amount of total petroleum hydrocarbons was found (110,000 mg/l), as was expected, as well as several volatile organic compounds: ethylbenzene (80,000 mg/kg), toluene (9,900 ug/kg) and total xylenes (500,000 ug/kg).

The QC samples analyzed by IT included a rinsate from the storage tank sampling equipment, a trip blank and a split sample. The rinsate (TK-02) detected a trace amount of mercury (0.0003 mg/l) just above the detection limit of 0.0002 mg/l. No total petroleum hydrocarbons or volatile organic compounds were found in the sample. The trip blank (TK-04) did not contain any contaminants. The split sample analyzed by IT is included in Table 5.

Three QA samples were sent to the COE MRD laboratory for analysis. These included a rinsate, a trip blank and a split sample. The rinsate (TK-05) was found to have trace amounts of iron (0.013 mg/l) and sodium (0.0851 mg/l). The MRD reported a trace amount of total petroleum hydrocarbons (0.996 mg/l) compared to no detection for IT's sample. No volatile organic compounds were found in the rinsate (TK-05) or the trip blank (TK-07) other than laboratory contaminants. The split sample (TK-06) contains smaller amounts of iron and lead as well as a much smaller amount of total petroleum hydrocarbons (8,857 mg/l) compared to IT's analysis (120,000 mg/l). The MRD explains the discrepancy as due to taking their sample from a water layer within the sample container and not from the oil layer as IT had done. The MRD reported similar amounts of volatile organic compounds as found by IT: ethylbenzene (60,000 ug/l versus 170,000 ug/l), toluene (5,3000 ug/l versus <25,000 ug/l) and total xylenes (330,000 ug/l versus 230,000 ug/l). The report from the MRD laboratory has been included as Appendix H.

5.0 CONCLUSIONS

Elevated levels of metals (cadmium, chromium and lead) were found in the ground water, silo water and soil samples. Elevated levels of total petroleum hydrocarbons were detected in launch silo #2 (SW-02). The presence of these contaminants can be explained by the unauthorized dumping of materials on the site and the leaking of hydraulic equipment and presence of lead paint within the silos.

The fuel oil present in the underground storage tank and the lack of petroleum hydrocarbons and other organic contaminants elsewhere indicates that the tank is probably not leaking at the moment.

TABLES

TABLE 1

GROUND WATER ELEVATIONS AND WELL DEVELOPMENT

FORMER NIKE BATTERY M-86

MENOMONEE FALLS, WISCONSIN

Monitoring Well Number	Water Level Below (1) Ground Surface	Estimated Water Elevations (2)	Ground Water Volume (Gallons) (3)	Water Condition (4)
MW-01	9.52	903.23	15	Cloudy
MW-03	8.30	898.55	10	Cloudy

(1) Water levels from April 6, 1989.

(2) Estimated Mean Sea Level. No nearby benchmark. Datum from topographic map:
925' at intersection of Menomonee Avenue and Lannon Road (reference point used by surveyors).

(3) Water volumes are estimated from the filling of 2.5 gallon bucket.

(4) Color slides were taken of the development water as specified in the Program plan

TABLE 2
SAMPLES COLLECTED & ANALYZED
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN

Sample Location*	Sample #	VOC	Petroleum Hydrocarbons	Total Metals
Ground Water Samples				
East of Generator Bldg (MW-01)	M-86-MW-01	X	X	X
East of Silo Area (MW-03)	M-86-MW-03	X	X	X
(QC Split)	M-86-MW-05	QC	QC	QC
(MRD Split)	M-86-MW-08	MRD	MRD	MRD
Rinsate -	M-86-MW-04	QC	QC	QC
Rinsate -	M-86-MW-07	MRD	MRD	MRD
Travel Blank	M-86-MW-06	QC	--	--
Travel Blank	M-86-MW-09	MRD	--	--
UST Samples[a]				
Near generator Bldg	M-86-TK-01	X	X	X
(QC Split)	M-86-TK-03	QC	QC	QC
(MRD Split)	M-86-TK-06	MRD	MRD	MRD
Rinsate -	M-86-TK-02	QC	QC	QC
Rinsate -	M-86-TK-05	MRD	MRD	MRD
Trip Blank	M-86-TK-04	QC	--	--
Trip Blank	M-86-TK-07	MRD	--	--
Soil Samples[b]				
South of Generator Bldg	M-86-SS-01	X	X	X
North of Missile Silos	M-86-SS-02	X	X	X
Northeast of Missile Silos	M-86-SS-03	X	X	X
South of Missile Silos	M-86-SS-04	X	X	X
Southwest of Missile Silos	M-86-SS-05	X	X	X
Guardhouse (background)	M-86-SS-06	X	X	X
(QC Split)	M-86-SS-08	QC	QC	QC
(MRD Split)	M-86-SS-11	MRD	MRD	MRD
Rinsate -	M-86-SS-07	QC	QC	QC
Rinsate -	M-86-SS-10	MRD	MRD	MRD
Travel Blank	M-86-SS-12	MRD	--	--
Travel Blank	M-86-SS-09	QC	--	--

Notes

X	Field Sample
-	Rinsate samples are split into one sample for the IT analytical laboratory and one sample for the USACE Missouri River Division QA laboratory.
a	Metals include As, Se, Ag, Hg, Cd, Cr, Pb, Ba
b	Metals include As, Se, Ag, Hg, Cd, Cr, Pb, Ba, Na, Fe, Mn
QC	QC Sample submitted to IT analytical laboratory
MRD	QC Sample subitted to USACE Missouri River Division
*	Refer to Figure 2 for sample locations

TABLE 2
SAMPLES COLLECTED AND ANALYZED
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN
(continued)

Sample Location*	Sample	VOA	Petroleum Hydrocarbons	Total Metals
Silo Water[a]				
Launch Unit #1	M-86-SW-01	X	X	X
Launch Unit #2	M-86-SW-02	X	X	X
Launch Unit #3	M-86-SW-03	X	X	X
(QC Split)	M-86-SW-05	QC	QC	QC
(MRD Split)	M-86-SW-08	MRD	MRD	MRD
Rinsate -	M-86-SW-04	QC	QC	QC
Rinsate -	M-86-SW-07	MRD	MRD	MRD
Travel Blank	M-86-SW-06	QC	--	--
Travel Blank	M-86-SW-09	MRD	--	--
Water Source				
Driller's Water	M-86-WS-01	X	X	X

Notes

X	Field Sample
-	Rinsate samples are split into one sample for the IT analytical laboratory and one sample for the USACE Missouri River Division QA Laboratory
a	Metals include As, Se, Ag, Hg, Cd, Cr, Pb, Ba
b	Metals include As, Se, AG, Hg, Cd,Cr, Pb, Ba, Na, Fe, Mn
QC	QC sample submitted to IT analytical laboratory
MRD	QA sample submitted to USACE Missouri River Division
*	Refer to Figure 2 for sample locations

TABLE 3
SUMMARY OF GROUND WATER ANALYSIS*
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN

PARAMETER	MCL	M-86-MW-01 (E. of generator bldg)	M-86-MW-03 (E. of silo area)	M-86-MW-05 (split from MW-01)	M-86-WS-01 (driller's water)
Metals					
(mg/l)[1]					
Cadmium	0.01	0.073	0.056	0.075	0.006/0.007[2]
Chromium	0.05	0.37	0.30	0.38	0.04/0.04
Lead	0.05	0.56	0.42	0.59	0.07/0.09
Total Petroleum Hydrocarbons					
(mg/l)[1]		ND	0.3/0.3[2]	ND	ND
Volatile Hazardous Substance List Compounds					
(ug/kg)[3]					
Acetone		160	ND	91	ND
Carbon Disulfide		13	ND	ND	ND

(1) mg/l = milligrams per liter or parts per million
(2) This sample was analyzed in duplicate
(3) ug/kg = micrograms per kilogram or parts per billion
MCL MCL = Maximum Contaminant Levels from 40 CFR
ND The compound was not detected at or above the detection limit
* The complete analytical data package is presented as Appendix G

TABLE 4
SUMMARY OF SILO WATER ANALYSIS*
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN

Parameter	MCL	M-86-SW-01 (Launch Unit #1)	M-86-SW-02 (Launch Unit #2)	M-86-SW-03 (Launch Unit #3)	M-86-SW-05 (Split from SW-03)
Metals					
(mg/l)(1)					
Cadmium	0.01	ND	0.046	0.017	0.028
Chromium	0.05	0.01	0.07	0.02	0.09
Lead	0.05	0.08	3.2	0.81	1.7
Total Petroleum Hydrocarbons					
(mg/l)(1)		10	910	ND	2.4
Volataile Hazardous Substance List Compounds					
(ug/kg)(2)					
Acetone		ND	ND	23	12
Carbon Disulfide		ND	14	5.3	ND

(1) mg/l = milligrams per liter or parts per million
(2) ug/kg = micrograms per kilogram or parts per billion
ND The compound was not detected at or above the detection limit
MCL MCL = Maximum Contaminant Level
* The complete analytical data package is presented as Appendix G

TABLE 5
SUMMARY OF CHEMICAL ANALYSIS OF SOIL SAMPLES*
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN

PARAMETER	M-86-SS-06 (guardhouse - background)	M-86-SS-08 (Split from SS-03)	AVERAGE CONCENTRATIONS OF ELEMENTS IN U.S. SOILS[4] Average Concentration	Concentration Range
Metals				
(mg/kg)[(1)]				
Arsenic	1.9/1.9[(2)]	1.4	5.2	<0.01-97
Barium	31/34	29	440	70-5,000
Cadmium	5/5	4	0.66[(5)]	0.01-22[(5)]
Chromium	27/29	23	37	3-2,000
Lead	37/38	32	16	40-700
Silver	3/3	3	--	--
Total Petroleum Hydrocarbon				
(mg/kg)[(1)]	18	83		
Volatile Hazardous Substance List Compounds				
(ug/kg)[(3)]				
Acetone	ND	14		

(1) mg/kg = milligrams per kilogram or parts per million
(2) This sample was analyzed in duplicate
(3) ug/kg = micrograms per kilogram or parts per billion
(4) Shacklette, et al., "Elemental Composition of Surficial Materials in the Conterminous United States." Geological Survey Professional Paper 574-D, United States Government Printing Office, Washington, DC, 1971.
(5) Friberg, L.M., et al., 1974, Cadmium in Environment, 2nd Edition CRC Press
ND The compound was not detected at or above the indicated detection limit
* The complete analytical data package is presented as Appendix G

TABLE 5
SUMMARY OF CHEMICAL ANALYSIS OF SOIL SAMPLES*
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN
(continued)

PARAMETER	M-86-SS-06 (guardhouse - background)	M-86-SS-08 (Split from SS-03)
Metals		
(mg/kg)(1)		
Arsenic	1.9/1/9(2)	1.4
Barium	31/34	29
Cadmium	5/5	4
Chromium	27/29	23
Lead	37/38	32
Silver	3/3	3
Total Petroleum Hydrocarbon		
(mg/kg)(1)	18	83
Volatile Hazardous Substance List Compounds		
(ug/kg)(3)		
Acetone	ND	14

(1) mg/kg = milligrams per kilogram or parts per million.
(2) This sample was analyzed in duplicate
(3) ug/kg = micrograms per kilogram or parts per billion
ND The compound was not detected at or above the indicated detection limit
* The complete analytical data package is presented as Appendix G

TABLE 6
SUMMARY OF CHEMICAL ANALYSIS OF OIL SAMPLES
FROM UNDERGROUND STORAGE TANKS
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN

Parameter	M-86-TK-01 (near generator bldg.)	M-86-TK-03 (split for TK-01)
Metals		
(mg/l)(1)	No significant amount of metals found.	
Total Petroleum Hydrocarbons		
(mg/l)(1)	110,000	120,000
Volatile Hazardous Substance List Compounds		
(ug/kg)(2)		
Carbon Disulfide	ND	34,000
Ethylbenzene	80,000	170,000
Toluene	9,900	ND
Total Xylenes	500,000	230,000

(1) mg/l = milligrams per liter or parts per million.
(2) ug/kg = micrograms per kilgram or parts per billion.
ND The compound was not detected at or above the detection limit.
* The complete analytical data package is presented as Appendix G.

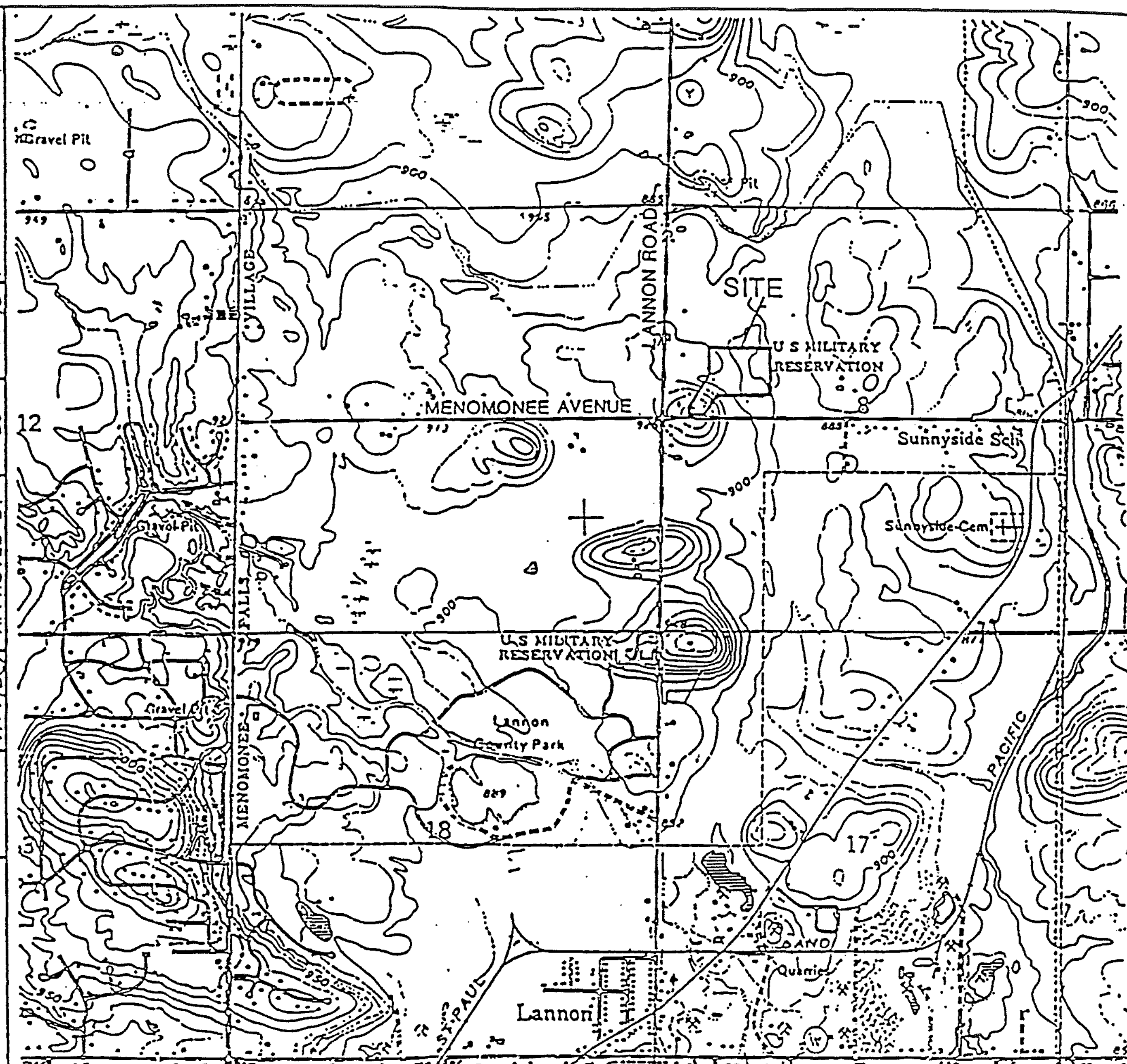
TABLE 7
RESULTS OF HYDRAULIC CONDUCTIVITY TESTING
FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN

Well Number	Test 1	Test 2	Average
MW-01	1.4×10^{-3}	5.2×10^{-3}	2.67×10^{-3}
MW-03	3.01×10^{-3}	3×10^{-1}	Average is probably not representative. See text.

All values are in cm/sec

FIGURES

DRAWN BY | CHECKED BY | APPROVED BY | 7/20/88 | 7-11-90 | DRAWING NUMBER 302245-A10



0 1/4 1/2

SCALE IN MILES

N

FIGURE 1

FORMER NIKE BATTERY M-86
MENOMONEE FALLS, WISCONSIN
SITE LOCATION MAP

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT

Source: Sussex Quadrangle
Wisconsin 7.5 Minute Series (topographic)
1959, Revised 1971

IT ... Creating a Safer Tomorrow

"Do Not Scale This Drawing"

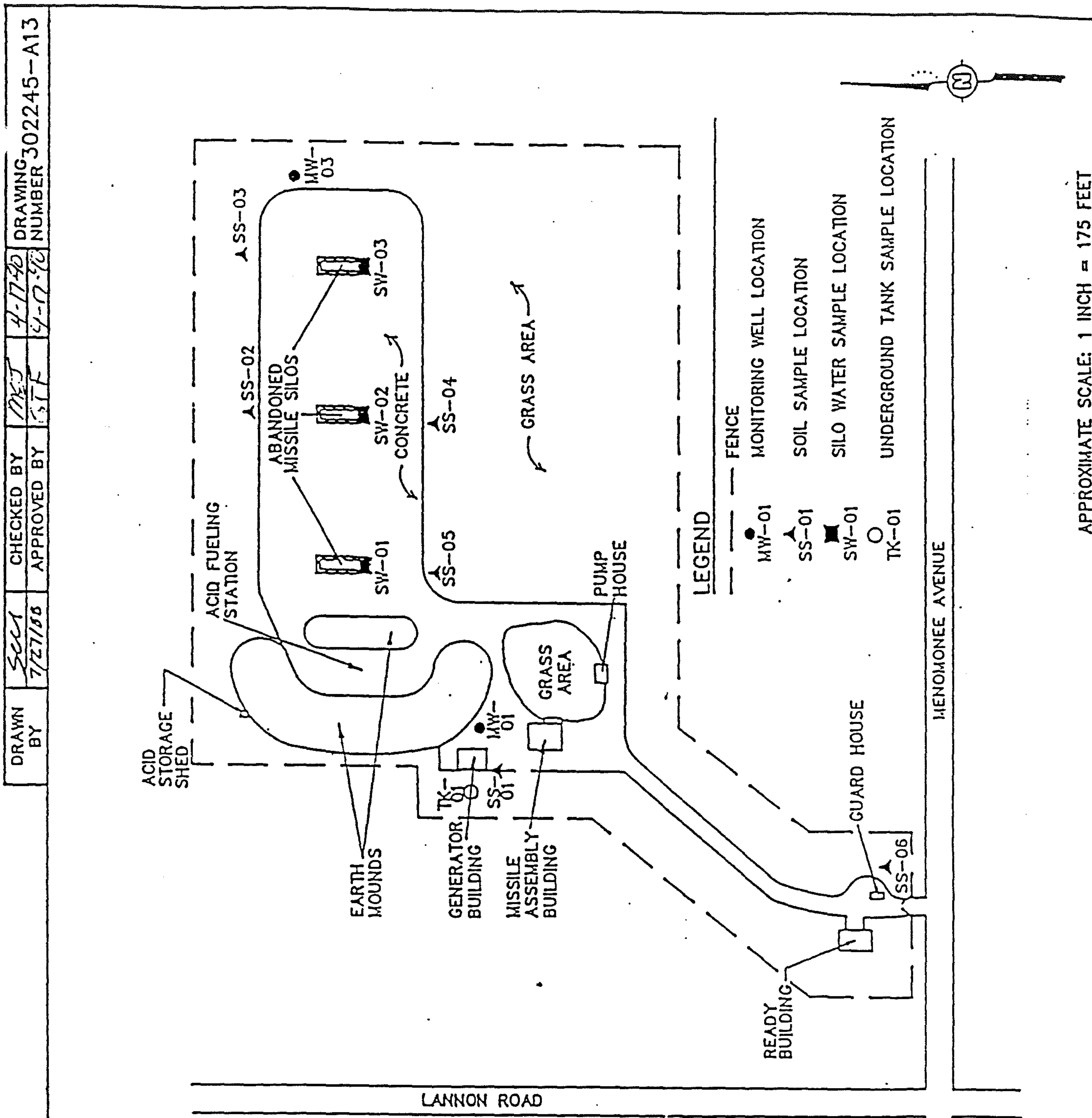


FIGURE 2
FORMER NIKE BATTERY M-86
MENOMONEE FALLS SITE MAP
WITH MONITORING WELL
AND SAMPLING LOCATIONS

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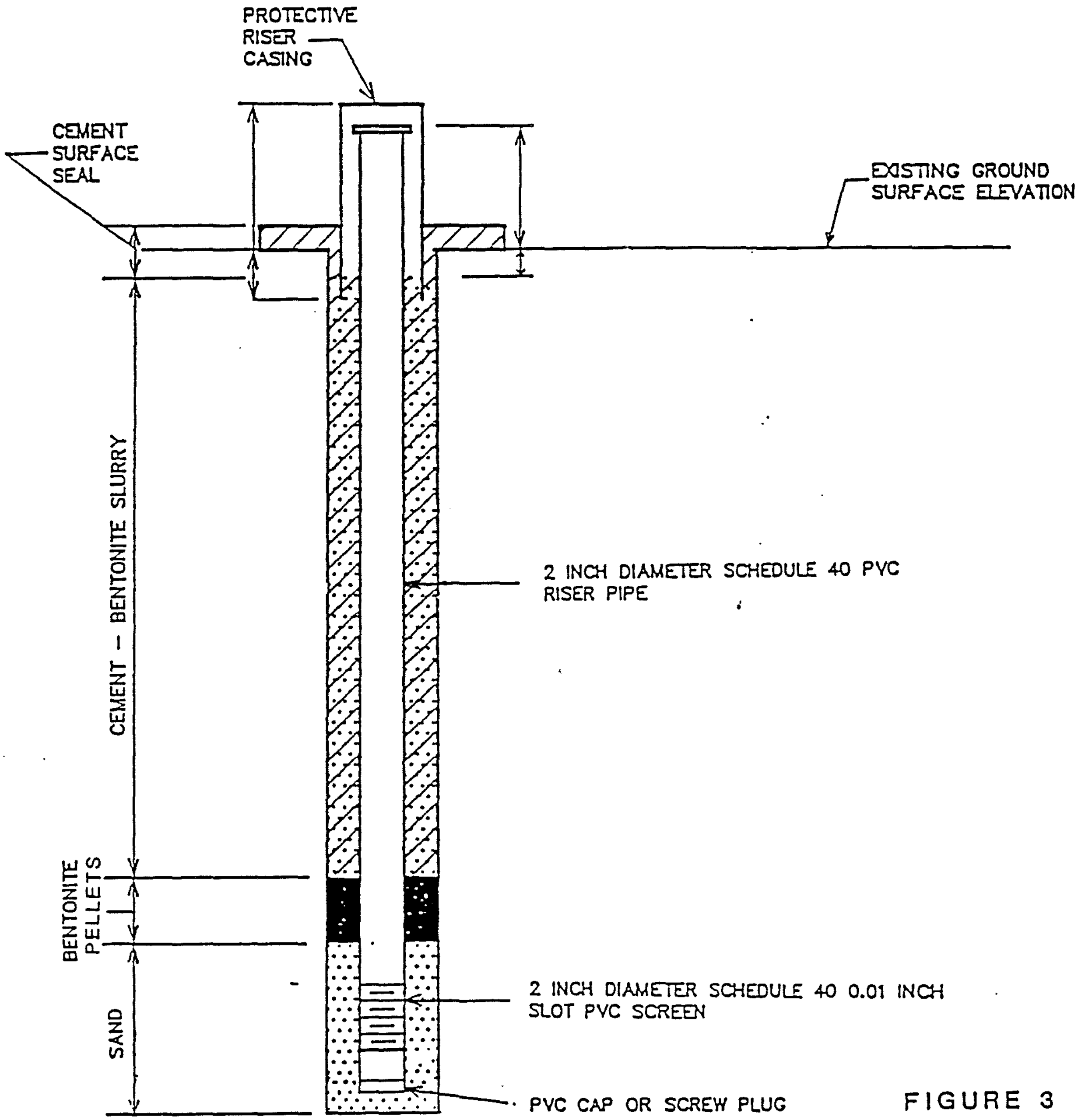

FIGURE 3

MONITORING WELL
CONSTRUCTION DIAGRAM
FORMER NIKE
BATTERY M-86
MENOMONEE FALLS, WISCONSIN

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DRAWN	CHECKED BY	APPROVED BY	DRAWING NUMBER
SRM 4/8/90	[illegible] 4-17-90	SFF 4-17-90	312[illegible]21.03.03

APPENDIX
A

APPENDIX A

SCOPE OF WORK

SCOPE OF WORK FOR CONTAMINATION EVALUATION

AT THE FORMER NIKE BATTERY M-86

MENOMONEE FALLS, WISCONSIN

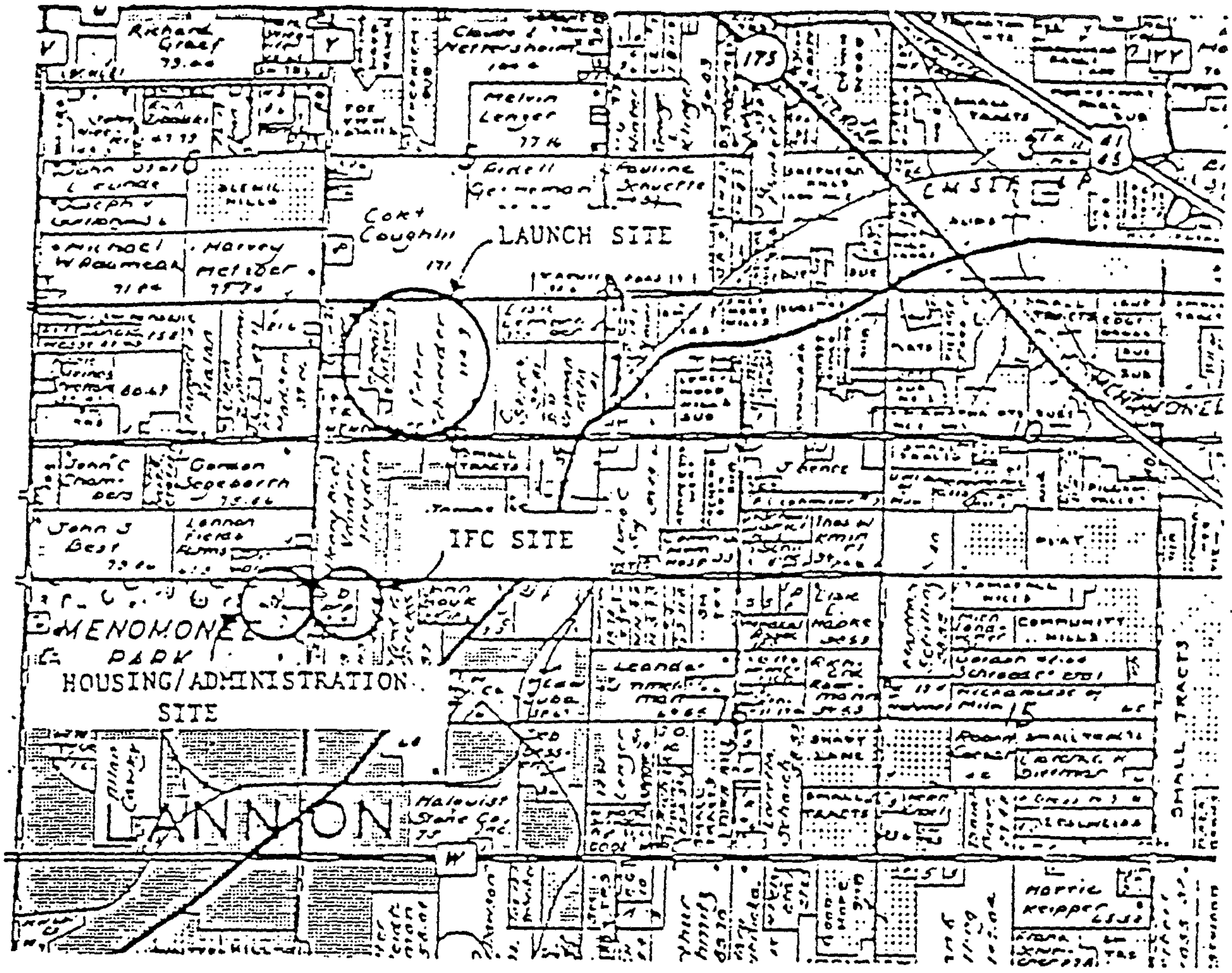
PROJECT NO. E05WI006773

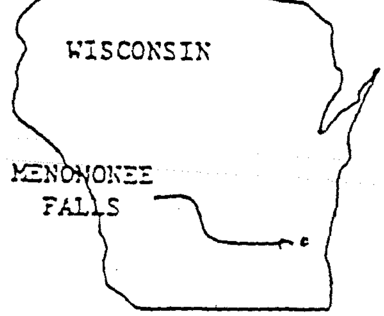
1.0 BACKGROUND AND GENERAL STATEMENT OF WORK

The work required under this scope of work falls under the Defense Environmental Restoration Account (DERA). Chemical contamination caused by Department of Defense (DOD) activities may exist at the former Nike Battery M-86 Menomonee Falls, Wisconsin. This document is the scope of work which addresses the possible chemical contamination at the control area of the Nike site. The generic scope of work (November 87) attached to the SOW of NIKE MSP-70 is employed to provide the non-site specific information required in the SOW.

1.1 General. The launch area of Nike Battery M-86 of the Milwaukee Defense Area is located in Menomonee Falls, Wisconsin, in north-central Waukesha County, Wisconsin. The site is in the north half Section of 8, T. 8 N., R. 20 E., and is west of Lannon Road about 1/2 mile south of Sunnyside Drive. The location is shown in this scope of work. (See attachments)

The 14.5-acre launch site was obtained by the United States of America on 28 November 1955 from Mr. Harry Johnson (9 acres), Mr. Elmer J. Rasmussen (4.5 acres), et ux, and Mr. Peter J. Schneider, et al. (1.0 acres). The site was declared excess to GSA on 9 March 1962 and was sold to Milwaukee County on 28 August 1963. The county then conveyed the site back to the United States on 19 July 1964. Elmer J. Rasmussen purchased the site from the

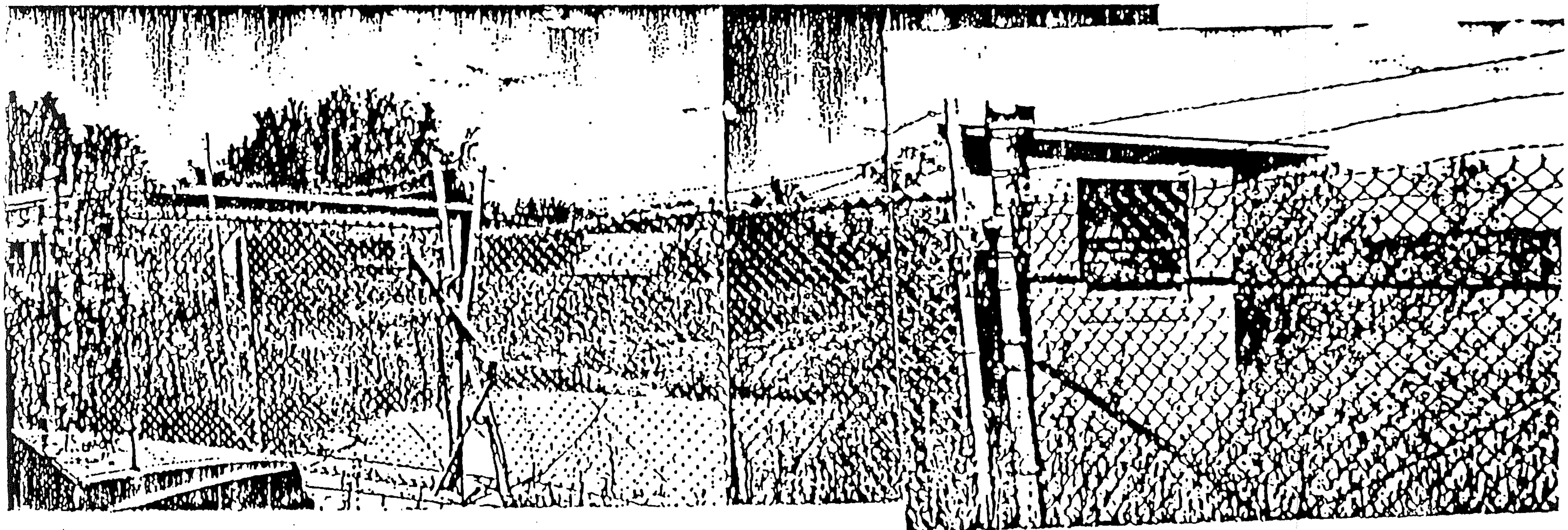




LOCATION MAP

DEFENSE ENVIRONMENTAL RESTORATION ACCOUNT (DE
INVENTORY PROJECT REPORT
MILWAUKEE DEFENSE AREA, NIKE BATTERY M-86
PROJECT NO. E05WI006773

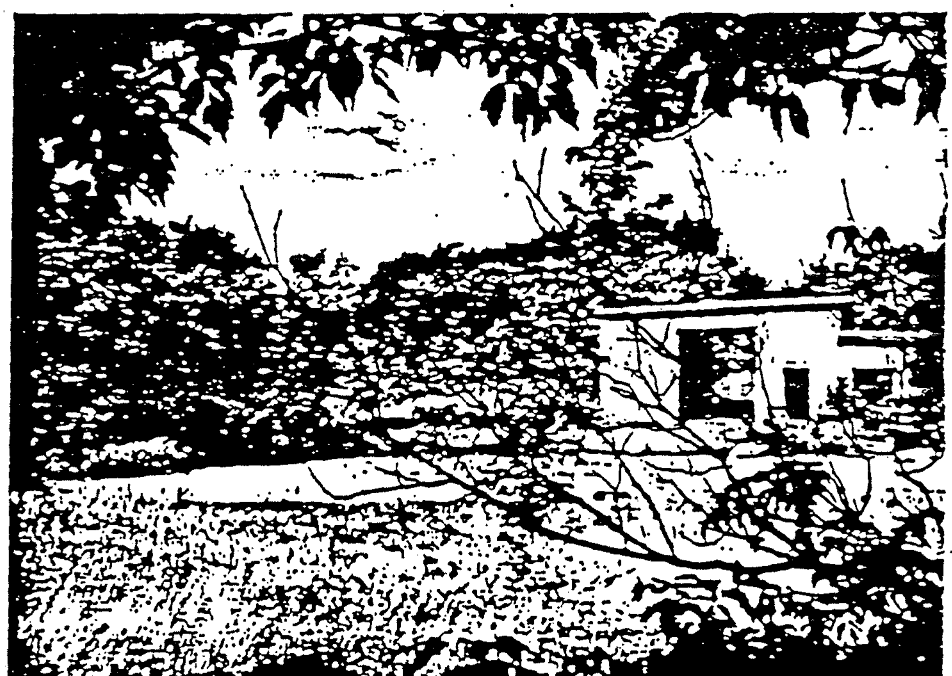
DEFENSE ENVIRONMENTAL RESTORATION ACCOUNT (DERA)
INVENTORY PROJECT REPORT
MILWAUKEE DEFENSE AREA, NIKE BATTERY M-86
PROJECT NO. E05W1006773



Entrance

DEFENSE ENVIRONMENTAL RESTORATION ACCOUNT (DERA)
INVENTORY PTOJECT REPORT
MILWAUKEE DEFENSE AREA, NIKE BATTERY M-86
PROJECT NO. E05WI006773

Warheading building



Warheading building

United States on 16 June 1965 and sold it to James Knodl on 10 May 1979. The facility was again sold on 19 August 1982 to John D. Hubber, who sold the site to Ford Carr, Sr. on 13 May 1983. Ford Carr, Sr. is the current owner of the launch facility of Nike M-86.

The launch area was part of a Nike missile site. The Army controlled this site exclusively from 1955 until 1962 when the property was reported excess to the General Services Administration (GSA). The Army probably built about four buildings, (a missile assembly building, generator building, ready building, and pump house) and other structures including three launch units during the period of occupation. It could not be determined if all the structures remain.

Buildings and structures typical of this facility include: generator building, warheading building, missile assembly building, ready building, sentry box, three magazine/launch units, pump house, kennels, acid storage shed, wastewater treatment facility, and other appurtenances. It is assumed that the magazine/launch units have not been altered. No site plans for this facility were available from the Omaha office.

Currently, the launch site from former Nike site M-86 is privately owned by Mr. Ford Carr, Sr. Mr. Carr was unresponsive to all Corps correspondence and, therefore, a site visit could not be arranged. The site was observed from outside the perimeter fence and appeared to be in the same condition as the time of deactivation. The site appears to be abandoned, with no visible development or maintenance of the area. The ready building, sentry box and warheading building were visible, as were some old barrels in front of the warheading building.

Underground fuel tanks were probably present on the site at the following locations:

Location	Capacity
Generator Building	8,000 gallon
Generator Building	4,000 gallon
Ready Building	2,000 gallon
Pump House	550 gallon

However, it appears that the current owner never used any underground fuel storage tanks.

No evidence of unexploded ordnance was found on the property.

Hazardous and toxic contamination of the launch area is most probably related to the following activities:

- Missile assembly drainage and seepage system.
- Magazine sump seepage system.
- Warheading/fueling area drainage system.
- Wastewater treatment facility.
- Diesel and fuel oil storage tanks.
- Secluded areas that were used for unofficial dumping.

Operations conducted at the missile assembly building included the use of solvents, anticorrosives, and paints. Waste and spilled materials were generally washed out of the building. Solvents may have contaminated the ground water in the area.

Extensive hydraulic systems were required by the elevator systems in the underground magazines. These systems are reported to have leaked hydraulic fluid. The magazines were equipped with sump pumps that pumped all water and waste (including hydraulic fluid, solvents, and paints) out of the magazine. These sumps may have been pumped directly to the drainage ditch surrounding the launch pad.

Acid-neutralizing pits were in the warheading/fueling area. Because the liquid fuels were extremely reactive, it is not likely that persistent contamination resulted from spills or leaks. However, battery electrolyte may have been deposited in this area causing some light contamination by lead ions.

Underground tanks were required for diesel fuel for generators and heating oil. Fuel was probably spilled during transfer and pumping operations. The greater contamination concern is that, in most cases, fuel was not removed from the tanks during deactivation. It is highly probably that the underground tanks have deteriorated and leaked.

The major function of the waste treatment system was handling sewage. However, it is possible that materials such as paints or cleaning agents may have been disposed of in the waste treatment system.

"Unofficial" dumping has been reported to have been a daily practice at some Nike sites. Low-lying areas secluded from the main facility were prime candidates for unofficial dumping, especially during deactivation.

DEFENSE ENVIRONMENTAL RESTORATION ACCOUNT (DERA)
INVENTORY PROJECT REPORT
M-86

Master list of significant potential Nike site contaminants

Benzene	Solvent	Evaporation, drainage, leaching
	General solvent and fuel constituent	Fuel tank leaks
Carbon tetrachloride (tetrachloromethane)	Solvent	Evaporation, drainage, leaching
Chromium (chromates, chrome III, IV, V)	Decorroding missile parts	Drainage and leaching, surface disposal
Petroleum hydrocarbons	Fuels, lubricants, hydrocarbons	Consumed, fuel tank leaks, spills to soil, POL turn-in, drainage and leaching, surface disposal
Lead (carbonates and oxides)	Paints and battery electrolyte	Drainage and leaching, POL turn-in
Perchlorethylene (tetrachloroethene)	Solvent	Evaporation, drainage, leaching
Toluene	Solvent	Drainage and leaching
	Constituent of fuels	Fuel tank leaks
1, 1, 1-trichloroethane	Solvent	Evaporation, drainage, leaching
1, 1, 2-trichloroethane	Solvent	Evaporation, drainage, leaching
Trichloroethylene	Solvent	Evaporation, drainage, leaching

From "Investigation of Former Nike Missile Sites for Potential Toxic and Hazardous Waste

1.2 The word "contamination" shall include chemical contamination of the groundwater, surface water or soils with contaminants specified by regulatory criteria. The work shall be conducted in an environmentally acceptable manner conforming to existing federal, state and local regulations.

2.0 OBJECTIVE

The objective is a preliminary determination of the presence or absence of chemical contamination which may have been caused by DOD related activities.

3.0 DETAILED DESCRIPTION OF SERVICES

The Architect-Engineer (AE) shall perform the following: records review and evaluation; a visual site inspection; submittal of Safety Plan; submittal of a Work Plan which includes a Sampling/Analysis-Quality Assurance/Quality Control Plan, and a Monitoring Well Installation Plan; performance of field investigations which include the installation of groundwater monitoring wells, in-situ permeability testing, collection and analyses of water and soil samples; preparation of an engineering report; and completion of a Hazardous Ranking System (HRS) form. Refer to paragraph 6.0 for method of payment explanation.

3.1 <u>(Task 1) Records Review and Evaluation</u>. The AE shall review and evaluate existing records, studies, and data concerning the site as provided by the Government, existing in the files of Government agencies such as USGS or Corps of Engineers District or Division offices, or otherwise readily available. Included in the task of records review shall be an investigation of available information on site geology (depth to bedrock), location of aquitards, lateral distribution of groundwater aquifers and groundwater flow directions in the immediate site vicinity. All available geologic data shall be utilized in determining the optimum location and depth of groundwater monitoring wells to be installed under the supervision of a Professional Engineer registered in the State of Wisconsin, in accordance with this scope of work.

3.2 (Task 2) Visual Site Inspection. The AE shall perform a walk over visual inspection, accompanied by a qualified safety and health professional, to look for potential hazardous or toxic pollutant sources (waste piles, drums, underground tanks, equipment, disposal pits, sumps, etc.) within the site. All potential sources shall be identified and located on the site map. All labeling on any sources shall be recorded. Potential hazardous/toxic chemicals including secondary chemicals or degradation products shall be listed. Information gathered from this task shall be summarized in the engineering report and utilized for preparation of the work plans, and the engineering report.

3.3 (Task 3) Safety Plan. The AE shall prepare and submit the Safety Plan (SP) to the Contracting Officer (CO) for review and approval after the site inspection but prior to commencement of any other field work, according to the schedule in paragraph 4.5. No other field work may be performed until this plan is reviewed and approved by the Contracting Officer and all work shall be performed according to the approved plan. The Safety Plan shall be prepared in accordance with paragraph 8 of this scope of work.

3.4 Work Plan. The AE shall provide a Work Plan which includes the Sampling/Analysis-Quality Assurance/Quality Control (QA/QC) Plan (Task 4) and the Monitoring Well Installation Plan (Task 5) to the Contracting Officer for review and approval prior to commencement of any field work according to the schedule in paragraph 4.5 of the generic scope of work. All work shall be performed according to the approved plan.

3.4.1 <u>(Task 4) Sampling/Analysis - Quality Assurance/Quality Control (QA/QC) Plan</u>. The AE shall prepare and submit the sampling/analysis - QA/QC plan according to the requirements of paragraph 9.0 of this scope of work. ER-1110-1-263 may be used as guidance for items not covered in enough detail in this scope of work. The site specific field and laboratory QA/QC plan shall be included.

3.4.1.1 <u>Approval</u>. The work plan must be approved by the Contracting Officer prior to performing any field work. The QA laboratory will review the draft Sampling/Analysis - QA plan and submit review comments to the Contracting Officer. In the event corrections or comments are made by the Contracting Officer of the draft plan, any necessary changes shall be implemented by the AE before final approval.

3.4.1.2 <u>AE Responsibility for Chemical Analyses</u>. It is the responsibility of the AE to properly collect, transport, analyze the samples and present the data pertaining to chemical analysis. If the AE or his subcontractor does not follow the specified criteria and approved work plans and thereby jeopardizes the samples, the Contracting Officer will disapprove the samples and direct the AE to resample, analyze, and present the data at no additional cost to the Government.

3.4.1.2.1 The laboratory shall be responsible for meeting any personnel or organizational certification requirements of Federal or state agencies and adhere to the requirements of Section 9.1 of this scope of work.

3.4.2 (Task 5) Monitoring Well Installation Plan. The AE shall prepare and submit a Monitoring Well Installation Plan according to the requirements of paragraph 10.0.

3.4.3 (Task 6) Underground Storage Tank Search

Drilling or digging will only be performed at location which have been determined to be free of buried objects by metal detector survey. Metal detector surveys should be used to locate four possible underground storage tanks. Since the site inventory report indicates that no alterations have occurred on site, it is probable that one 8,000 gallon and one 4,000 gallon underground fuel tanks are located near the generator building. A 2,000 gallon tank may be located near the ready building, and a 550 gallon tank may be located near the pump house. Underground storage tanks are typically found to the rear of these buildings. If the tanks are located, coordinates, should be recorded in respect to the buildings.

3.5 (Task 7) Location, Drilling and Installation of Groundwater Monitoring Wells. The AE shall install 3 groundwater monitoring wells. Coordinates and elevations at each well shall be established in accordance with paragraph 10.7 of this scope. The average depth of each well shall not be greater than 30 feet. The total number of linear feet drilled shall not exceed 90. No single well shall be drilled deeper than 50 feet without prior approval of the Contracting Officer. The uppermost permanent water bearing stratum shall be sampled. Final depths and locations of the screened interval shall be determined by the AE, based on subsurface conditions, in accordance with paragraph 10.3.3.2.3 and with the approval of the Contracting Officer.

3.6 <u>(Task 8) Additional Well Drilling</u>. The Contracting Officer may, at his option, direct the AE to extend the total depth of any well. Payment for this additional work will be made on a unit price per foot basis. The AE shall provide a unit price per foot to include all additional labor and materials required to extend the well depths as specified below.

3.6.1 <u>(Task 8, Option A)</u>. The AE shall extend the depth of the first well by a maximum of 20 feet.

3.6.2 <u>(Task 8, Option B)</u>. The AE shall extend the depth of the second well by a maximum of 20 feet.

3.6.3 <u>(Task 8, Option C)</u>. The AE shall extend the depth of the third well by a maximum of 20 feet.

3.7 <u>(Task 9) Collection of Well Cuttings and Water</u>. Drill cuttings brought to the surface during drilling shall be placed on plastic sheeting beside the hole unless there is visual or instrumental (i.e. HNUMETER) indications of contamination. If there are indications of contamination, the drill cutting will be placed in drums. Groundwater or well development water will be allowed to infiltrate into the ground near (but not into) the bore hole. If after analyses of groundwater samples are performed, the test results indicate that regulated concentrations of hazardous contaminants are present, the AE shall determine the optimum method for disposing of these wastes and furnish an estimated cost to the Contracting Officer. If the material is determined not to be a regulated waste, the AE shall dispose of the material at no additional cost to the Government.

3.8 <u>Collection and Chemical Analysis of Samples</u>. Samples collected and prepared in the field shall include: groundwater samples, samples, of water standing in the underground missile storage structures, if any is present, soil samples, tank samples, rinsate, and field control samples, as described in succeeding paragraphs. All sample collections and subsequent sample handling procedures shall be in accordance with the sampling/analysis QA/QC plan and with references 7.24 and 7.30. When arranging the schedule for sample collection, the AE shall coordinate with the Corps QA/QC Laboratory to obtain the bottles necessary for submission of field control samples, and with the designated QA laboratory not less than 48 hours before sampling, to assure that the laboratory is alerted to receive the QA samples and process them within the time limits specified by applicable EPA regulations and guidelines. The QA laboratory needs at least 5 days notice to be sure that sample bottles for QA splits, duplicates, and blanks arrive in time for sampling.

3.8.1 (Task 10) Groundwater Samples. Each of the groundwater monitoring wells shall be sampled once as described in paragraph 11.1. In addition, and if possible, the water supply well near the pumphouse should be sampled. Analyses are to be performed on unfiltered field samples resulting in a total of 4 samples to be analyzed. In addition, certain field control samples shall be prepared as described in paragraph 11.2. The number of samples and analyses are listed in Tables 1 and 2 respectively.

3.8.2 (Task 11) Soil Samples. One representative soil sample shall be collected from each of the 6 areas presenting the greatest potential for contamination within the area. The locations shall be identified to the Contracting Officer by the AE following the visual inspection (paragraph 3.2). One of the six soil samples shall be taken from an area far removed from possible contamination, but on the Nike site and on an area of similar soil type. This sample shall be known as a background soil sample.

Coordinates at each sampling point (boring) shall be established in accordance with paragraph 10.7 of the generic scope of work. The samples shall be collected and analyzed using techniques and equipment described in the sampling and analysis plan. All equipment used in the taking and preparation of soil samples for transportation shall be of stainless steel. The number of samples and required analyses are specified in Tables 1 and 2. One sample shall be taken at each of the specified locations at an approximate depth of three feet below the surface.

3.8.2.1 Field Control Samples, Soil. From one of the soil sampling points, sufficient soil shall be collected for three samples. The soil shall be placed in a stainless steel bowl and mixed thoroughly, with stainless steel spoons, then divided among three sets of sample containers and cooled to 4 degrees C. Replicate samples are also required for volatile organics analysis. Each of the three samples to be analyzed for volatiles shall be collected separately, without any mixing, and shall be place directly in VOA containers and cooled to 4 degrees C. It is understood that these are essentially field replicates (i.e. samples taken at the same time from the same place) rather than a split composite. One of the samples shall be sent to the QA laboratory. The other two shall be separately identified and sent to AE's laboratory or subcontract laboratory as field duplicates.

3.8.3 (Task 12) Missile Storage Structures ("Silos") Inspection. Each of the underground missile storage structures may be partially or completely filled with water. The AE shall access each missile storage structure to determine if water is present. However, no extra ordinary efforts should be undertaken to gain access to the silos. If easy access is gained, all efforts should be made to secure the entrance back to the original condition. Safety precautions against ignitable, toxic or asphyxiating substances shall be taken as specified in the Safety Plan. Care shall be exercised during accessing to avoid contaminating the water that may be present.

3.8.4 (Task 13) Water Samples, Silo (Optional). Silo water may or may not be present at the site. Water in the structures, if present, shall be sampled and analyzed. One water sample shall be collected from each of the silos, and analyzed along with QA/QC analytical requirements that are listed in Table 1. The required analyses and approved methods are given in Table 2. The samples shall be collected using techniques and equipment sufficient to obtain representative samples for determining the identity and concentration of existing contaminants. In each instance, the AE shall determine the water surface elevation, and record the total depth of water and the location and depth of each sampling point. One of the samples shall be collected in triplicate and split three ways. One split shall be submitted to the QA laboratory in bottles furnished by CEMRD-ED-L. The other two shall be separately identified and sent to the AE's laboratory or subcontract laboratory as field duplicates. After sampling is complete, the AE shall leave the structures in a condition similar to that originally encountered at no additional cost to the Government.

3.8.5 (Task 14) Surface Water Sample (Optional). Surface water may or may not be present at the site. Surface water, if present in ditches or other locations, shall be sampled and analyzed. One water sample shall be collected and analyzed from each surface location. The number of samples to be analyzed along with QA/QC analytical requirements are listed in Table 1. The required analyses and approved methods are given in Table 2. The samples shall be collected using techniques and equipment sufficient to obtain representative samples for determining the identity and concentration of existing contaminants. At each sampling location, AE shall determine the water surface elevation, and record the total depth of water and the location and depth of each sampling point. One of the samples shall be collected in triplicate and split three ways. One split shall be submitted to the QA laboratory in bottles furnished by CEMRD-ED-L. The other two shall be separately identified and sent to the AE's laboratory or subcontract laboratory as field duplicates.

3.8.6 (Task 15) Transformer Sampling. This task will not be performed.

3.8.7 (Task 16) Underground Tank Sampling (Optional). This task is to be performed if any of the underground tanks are locatable and accessible for sampling. Water or oil in the underground tanks, if present, shall be sampled and analyzed. One water sample shall be collected and analyzed from each tank vent. The number of samples to be analyzed along with QA/QC analytical requirements are listed in Table 1. The required analyses and approved methods are given in Table 2. The samples shall be collected using techniques and equipment sufficient to obtain representative sample for determining the identity and concentration of existing contaminants. In an underground storage tank there is a strong possibility that there may be more than one liquid phase present. Tanks shall be sampled by taking one sample from near the bottom of the tank at 80% of liquid depth, one sample from mid depth and one near the surface at 20% of liquid depth. These samples are to be maintained separately and examined visually for differences in composition. If there is no obvious phase difference, the samples are to be composited. If there is a phase difference, a sample of each phase is to be retained. If there is a phase difference, each phase shall be sampled and analyzed separately without mixing or compositing of samples. In each tank, the AE shall determine the liquid surface elevation (if any), the total depth of liquid, the total depth of liquid, the location and depth of each sampling point, the total estimated volume if liquid and the estimated volume of each liquid phase found in the tank. One of the samples shall be collected in triplicate and split three ways. One split shall be submitted to the QA laboratory in bottles furnished by CEMRD-ED-L. The other two shall be separately identified and sent to the AE's laboratory or subcontract laboratory as field duplicates. After sampling is complete, the AE shall seal the tanks to protect against the introduction of any additional material. The seal should be able to be removed at some future date. The soil in the vicinity of underground storage tanks should be considered for soil sampling.

3.8.7.1 <u>(Task 16 Option A).</u> If two liquid phases exist in the first tank the second phase sample shall be analyzed according to Table 2.

3.8.7.2 <u>(Task 16 Option B).</u> If two liquid phases exist in the second tank the second phase sample shall be analyzed according to Table 2.

3.8.7.3 <u>(Task 16 Option C)</u>. If two liquid phases exist in the third tank the second phase sample shall be analyzed according to Table 2.

3.8.7.4 <u>(Task 16 Option D)</u>. It two liquid phases exist in the fourth tank the second phase sample shall be analyzed according to Table 2.

3.8.8 <u>Sample Handling</u>. All details of sampling shall conform to the sampling/analysis - QA/QC Plan, and reference 7.24 and 7.30. Details include sample volumes, composition and size of container, methods of preservation, identification and labeling, packing, transportation and shipment.

3.8.9 Summary. The types and numbers of samples required are summarized in Table 1.

3.8.10 Analysis of Samples

3.8.10.1 (Task 17) Field Samples. Table 2 list required analyses and approved methods. All analyses listed shall be performed on each field sample as well as on field controls sent to the AE's laboratory or subcontract laboratory. Laboratory controls (internal QC Samples) are not listed, but shall be performed in accordance with the approved sampling/analysis - QA/QC plan. Alternate methods to those in Table 2 may be used if approved by the Contracting Officer and described in the approved plans.

3.8.10.2 (Task 18) QA/QC Samples. QA/QC samples shall be collected, handled and analyzed in accordance with the approved sampling/analysis QA/QC plan. The number of samples to be analyzed along with the analytical requirements are listed in Table 1. The required analyses and approved methods are given in Table 2.

TABLE 1 - Numbers of Samples to be Collected and Analyzed

Type	Field Samples (Collected and Analyzed by AE	Control Samples Analyzed by AE	Control Samples Analyzed by QA Lab
Groundwater	4	-	-
Sampling Blank (Rinsate)		1	1
Split Samples*		1	1
Travel Blank, Groundwater (VOA)		1	1
Surface Water (Optional)	2	-	-
Sampling Blank (Rinsate)		1	1
Split Samples*		1	1
Travel Blank, Surface Water (VOA)		1	1
Underground Storage Tanks (Optional)	4	-	-
Sampling Blank (Rinsate)		1	1
Split Samples*		1	1
Travel Blank, Underground Storage Tank(VOA)		1	1
Silo Water (Optional)	3	-	-
Sampling Blank (Rinsate)		1	1
Split Samples*		1	1
Travel Blank, Silo Water (VOA)		1	1
Soil	6	-	-
Sampling Blank (Rinsate)		1	1
Split Samples*		1	1
Travel Blank (VOA)		1	1
*Replicate samples are required for VOA; Split samples for non-volatile constituents are taken from a single composite.			
Totals	19	15	15

[illegible] options

TABLE 2 - Required Analyses and Approved Methods

Analysis		EPA Methods: Soil and Groundwater Samples	EPA Methods: Silo and Surface Water Samples
Volatile Organics		8240	624
Petroleum Hydrocarbons		9071/418.1*	418.1
Total Metals: ***	As	7060	206.3 or 206.2
	Se	7740	270.3 or 270.2
	Hg (Soil)	7471	245.1
	Hg (Groundwater)	7470	245.1
	Ba	6010	200.7
	Cd	6010	200.7
	Cr	6010	200.7
	Pb	6010	200.7
	Ag	6010	200.7
	Fe**	6010	
	Mn**	6010	
	Na**	6010	

*Note: Freon 113 shall be used as the extraction solvent. Method 9071 will be followed only through extracting steps.

**Note: Fe, Mn and Na to be measured only in groundwater.

***Note: The digestion method for total recoverable metals is 3005 for water samples and 3050 for soils. For As and Se, use the sample preparation and digestion procedures included in the specified method. For As and Se in soil, digestion method 3050 is appropriate.

3.8.11 Review of Analytical Data. As soon as the analyses of field samples are completed, and before preparation of the Draft Engineering Report, the AE shall transmit the results, (with comments if desired) to CEHND-ED-PM, CEMRD-ED-L, and CENCB-ED-HQ. Likewise, as soon as the analyses of field control samples are completed, the QA laboratory shall transmit the results to CEMRD-ED-PM, CEHND-ED-L, and CENCB-ED-HQ. Daily quality control reports and reports in writing stating significant problems with sampling, analysis, instrumentation or quality control should be transmitted within two working days. The combined results shall be reviewed by CEMRD-ED-L in coordination with CEHND-ED-PM. Comments sent to the AE should be transmitted by the Contracting Office or Project Manager. The Engineering report shall include responses to the comments.

3.9 Report Preparation and Presentation. The AE shall after completion of the field work, laboratory analyses, and data review, evaluate all data collected and present the data as follows:

3.9.1 (Task 19) Preparation of Engineering Report. The AE shall make an assessment to the site based on the field work and analyses required in this scope of work. At a minimum, the AE shall describe the site investigation and analytical results, emphasizing the significance of detected concentrations relative to appropriate federal and state criteria. In the conclusions and recommendations section, the AE shall make a preliminary determination, including specific documentation and appropriate references, of whether any chemical contamination found on the site may have been caused by DOD related activities. The Engineering Report shall include, but not necessarily be limited to the following:

Section 1.0 - EXECUTIVE SUMMARY

Section 2.0 - GENERAL

- 2.1 - Introduction
- 2.2 - Project Objectives
- 2.3 - Site Location and Geology
- 2.4 - Ownership and Prior Use

SECTION 3.0 - SITE INVESTIGATION

- 3.1 - Introduction
- 3.2 - Monitoring Well Location and Installation
- 3.3 - Sampling Program

SECTION 4.0 - ANALYTICAL RESULTS

- 4.1 - Introduction
- 4.2 - Ground Water
- 4.3 - Soils
- 4.4 - Surface Water
- 4.5 - Transformers
- 4.6 - Underground Storage Tank
- 4.7 - QA/QC Results

SECTION 5.0 - CONCLUSIONS AND RECOMMENDATIONS

APPENDICES (Supporting Documentation)

3.9.2 (Task 20) Presentation of Final Conclusions. Will not be completed in this scope of work.

3.10 (Task 21) Hazardous Rank System (HRS) Form. Based on the results of all completed tasks in this scope of work, the AE shall use the existing data to complete the HRS form. The HRS form essentially re-states data previously collected and should not require extensive research efforts.

3.11 Summary of Tasks

TASK NO.	REF. PARA.	DESCRIPTION OF TASK
1	3.1	Records Review and Evaluation
2	3.2	Site Inspection
3	3.3	Safety Plan

APPENDIX B

APPENDIX B

INVENTORY REPORT AND

HAZARDOUS RANKING SYSTEM EVALUATION

DERP

INVENTORY REPORT AND HAZARDOUS RANKING SYSTEM EVALUATION

Preliminary General Information

1.	DERP Code Number. (11)	E 05WI 006773
2.	Site Name (current). (35)	Former NIKE Battery M-86
3.	Site Name when used by DOD. (35)	NIKE Battery M-86
4.	Street/Route Number. (25)	N84W20260 Menomonee Avenue
5.	City. (16)	Menomonee Falls
6.	County. (15)	Waukesha
7.	State. (2)	WI
8.	Zip Code. (9)	53132
9.	Congressional District Code Number. (2)	9
10.	Latitude: degrees, minutes, seconds. (6)	43° 10' 15"
11.	Longitude: degrees, minutes, seconds. (7)	88° 9' 45"
12.	Is a large scale, greater than 1 inch equals 200 feet, topographic map of the site area available to attach to this inventory report? (1) Y = YES N = NO	N
13.	Are site maps or sketches on file with the inventory? (1) Y = YES N = NO	Y
14.	Are there photographs on file with the inventory? (1) Y = YES N = NO	N
15.	Current Owners Name(s). (45)	Ford Carr, Sr.
16.	Owner's Street Address. (25)	Unknown
17.	Owner's City. (16)	Springfield
18.	Owner's State. (2)	MO
19.	Owner's Zip Code. (9)	Unknown
20.	Number of Years Owned. (2)	5
21.	What is the current owner's use of the site? (50)	Not using at the present time

Real Estate Search Information

22. Give chronological list of owners or lessees since termination of DOD ownership or lease; include dates of ownership and brief description of use. (240)

November 28, 1955 - obtained by U.S. Army, declared excess to GSA March 9, 1962, sold to Milwaukee County August 28, 1963. Conveyed back to the United States on July 19, 1964. Elmer J. Rasmussen purchased the site from the government on June 16, 1965 and sold it to James Knodl on May 10, 1979. Sold again on August 19, 1982 to John D. Hubber, who sold the site to Ford Carr, Sr. on May 13, 1983.

23. Was property leased out to others by DOD? (Y or N), describe and match owner/lessee with use(s). (51)

Unknown

24. Was property leased-out to others by subsequent owners? (Y or NO) Describe. (51)

Unknown

25. Type of problem(s) listed in claim documents, check as many as applicable: (3) H

Hazardous and Toxic = H (if listed complete questions 100 to 399).
Ordnance and Explosive = O (if listed complete questions 400-499).
Debris/Structures = D (if listed complete questions 500 to 599).

26. Has Right of Entry permit been obtained? (Y or N). (1) Y

27. Are copies of lease agreements or deeds or other instruments conveying title on file? (Y or N). (1) Unknown

28. Does deed(s) or lease agreement(s) contain any disclaimers or restoration requirements? (Y or N). If yes, describe. (161)

Not known

29. Date field inspection completed. (6) 06/29/88, 07/26/88

30. Agency performing inspection. (25)

IT Corporation, Consultant to COE Buffalo District

31. Inspection team leader's name. (20) Gregory Buckle

32. Title. (25) Site Coordinator

33. Organization (office symbol). (10) IT Corporation

34. Telephone number(s): Commercial. (10) (708) 250-7788

35. Telephone number(s): FTS. (7) N/A

36. Telephone number(s): AUTOVON. (7) N/A

37. Site Status: A = Active I = Inactive (1) I

38. Years of operation in current status. (2) 28

39. Type(s) of problems found by inspection team. (3) H,D

USE:
H = H&T
O = OEW
D = DEBRIS

40. Enter the number of buildings on the site. (3) 7

41. Describe. (80)

Generator building, missile assembly building, ready building, guard-house, acid storage shed, pump house

42. What is the major land use for a one mile radius around the site? (20) (e.g., agriculture, industry, residential).

Farmland/Residential

43. What is the estimated population within a one mile radius around the site? (use 3.8 persons/house). (6)

About 200 house count est. from topographic map.

44. Describe the security of the site. (120)

Surrounded by chain link fence; one point of entry - locked gate

45. Describe the best access to the site from the nearest public road. (120)

Site entrance off north side of Menomonee Ave. at Cannon Road, Menomonee Falls, WI

List Current and/or Past Pollution Abatement Permits

Permit Information Type Of Permit Issued Past And/Or Present	Present No.	Date Issued	Expiration Date	Comments

46. NPDES (National Pollution Discharge Elimination System). (72) (Permit 3, Date Issued, Expiration Date, Comments)

Not Known

47. UIC (Underground Injection Control). (72) (Same as 46)

Not Known

48. AIR. (72) (Same as 46)

Not Known

49. RCRA (Resource Conservation and Recovery Act). (72) (Same as 46)

Not Known

50. Describe any pertinent environmental protection response actions previously taken at the site. (240)

None Known

51. Describe any environmental protection remediation actions previously taken at the site. (240)

None Known

52. List any court orders, lawsuits, fines or other legal actions that have been taken against any owners/operators of the site since DOD ownership/lease. (160)

None Known

53. Determination of Responsible Party for restoration: (1) N

DOD Other Not yet determined

54. Contract 1. (13) _____

55. Contract 2. (13) _____

56. Contract 3. (13) _____

57. Contract 4. (13) _____

58. Contract 5. (13) _____

59 - 98. Reserved.

99. Preliminary Information Remarks. (80)

DESCRIPTION OF WASTE AREAS WITH HRS OF WASTE STORAGE AT THE SITE

CONTAINMENT

100. Types of containment found in the individual waste areas: (4) C,P

Surface Impoundment	____ (I)	Waste piles, including contaminated surface soils	x	(P)
Containers	x (C)	Landfill, including contaminated subsoils	____	(L)

101. Present integrity of containment: (25) (Use Tables 1, 2 or 3 phrases)

Containers 3, contaminated soils 3

102. Evaluation of the integrity of containment versus potential ground water release, before any remedial actions (see Table 1 for evaluation considerations). HRS Value - (Ground Water Containment). (1)
3

103. Evaluation of the integrity of containment versus potential surface water release, before any remedial actions (see Table 2 for evaluation considerations). HRS Value - (Surface Water Containment). (1)
3

QUANTITY

104. Total quantity of hazardous waste, as deposited and capable of migrating. (Having a non-zero containment value (Table 3). The air pathway quantity is to include only those quantities that can be transported by the air: (10)

Not Known

105. Total quantity of waste now present: CY, drums and gallons (use only one common unit). (10)

Unknown

106. Quantity with the potential to migrate by groundwater. (10)

Contents of underground storage tank could migrate if leaking.

107. HRS Value (ground water quantity). (1) (Table 3) Unknown

108. Quantity with the potential to migrate by surface water. (10)

if underground tanks fill and overflow

109. HRS Value (Surface Water Quantity). (1) (Table 3) Unknown

110. Quantity with the potential to migrate by air. (10) None Observed

111. HRS Value (Air Quantity). (1) (Table 3) 0

HAZARDOUS SUBSTANCES

112. Hazardous substances in this area. (360)

Name(s)	Chemical Abstract System (CAS) Number
Cadmium	7440439
Chromium	7440473
Lead	7439921
Total Petroleum Hydrocarbon	
Ethylbenzene	1330207
Toluene	108883
Total xylenes	100414

113. Highest scoring substance for Ground Water Migration Route. (25)

Total petroleum hydrocarbons, lead, chromium, cadmium

114.* Toxicity ranking number. (1) 3

115.* Persistence ranking number. (1) 3

116.** HRS Matrix Value. (2) 18

117. Highest scoring substance for Surface Water Migration Route. (25)

Total petroleum hydrocarbons, lead, chromium, cadmium

118.* Toxicity (ranking number). (1) 3

119.* Persistence (ranking number). (1) 3

120.** HRS Matrix Value. (2) 18

121. Highest scoring substance for Air Migration Route. (25)

No significant air migration

122.* Toxicity (ranking number). (1) N/A

123.** HRS Value. (2) N/A

PHYSICAL STATE

* Use Tables 4, 5, or 6
** Use Table 7
* Use Tables 4, 5 or 6
** Use Table 7

124. Physical state of waste <u>as deposited</u>: (1)

	HRS Value		HRS Value
Solid, consolidated or stablized:	0	Powder or fine material:	2
Solid, unconsolidated or unstabilized:	1	Liquid, sludge or gas:	[3]

HRS value from item 124. <u>3</u>

125. Description of current physical state of waste. (15)

<u>Underground tanks which contain petroleum hydrocarbons</u>

GROUND WATER MIGRATION ROUTE

HYDROGEOLOGY

126. Description of strata from surface to the deepest aquifer of concern (names, thickness, type of material). (Refer to Table 8.) (200)

<u>Glacial till in the form of ground and end moraine up to 50 feet thick overlying the Silurian Niagara dolomite, which lies over the Ordovician Maquoketa shale and the Cambro-Ordovician sandstone aquifer group.</u>

127. Direction of regional ground water flow. (3)

<u>To the east.</u>

128. Are there barriers to horizontal migration of ground water within 3 miles downgradient of the site (e.g., rivers). These barriers should be identified on a map of the site. (1) Y/N

<u>Y</u>
(Fox River)

129. Are there discharge and/or recharge areas within 3 miles of the site? (These areas should be identified on a map of the site). (1) Y/N

<u>Y</u>
(Fox River)

COMPARATIVE DOCUMENTATION OF AQUIFERS

(All questions on this page refer to surficial aquifer).

130. Name of aquifer. (25) <u>Glacial till/Silurian Niagara dolomite</u>

131. Designation of aquifer use. (3) <u>Residential/Commercial</u>

132. Depth to highest seasonal level. (3) 9 feet

Circle the HRS value corresponding to the use of ground water drawn from within 3 miles from the source of contamination:

	Value
Unusable	0
Commercial, irrigation, or not used but usable	1
Drinking water with alternate source available	(2)
Sole source, drinking water supply	3

133. The HRS Value circled. (1) 2

134. Location of nearest drinking or irrigation well within 3 miles downgradient of the source of contamination, give direction. (20)

< 1000' due east of site

135. Depth of the nearest well (feet). (3) 124'

136. Distance to the well from nearest point of contamination (critical distances that require careful measurement for HRS purposes of 2000' 1 mile, 2 miles and 3 miles). (5)

< 1000'

137. Population served by ground water drawn from aquifer within 3 miles of contamination. (6)

21,000 people

138. Basis of population figure (e.g., census, house count). (10)

estimates from representatives of local communities

139. HRS value from Distance/Population Matrix (Table 9). (2) 40

140. Acres of cropland/pastureland irrigated by water drawn from the aquifer within 3 miles of contamination. (4)

Approx. 15,000 acres

COMPARATIVE DOCUMENTATION OF AQUIFERS

(All questions on this page refer to Deeper Aquifer)

141. Name of aquifer. (25) Cambrian - Ordovician sandstone

142. Designation of aquifer use. (10) Residential, Commercial

143. Distance from ground surface (elevation) to highest seasonal water level. (3)

N/A

Circle the HRS value corresponding to the use of ground water drawn from within 3 miles from the source of contamination:

	Value
Unusable	0
Commercial, irrigation, or not used but usable	1
Drinking water with alternate source available	2
Sole source, drinking water supply	3

144. HRS value circled. (1) 2

145. Location of nearest drinking or irrigation well within 3 miles downgradient of the source of contamination, give direction. (20)
N/A

146. Depth of the nearest well (feet). (3) N/A

147. Distance to the well from nearest point of contamination (critical distance that require careful measurement for HRS purposes are 2000' 1 mile, 2 miles and 3 miles). (5)
N/A

148. Population served by ground water drawn from aquifer within 3 miles of contamination. (6)
7,000

149. Basis of population figure (e.g., census, house count). (10)
estimates from local community representatives

150. HRS value from Distance/Population Matrix (Table 9). (2) 16

151. Acres of cropland/pastureland irrigated by water drawn from the aquifer within 3 miles of contamination. (4)
Approx. 5,000 acres

RELEASE TO AQUIFER OF CONCERN

Select from the comparative documentation of aquifers, the aquifer that yields the highest HRS ground water score. Document and evaluate this aquifer.

152. Name of aquifer. (25)

Glacial till/Silurian Niagaran Dolomite

153. Is it the surficial (S) or deeper (D) of the aquifers? (1) S

154. Is there an observed release of contaminants to this aquifer: (1) N

Y (YES), Value = 45
N (NO), Value = 0

155. HRS Value. (2) 0

156. Are there any analytical findings that document observed release to ground water above background? (1)

Y = YES N = NO — Y

157. Date of Analysis. (6) — 5/89

158. Reference. (60)

Contamination Evaluation Former NIKE Battery M-86

159. Identification of background well(s). (25) — None

160. Identification of contaminated well(s). (25)

2 wells drilled for above evaluation

161. Contaminants detected. (150)

Analytical results indicated cadmium, chromium and lead at moderate levels

162. Depth of contamination. (3) — to 28'

163. Distance from ground surface to highest seasonal water level in this aquifer. (3)

14'

164. Depth below ground surface of deepest documented waste, or, of intake of a contaminated well. (3)

28'

165. Depth from deepest point of documented contamination to the aquifer of concern. (3) (Question 163 minus 164)

0

166. HRS Value. (1) — 3

Depth	Value
0 - 20	3
21 - 75	2
76 - 150	1
150	0

167. Inches of normal annual total precipitation (Figure 1). (2) — + 34"

168. Inches of mean annual lake evaporation (Figure 2). (2) — - 28"

169. Net precipitation, in inches (if seasonal data is used, show month(s) represented). (2)

-10 inches = 0 15 inches = 3 + 6"
-10 to +5 = 1
+ 5 to +15 = 2

170. HRS Value (Precipitation). (1) 2

171. Permeability of the least permeable layer between documented contamination and the highest seasonal water level of this aquifer of concern (Table 10). (6)

2.67×10^{-3}

172. HRS Value (Permeability) (1) 3

GROUNDWATER USE

173. Write the number for the highest-valued actual use of this aquifer within a 3-mile radius as shown on the comparative evaluation. (1) 2

Use	Value	Use	Value
Unusable	0	Drinking water with alternate source	2
Commercial or irrigation	1	Without alternate source	3

DISTANCE TO NEAREST WELL

174. Distance to the nearest drinking water or irrigation well in this aquifer (comparative evaluation between surficial and deeper). (3)

< 1000'

POPULATION SERVED

175. Total population served by ground water drawn from the aquifer within 3 miles of contamination (comparative evaluation between surficial and deeper).

Population (3.8 persons/house) (5) + 21,000

176. Acres irrigated times 1.5 persons/acre (4) + 0

177. Total Population (5) 21,000
estimate from representatives from local community

178. Determine the worst case from distance/population Matrix (Table 9) and enter HRS value. (2) 16

SURFACE WATER MIGRATION

A topographical map is to be attached showing the migration path that runoff would follow from the areas of waste storage to surface waters and thence to targets within 5 miles downstream. All distances are to be measured along the migration path rather than by a straight line.*

Indicate sampling points, the most downstream point (or point along migration path) of documented contamination, all water intakes by use, and sensitive environments and critical habitats that lie contiguous to the migration path. Show names of water bodies.

OBSERVED RELEASE

179. Is there analytical evidence of contamination of surface waters above background? (1)

Y

N, Go to Item 185
Y, Go to Item 180 — Silo Water (contained)

180. Date of Evidence: (6) — March and April, 1989

181. Reference: (60) — Analytical Report, IT Corporation

182. Background Sampling Points (list site identification): (80) — None

183. Downstream Sampling Points (list site identification): (80) — None

184. Contaminants Detected (5 maximum): (100) — Petroleum hydrocarbons
Cadmium, Chromium, Lead

185. HRS Value. Direct evidence of release of surface water (evidence must be quantitative)

HRS value = 45; no evidence - HRS value = 0 (2) — 45

186. Check if drinking water intakes have been contaminated. (1) — 0

0 = NO
1 = YES, Public
2 = YES, Private
3 = Both

Questions 187 to 193 must be completed only if evidence of an observed release to surface water is lacking.

ROUTE CHARACTERISTICS

187. Does this facility lie in a topographical depression with no surface water migration route? If YES, assign a surface water migration score of zero. If NO, continue with Item 188. (1)

N

SLOPE

188. Slope of the facility. (2) — < 2%

189. Slope of intervening terrain from nearest point of documented contamination to surface water (use Table 11): (2)

< 2%

190. HRS Value (Slope Matrix). (1) — 0

191. 1 Year 24 Hour Rainfall as indicated for the site on Figure 3 (inches). (2)

2.3"

192. HRS Value (Rainfall). (1) — 2

193. Distance along migration path from most downstream point of documented contamination to surface waters. (7) Distances of 2 miles and less are classifiable.

< 1 mile

*Distance - Assign a value as follows:

Distance	Assigned Value
2 miles	0
1 to 2 miles	1
1000 feet to 1 mile	2
1000 feet	3

194. HRS Value (Distance of Surface Water). (1) — 2

SURFACE WATER USE

195. Surface water use within 3 miles (1 mile maximum in static waters) along the migration path from the msot downstream point of documented contamination: (1)

	HRS Value		
Not currently used for reasons unrelated to contamination from site:	----- 0	Irrigation recreation, etc.:	----- 2
Commercial or industrial use:	----- 1	Drinking water:	----- 3

HRS Value (Surface Water Use) (Values may be added if water has more than one use).

2

DISTANCE TO A SENSITIVE ENVIRONMENT

196. Name of nearest sensitive environment that is within 2 miles. (20)

Tamarac Swamp

197. Type of Sensitive Environment. (3)

1 = Coastal Wetland
2 = Freshwater Wetland
3 = Critical Habitat
(S - State or F - Federal)

2

198. Distance to a wetland (5 acre minimum) or critical habitat of a federal list endangered species that lies contiguous to the migration path. Measure distance from the nearest point of documented surface contamination along the migration path. (6)

2 miles

199. HRS Value (Distance to Sensitive Environment). (1) Use Table 12. 0

DISTANCE TO WATER INTAKE

200. Distance to drinking water or irrigation intake, measured from probable point of entry of migration path to surface water. (6)

N/A - no surface water intake nearby

POPULATION SERVED

Total Population served by water drawn from surface water within the 3 mile limit:

201.	Population (assume 3.8 persons/house). (5)	N/A
202.	Acres irrigated times 1.5 persons/acre. (4)	N/A
203.	Total HRS population: (5)	0
204.	HRS Value (Distance/Population Matrix). (2) (The distance (question 200) and population (question 203) are used in Table 9 to determine HRS value.)	0

AIR MIGRATION ROUTE

OBSERVED RELEASE - AIR

205. Is there any reason to suggest that air sampling should be done? (80)

NO X YES _____

Narrative Summary: No probable air emissions

206. Is there analytical evidence confirming an observed released air above background? (1)

NO X Go to Item 212 YES _____ Continue with Item 207

207. Date: (6)

208. Reference: (60)

209. Location of upwind and downwind sampling points: (80)

210. Method and equpment: (80)

211. Contaminants detected above background: (150)

212. Analytical evidence of contaminants. (2) 0

HRS value - 45 if yes NO evidence - HRS value = 0

REACTIVITY & INCOMPATABILITY

See Table 13 and Table 14.

Most reactive materials on-site are: (List)

213. (25) Petroleum Hydrocarbons

214. (25) Cadmium

215. (25) Chromium

216. (25) Lead

217. (25) Total xylenes

218. (25) Toluene, ethylbenzene

Most incompatible pairs of material onsite are: (List)

219. (25) None

220. (25)

221. (25)

222. (25)

223. (25)

224. (25)

Incompatibility	Value	and Table 13
No incompatible materials are present	0	
Present but do not pose a hazard	1	
Present & may pose a future hazard	2	
Present & posing an immediate hazard	3	

225. HRS Value (R/I). (1) 0

POPULATION EXPOSED

Population exposed to risk of air release, (fill in population information for all distances from the volatilizing source):

Indicate in each box (a, b, c and d) the total population for the given radius.

Total Population

226. 0 - 1/4 mile (7) — No volatiles

227. 0 - 1/2 mile (7) — N/A

228. 0 - 1 mile (7) — N/A

229. 0 - 4 miles (7) — N/A

230. Use insert *** to determine HRS value. (2) — N/A

*** Select the highest value for this rating factor as follows:
Distance to Population from Hazardous Substance

Population	0-4 Miles	0-1 Miles	0-1/2 Miles	0-1/4 Miles
0	0	0	0	0
1-100	9	12	15	18
101-1000	12	15	18	21
1001-3000	15	18	21	24

DISTANCE TO A SENSITIVE ENVIRONMENT

Coastal Wetland   Freshwater Wetland   Critical Habitat

231. Location and description of wetlands (5 acre minimum): (200)

Tamarac Swamp located about 2 miles to the east of the site

Location of critical habitat of endangered species, including notation of whether the species is on the Federal list.

232. Distance from volatile substance to the sensitive environment. (6)

none known

233. HRS Value - See Table 12. (1) — N/A

Land Use within 2 miles - See Table 14.

Distance/Value

234. Commercial/industrial area. (5) N/A /

235. Residential area. (5) N/A /

236. National/State park, forest, wildlife reserves. (5) N/A /

237. Prime agricultural land. (5) N/A /

238. Agricultural land in production within the past 5 years. (5)

N/A /

239. Is a historic landmark site within view of the facility or likely to be subject to significant impacts from air release? YES/NO (80) If so, identify, locate and describe expected impacts:

No

240. HRS Value (use Table 14, Land Use). (1) 0

FIRE AND EXPLOSION FROM HAZARDOUS OR TOXIC MATERIALS

FIRE AND EXPLOSION POTENTIAL

241. Based on field observation and measurement, is there a demonstrated fire and explosion threat at this tie? (41) NO/YES Describe:

Yes

Narrative Summary: Fuel oil remains in buried tank

242. Has state or local fire marshal certified that site presents a significant hazard of fire or explosion: (41)

Narrative Summary: Not to IT's knowledge

- -

If any questions in items 241 and 242 have been checked "Yes" for fire and explosion potential, complete items (243 to 284).

CONTAINMENT

Substances found on-site that are individually ignitable.

243. (25) Fuel oil found in buried tank

244. (25)

245. (25)

246. (25)

247. (25)

Substances found on-site that are incompatible.

248. (25) None

249. (25)

250. (25)

251. (25)

252. (25)

253. Are any of the substances that are onsite hazardous in combination and are not segregated or isolated so as to prevent the fomation of incompatible mixtures: Y or N (1)

None known

Isolated/Segregated	Value
Yes	3
No	1

254. HRS Value (Containment). (1) 1

WASTE CHARACTERISTICS

255. Direct Evidence of ignitability or explosion potential, as measured:

Y = YES N = NO (1) N

256. HRS Value (Direct Evidence). Value: YES 3 NO 0 (1) 0

257. Ignitability: List the most ignitable substance onsite and indicate the National Fire Protection Agency (NFPA) level assigned this substance (Table 15): (25)

Fuel oil

258. HRS Value (Ignitable). (1) 2

259. Most reactive materials onsite are: See Table 16. (25)

Fuel oil

260. HRS Value (Reactive): (1) 1

261. Most incompatible pairs of material on site are: See Table 13. (40)

None

262. HRS Value (Incompatible). (1) N/A

263. Quantity of materials onsite that are flammable or explosive, including hazardous materials that are flammable or explosive alone or in

combination: (9)

Unknown

264. HRS (Quantity) - See Table 3. (1) Unknown

DISTANCE TO TARGETS

265. Distance to nearest persons like to be at risk to fire or explosion (critical distances that require careful measurement for HRS purposes are 0 feet, 200 feet, 1/2 mile, 1 mile and 2 miles): (6)

1/2 mile

266. HRS Value (Population) - See Table 15A. (1) 3

267. Distance to the nearest building from the hazardous substance (critical distances that require careful measurement for HRS purposes are 50 feet, 200 feet and 1/2 mile): (6)

> 200'

Distance	Value
1/2 mile	0
201' - 1/2 mile	1
51' - 200'	2
0 - 50'	3

268. HRS Value (Buildings). (1) 2

269. Distance to nearest wetland from the hazardous substance? (6)

2 mile

Distance	Value
100'	0
100'	3

270. HRS Value (Wetlands). (1) 0

271. Distance to a critical habitat from the hazardous substance (critical distances that require careful management of HRS purposes are 100 feet, 1000 feet and 1/2 mile): (6)

2 miles

Distance	Value
>1/2 mile	0
1001 - 1/2 mile	1
101 - 1000'	2
0 - 100'	3

272. HRS value (Habitat). (1) 0

273. Is a fire likely to spread to this critical habitat, regardless of distance? YES or NO (1)

N

TARGETS FOR FIRE AND EXPLOSION

Land use within 2 miles (note that this item is identical to the air migration pathway, providing the location of the volatilizing substances and the flammable or explosive substance is the same):

(Critical distances requiring measurement for HRS purposes are 1/4 mile, 1/2 mile, 1 mile and 2 miles): See Table 14.

		Distance/Value
274.	Commercial/industrial area. (5)	> 1 mile / 0
275.	Residential area. (5)	1/4 mile / 3
276.	National/State park, forest, wildlife reserves. (5)	> 2 mile / 0
277.	Prime agricultural land. (5)	1/4 mile / 3
278.	Agricultural land in production within the past 5 years. (5)	1/4 mile / 3

279. Is a historic landmark site within view of the facility or likely to be subject to significant impacts from fire or explosion?

YES OR NO. Describe (81) No

Table 14 is used to determine the HRS value. The highest value is to be chosen.

280. HRS Value (Land Use). (1) 3

281. Population with 2 mile radius. (If aerial photography is used in making the count, assume 3.8 individuals per dwelling). (6)
about 15,000 est. from local community representatives

Population	Value
0	0
1-100	1
101-1000	2
1001-3000	3
3001-10,000	4
>10,000	5

282. HRS Value (Population). (1) 5

283. Buildings within a 2-mile radius (measures from the hazardous substance). (4)
nearby residential areas; approx. 500 bldgs.

No. of Buildings	Value
0	0
1-26	1
27-260	2
261-790	3

791-2600	4
>2600	5

284. HRS Value (Buildings). (1) 3

DIRECT CONTACT

285. Is there a confirmed instance in which contact caused injury, illness or death to humans or to domestic or wild animals? (100)

Narrative Summary: No

286. HRS Values: YES - 45, NO - 0 (2) 0

- -

If Item 285 for Direct Contact is checked "yes" skip to line 292 - if "no", complete itmes 287 to 291.

Accessibility to where the hazardous material is deposited - evaluate the following aspects: (1)

287. Surveillance System:

	Value	
YES	0	
NO	1	0

288. Artificial or natural barriers to entry: (1)

	Value	
YES	0	
NO	1	0

289. Control of entry points: (1)

	Value	
YES	0	
NO	1	0

Add values from lines 287, 288 and 289 to mark in 291.

290. Have any changes in accessibility been made since the confirmed instance of direct contact? (1) Y/N N/A

291. HRS Value (Access). (1) 0

292. Indicate if there is containment of the hazardous materials against direct contact: (6)

Containment	Value	Y or N
Surface impound.	15	N
Sealed or unsealed containers	15	N

Tanks	15	Y
Landfill with less than 2' cover	15	N
Spills	15	N
Otherwise	0	N

293. HRS Value (Containment) from item 292. (2) 15

294. Toxicity of the most hazardous materials that are not adequately contained against direct contact: Refer to Tables 4 & 5 (60)

Storage Area #

N/A (20)

Material

N/A (20)

Toxicity

N/A (20)

295. HRS Value (Toxicity). (1) 0

296. Population within one mile of hazardous materials: (7) about 200 people

Population Within 1 Mile	Value
0	0
1-100	1
101-1000	2
1001-3000	3
3001-10,000	4
>10,000	5

Basis for this estimate: house count from topographic map

297. HRS Value (Population): (1) 2

Location of critical habitat of endangered species, including notation of whether species is on the federal list:

298. Circle the appropriate Distance to the critical habitat (critical distance that require measurement for HRS purposes are 1/4 mile, 1/2 mile and 1 mile): (6)

> 2 miles

Distance	Value
>1 mile	0
1/2 mile - 1 mile	1
1/4 mile - 1/2 mile	2
<1/4 mile	3

299. Indicate if the critical habitat is on the State S, Federal F, or both B list(s). (1) Not known

300. HRS Value (Distance to critical habitat) from Item 298. (1) 0

301- Reserved.
298.

399. Remarks. (80)

ORDNANCE AND EXPLOSIVE WASTE (OEW)

OEW RISK ASSESSMENT

The OEW risk assessment is based on records searches, reports of Explosive Ordnance Detachment actions, and field observations and measurements. These data are used to assess the risk involved based upon the hazards identified at the site. The risk assessment is composed of two factors, hazard severity and hazard probability.

Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel error, environmental conditions, or other pertinent factors.

Description	Category	Mishap Definition
CATASTROPHIC	1	Explosion, death, life-threatening or other injury causing total permanent disabiality, or property damage in excess of $500,000.
CRITICAL	2	Major fire, severe injury which requires doctor or hospital care for 1 or more persons, or property damage between $100K and $500K.
MARGINAL	3	Minor fire, minor injury which would require any medical or property damage between $700 and $100,000.
NEGLIGIBLE	4	No injuries or property damage less than $700.

400. The Hazard Category assigned for this site is: (1) 4

401. This is based primarily upon the following: (160)

No ordnance or explosives on-site

Hazard Probability. The probability that a hazard has been or will be created due to the presence of unexploded ordnance or explosive materials on a formerly used DOD site.

Description	Level	Probability Definition
FREQUENT	A	Has already occurred more than once or has the potential to occur at least every 1 or 2 years.
PROBABLE	B	Has already occurred once or has the potential to occur more than once in the next 10 to 20 years.
OCCASIONAL	C	Is likely to occur sometime in the next 10 to 20 years.
REMOTE	D	Unlikely but possible due to the nature of past DOD use of the site.
IMPROBABLE	E	So unlikely that it can be assumed that it will not occur.

402. The hazard probability level assigned for this site is: (1) E

403. This is based upon the following: (160)

No ordnance or explosives on-site

Risk Assessment. The risk assessment value for this site is to be found by using the following table. Enter with the results of items 400 and 402.

Probability Level	A	B	C	D	E
Severity Category:					
I	20	20	18	14	10
II	20	18	14	10	6
III	18	14	10	6	2
IV	14	10	6	2	0

404. The risk assessment value for this site is: (3) 0

405. **Ordnance and Explosive Waste Characteristics.** Is there any direct or other evidence that OEW is present or could be present based upon former DOD uses of the site? This evidence can be based upon direct observation of the site survey team, reports received from individuals, government agencies, or news media, review of drawings or archive documents relating to DOD operations at the site, or any other pertinent source.

YES (Complete the rest of this question.)

NO (Continue starting with Question 422.)

If the answer to this questions is YES, describe briefly the type of evidence and where that evidence is available for detailed review. (161)

No

(For Questions 406 through 442, underline, check, circle, or, otherwise indicate each appropriate answer.)

406. High Explosives. (4)

	Yes Value	No Value	Y or N
Primary or Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, etc.)	10	0	
Booster or Bursting Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	5	0	
Military Dynamite	5	0	
Less Sensitive Explosives (Ammonium Nitrate, Favier Explosives, etc.)	3	0	

407. High Explosives Ordnance Ranking System (ORS) Value (Maximum value of 10). (2)

408. Propellants. (5)

	Yes Value	No Value	Y or N
Single Base Propellant (M10, M12, etc.)	3	0	
Double Base Propellant (M2, M5, M9, M13, etc.)	4	0	
Triple Base Propellant (M15, M17, etc.)	4	0	
Liquid Propellant	4	0	
Large Rocket Motors	5	0	

409. Other (describe). (15)

410. Propellants HRS Value from item 408. (1)

411. Conventional Ordnance and Ammunition. (11)

	YES Value	Y or N
Small Arms (.22 cal - 20mm)	1	

Medium/Large Caliber (over 20mm)	5
Ammunition, Inert	0
Ammunition, Blank or Practice	2
Bombs, Explosive	5
Bombs, Practice, Fuzed	2
Grenades, Mines	5
Grenades, Mines, Practice, Fuzed	2
Detonators, Blasing Caps	5
Rockets, Missiles	5
Demolition Charges	4

412. Other. (15)

413. Conventional Ordance and Ammunition ORS Value from item 411 (Maximum of 5). (1)

414. Pyrotechnics. (4)

	Yes Value	Y or N
White Phosphorus	5	
Pyrolusite	4	
Flares	3	
Smoke Rounds and Bombs	3	

415. Other Pyrotechnic Devices. (15)

416. Pyrotechnics ORS Value (Maximum of 5). (1)

417. Chemical Weapons/agents. (3)

	Yes Value	Y or N
Toxic Chemical Warfare Agents (GB, VX, H, HD, BZ, __, etc.)	40	
Vomiting Agents (DA, DM, DC, etc.)	20	
Tear Agents (CNS, CNB, BBC, CS, etc.)	10	

418. Other Chemical Warfare Agents. (15)

419. Chemical Weapons ORS Value. (2)

420. Total Ordnance and Explosive Waste Characteristics ORS Value (Total = 407 + 410 + 413 + 416 + 419 with a Maximum Value of 55). (2)

421. Provide a detailed description on any and all chemical weapons or chemical agents present at the site. (400)

422. Locations of Contamination. (6)

	Yes Value	Y or N
Within Tanks, Pipes, Vessels or	5	

Other confined locations.

On the surface or within 3 feet.	5
Inside walls, ceilings, or other parts of Buildings or structures.	4

423. Other (describe). (22)

424. Locations of Contamination ORS Value (Maximum of 5). (1)

425. Area Contaminated. (6)

	Value
None	0
Less than 1 acre	1
1 to 5 acres	2
5 to 50 acres	3
50 to 250 acres	4
Over 250 acres	5

426. Area Contaminated ORS Value (Maximum of 5). (1)

427. Extent of Contamination ORS Value
Sum of items (424 + 426) - (Maximum of 10). (2)

428. Weight of OEW materials on site. (7)

429. Number of rounds (from 428). (7)

Weight of Bulk Explosives in Rounds	No. of Rounds, Containers, etc.	Value
0	0	0
Less than 10	1 to 9	2
10 to 100	10 to 100	4
101 to 500	101 to 500	6
501 to 1000	501 to 1000	8
Over 1000	Over 1000	10

430. Quantity of OEW ORS Value (Maximum of 10). (2) Two valves may be figured (e.g., 8 lbs. TNT gives a value of 2, and 200 rounds gives a value of 6. Then the ORS value would be 8).

431. Provide a detailed description and the types and amounts of ordnance and explosive materials previously removed from the site by EOD forces, currently at the site, or suspected to be at the site. (800).

432. Distance to nearest persons or normally inhabited structures likely to be at risk from OEW site. (6)

Distance to Nearest Target	Value
Less than 1250 feet	5
1250 feet to 0.5 miles	4
0.6 miles to 1.0 mile	3
1.1 mile to 2.0 miles	2
2.1 miles to 5.0 miles	1
Over 5.0 miles	0

433. Distance to Persons ORS Value (Maximum of 5). (1)

434. Distance to nearest utility system (power, water, or gas) or public highway likely to be at risk from OEW site. (6)

Distance to Nearest Target	Value
Less than 1250 feet	5
1251 feet to 1 mile	3
11 miles to 2 miles	1
Over 2 miles	0

435. Distances to Public Utilities/Highways ORS Value (Maximum of 5). (1)

436. Distances ORS VAlue (433 + 435) - (Maximum of10). (2)

437. Numbers and types of Buildings within a 2 mile radius measured from the hazardous area, not the installation boundary. (6)

Numbers of Buildings	Value
0	0
1 to 10	1
11 to 50	2
51 to 100	3
101 to 250	4
251 or Over	5

438. Numbers of Buildings ORS Value (maximum of 5). (1)

439. Types of Buildings. (30)

	Value
Educational, Child Care, etc.	5
Residential, Hospitals, Hotels, etc.	5
Commercial, Shopping Centers, etc.	5
Industrial, Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
Military	1
No Buildings	0

440. Types of Buildings ORS Value (Maximum of 5). (1)

441. Numbers and Types of Buildings ORS Value (438 + 440) - Maximum of 10). (2)

442. Accessibility to site refers to the measures taken to limit access by humans or animals to ordnance and explosive wastes. Assign a value using the following guidance: Describe. (40)

Barrier	Assigned Value
A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility;	0
or	
Barrier	**Assigned Value**
An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).	0
Security guard, but no barrier	1
A barrier, but no separate means to control entry	2
Barriers do not completely surround the facility	3
No barrier or security system	5

443. ORS Value (Maximum of 5). (1) 0

444-498. Reserved.

499. Remarks. (80)

DEBRIS

DEBRIS DESCRIPTION

500. Type of Debris. (150)

Used tires on site and in missile silos; bricks and wood strewn around, transformers, abandoned building, underground storage tank

501. Type of construction for structures. (100)
Concrete and steel frame

502. Quantity. (80)
Seven buildings, three abandoned missile silos, two 55 gallon drums, three transformers, one underground storage tank

503. Condition, etc. (15)
Poor; collapsed roof on missile assembly building

504. List underground structures or items. (80)
3 underground missile silos, 1 underground storage tank

505. DOD use of debris items. (80)

506. List buildings or other items that owner(s), after DOD disposal, have used for their benefit. Give use. (150)

N/A; abandoned site

507. List items on-site that were not constructed or used by DOD or DOD contractor. (80)

None known

508. List items owner wants to retain. (80)

Unknown

509. List items that may have salvage value. (100) Unknown

510. Give location of nearest or most economical disposal location. (80)
Unknown

511. Give special labor, equipment or methods that will be required for project. (100)

Unknown

512. List any restrictions on methods of demolition or disposal. (80)
None known

513. Describe site grading that will be required for restoration: (include any special requirements or adverse foundation conditions). (40)
If silos or underground storage tanks are removed, fill and grading will be necessary.

514. Give location for borrow material if required. (40) Unknown

515. List and give location of underground items that need to be preserved. (60)

None known

516. Give requirements for seeding and mulching or other erosion measures. (80)

Unknown

517. Describe unsightly debris (UD). If no unsightly debris exists, enter NONE for this item, and do not complete items 518 through 529. (160)

Abandoned buildings

518. Size of Debris Area. (UD) (2) **Value** 2

	Value
Debris covers are 5 acres or less in size.	2
Debris covers are 6-25 acres in size.	5
Debris covers area over 25 acres in size.	10

519. Debris Above Ground Level. (UD) (2)

(Include structures, miscellaneous debris items or piles 3' or more in height. Structures larger than 12,000 SF in area or more than two-story height to count as two structures. Groups of individual items will be considered one structure).

6

Number of Structures or Piles	Value
0	0
1-2	2
3-6	4
7-15	6
16-30	8
31 or more	10

520. Describe unusual items that require transformation to structure comparison in Item 519. (100)

521. Ground level debris (less than 3' high) (UD). Foundations, slabs, small piles, etc. (1)

0

Area Covered by Debris Items	Value
No Ground Level Debris	0
0 - 20,000 SF	1
20,000 - 100,000 SF	3
Over 100,000 SF	5

522. Briefly describe Item 521 (concrete foundation, rubble, etc.) (80)

523. Condition of Debris. (UD) (2) **Value** 5

Building or structures very unsightly, such as partially demolished or collapsed or deteriorated beyond any reasonable renovation.	10
Structures that are in need of considerable maintenance, very large foundations, piles of building rubble, etc.	5
	Value
Small foundations, small debris piles or buildings in good condition that are not compatible with surrounding area.	2

524. Give basis for value selected in Item 523. (100)
<u>abandoned building in poor state, one building has collapsed roof</u>

525. **Location (UD)**: (2) — **Value** — 2

Rural	2
Small Town or Community	5
Urban or densely populated residential area	10

526. Effect on Surrounding Area. (UD) (1) — **Value** — 0

Contributes highly to general area being slum or very desirable for use.	5
Serves as a deterent to development of general area or has slight bearing on above choice.	2
No effect.	0

527. Briefly describe effect in Item 526. (80)
<u>Rural area; not visible from roadway</u>

528. Public Use or Exposure. (UD) (2) — **Value** — 0

Isolated from public exposure.	0
Located in area with little public exposure.	1
Located in area that receives heavy public use or exposure of seasonal or other varying nature.	6
Located in area that receives heavy year round use.	10

529. Give basis for value selected in Item 528. (80)
<u>Fenced area; rural</u>

530. Describe Hazardous Debris. (HD) (160)

If there is no debris that represents a potential physical or health hazard to persons or is a potential source of damage to surrounding property, enter NONE for this item and 0 for item 540 and do not complete items 531 through 537.

An underground storage tank which contains fuel oil; open missile silos

531. Probability of Injury or Health Hazard (HD) (2) 2

	Value
Has occurred frequently or has potential to occur at least annually.	10
Has occurred once and has potential to occur at least once every two years	8
Has potential to occur every 2-10 years.	6
Has potential to occur every 10-25 years.	4
Unlikely to occur once every 25 years.	2

532. List past occurrences or give basis for value selected in Item 531. (100)

Injury improbable

533. Severity of Potential Hazard (HD) (2)
(Most probable results from incident involving debris)

10

	Value
Totally disabling or death.	10
Loss of limb, partial sight, hearing, etc.	8
Would require hospitalization or repeated medical treatment.	6
Would require minor medical care.	3
Minor cuts and bruises.	1
No injury.	0

534. Give information on past incidents or describe conditions that would contribute to value selected in Item 533. (100)
Falling into abandoned silo

535. Hazard to Property Other Than Owner (HD) (2)
(Damage resulting from fire, collapse, etc.)

	Value	0
Potential for damage in excess of $250,000.	10	
Potential for damage of $75,000 to $250,000.	5	
Potential for damage of less than $75,000.	1	
No damage potential.	0	

536. List hazard and property that would be exposed to hazard in Item 535. (80)

537. Probability of Damage Occurring. (HD) (1) 1

	Value
In next two years.	5
In 2-10 years.	4
In 10-25 years.	2
Beyond 25 years.	1

538. Has site been coordinated for demolition and/or removal under Section 106 of the National Preservation Act?

Unknown

____Yes ____No (1)

542-598. Reserved.

599. Remarks. (80)

DEBRIS WORKSHEET

539. Unsightly Debris Score:

A. **Item No.** | **Value**

Item No.	Value
518	2
519	6
521	0
523	5
525	2
526	0
TOTAL	15

B. If value for item 528 is 0, multiply total in A by 0.5 __7.5__.

If value for items 528 is 1, multiply total in A by 0.9 ________.

If value for item 528 is 6 to 10, add value selected to Total in A ________.

C. Divide B by 2.10 for Unsightly Debris Score __4__ (round to nearest whole number).

540. Hazard Debris Score:

Item No.	Value
531	2
533	10
535	0
537	1

A. Multiply Item 531 value by Item 533 = 20

B. Multiply Item 535 value by Item 537 = 0

Total A + B = 20

Hazardous Debris Score = Total A + B = 20
(Round to nearest whole number)

541. Total Score for Ranking.

Total Score = Unsightly Debris Score (Item 535)
\+ Hazardous Debris Score (Item 539)
= 24

APPENDIX C

APPENDIX C

BORING LOGS

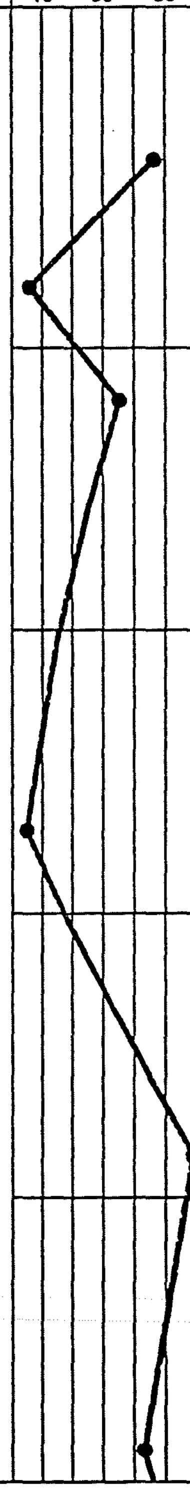
DATE BEGAN: 3-7-89
DATE FINISHED: 3-7-89
GROUND SURFACE EL: N/A

BORING NO. SB-01

INTERNATIONAL TECHNOLOGY CORPORATION

FIELD ENGINEER: M. Jank
CHECKED BY: G. FitzGerald

ELEV. (FEET)	DEPTH (FEET)	SAMPLE NO. / TYPE	% REC.	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
N/A	2.5	1 S	33	VERY STIFF, GREY BROWN CLAY, SOME SILT, ROCK FRAGMENTS, MOIST	cl		HNU=0ppm
	5.0	2 S	0	NO RECOVERY			
	7.5	3 S	33	STIFF BROWN SILTY CLAY WITH MANY ROCK FRAGMENTS,MOIST	cl		HNU=0ppm
	10.0	4 S	8	DENSE ROCK FRAGMENTS WITH SOME SILT AND CLAY MOIST	cl		HNU=0ppm
		5 S	0	NO RECOVERY			
	12.5						HNU=0ppm
	15.0	6 S	25	VERY STIFF GREY BROWN CLAY ROCK FRAAGMENTS MOIST	cl		
	17.5						HNU=0ppm
	20.0	7 S	33	VERY STIFF BROWN SILTY CLAY BELOW WHICH IS GREY CLAY LESS SILTY ROCK FRAGMENTS, MOIST	cl		
	22.5						HNU=0ppm
	25.0	8 S	33	VERY STIFF BROWN AND GREY CLAY, SILTY ROCK FRAGMENTS, MOIST	cl		



PROJECT NO.: 302245-03
PROJECT NAME: COE BUFFALO
MENOMONEE FALLS M-86

DATE BEGAN: 3-7-89
DATE FINISHED: 3-7-89
GROUND SURFACE EL: N/A

BORING NO. SB-01

INTERNATIONAL TECHNOLOGY CORPORATION

FIELD ENGINEER: M. Jank
CHECKED BY: G. FitzGerald

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	% REC.	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
N/A	27.5	9 S	12	ENCOUNTERED WATER AT 26' 100 BLOWS TO GO .5' STIFF BROWN AND GREY CLAY, ROCK FRAGMENTS, SILT	cl		HNU=0ppm
	30			BEDROCK AT 28.8 FEET			

PROJECT NO.: 302245-03
PROJECT NAME: COE BUFFALO
MENOMONEE FALLS M-86

BORING NO. SB-01
SHEET 2 OF 2

DATE BEGAN: 3-7-89
DATE FINISHED: 3-7-89
GROUND SURFACE EL: N/A

BORING NO. SB-02

INTERNATIONAL TECHNOLOGY CORPORATION

FIELD ENGINEER: M. Jank
CHECKED BY: G. FitzGerald

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	% REC.	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
N/A	2.5	1 S	87	VERY STIFF, DARK BROWN CLAY, SILTY, ORGANIC MATTER NUMEROUS ROCK FRAGMENTS, MOIST	cl		HNU=0ppm
	5.0	2 S	75	VERY STIFF, DARK BROWN CLAY, MOIST (2") DENSE ROCK FRAGMENTS WITH GRAVEL, SAND, SOME CLAY AND SILT, DRY	gm		HNU=0ppm
	7.5	3 S	75	DENSE ROCK FRAGMENTS, GRAVEL AND SAND, ROCK POWDER DRY	gm		GEOTECHNICAL SAMPLE 8-10' M86-SB-01
	10.0	4 S	50	MEDIUM DENSE ROCK FRAGMENTS SAND ROCK FLOUR (6") DRY STIFF BROWN CLAY, SILT, SANDY ROCK FRAGMENTS, MOIST (6")	gm/cl		HNU=0ppm
		5 S	50	STIFF BROWN CLAY, CLAY SILTY ROCK FRAGMENTS MOIST (6") ROCK FRAGMENTS, SAND, ROCK FLOUR, DRY (6")	cl/gm		HNU=0ppm
	12.5						
	15.0	6 S	25	STIFF BROWN CLAY ROCK FRAGMENTS, DRY	cl		HNU=0ppm
	17.5			125 BLOWS - WENT .3' NO RECOVERY BEDROCK ? 18.5 FEET			
	20.0						
	22.5						
	25.0						

PROJECT NO.: 302245-03
PROJECT NAME: COE BUFFALO
MENOMONEE FALLS M-86

BORING NO. SB-02
SHEET 1 OF 1

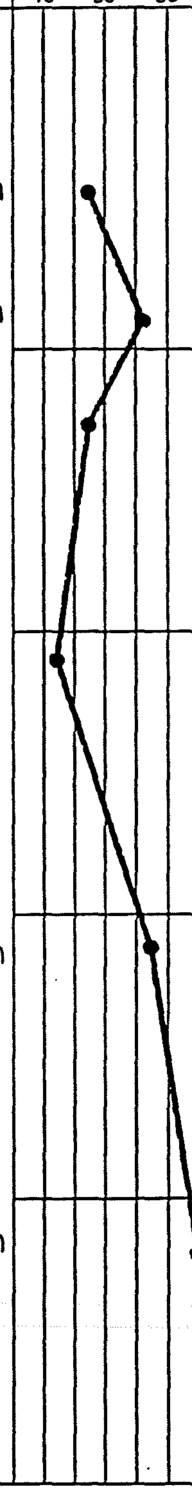
DATE BEGAN: 3-8-89
DATE FINISHED: 3-8-89
GROUND SURFACE EL: N/A

BORING NO. SB-03

INTERNATIONAL TECHNOLOGY CORPORATION

FIELD ENGINEER: M. Jank
CHECKED BY: G. FitzGerald

ELEV. (FEET)	DEPTH (FEET)	SAMPLE TYPE	% REC.	DESCRIPTION	U.S.C.S.	PENETRATION RESISTANCE (BLOWS PER FOOT) 10 30 50	REMARKS
N/A	2.5	1 S	50	MEDIUM DENSE, GRAVEL AND BROWN SILTY SAND, DRY	gm		HNU=0ppm
	5	2 S	37	MEDIUM DENSE, GRAVEL BROWN SILTY SAND, DRY	gm		HNU=0ppm
	7.5	3 S	37	MEDIUM DENSE, GRAVEL AND BROWN SILTY CLAY, DRY	gc		HNU=0ppm
	10	4 S	0	NO RECOVERY			
		5 S	37	VERY STIFF, GREY CLAY MUCH ORGANIC MATTER MOIST	cl		HNU=0ppm
	12.5						
	15	6 S	25	MEDIUM DENSE, ROCK FRAGMENTS, BROWN SILTY SAND, WET	gm		HNU=0ppm GEOTECHNICAL SAMPLE 15-17' M86-SB-02
	17.5						
	20	7 S	25	MEDIUM DENSE, ROCK FRAGMENTS, BROWN SANDY SILT	gm		HNU=0ppm
	22.5			BEDROCK 21.1 FEET			
	25						



PROJECT NO.: 302245.03
PROJECT NAME: COE BUFFALO
MENOMONEE FALLS M-86

BORING NO. SB-03
SHEET 1 OF 1

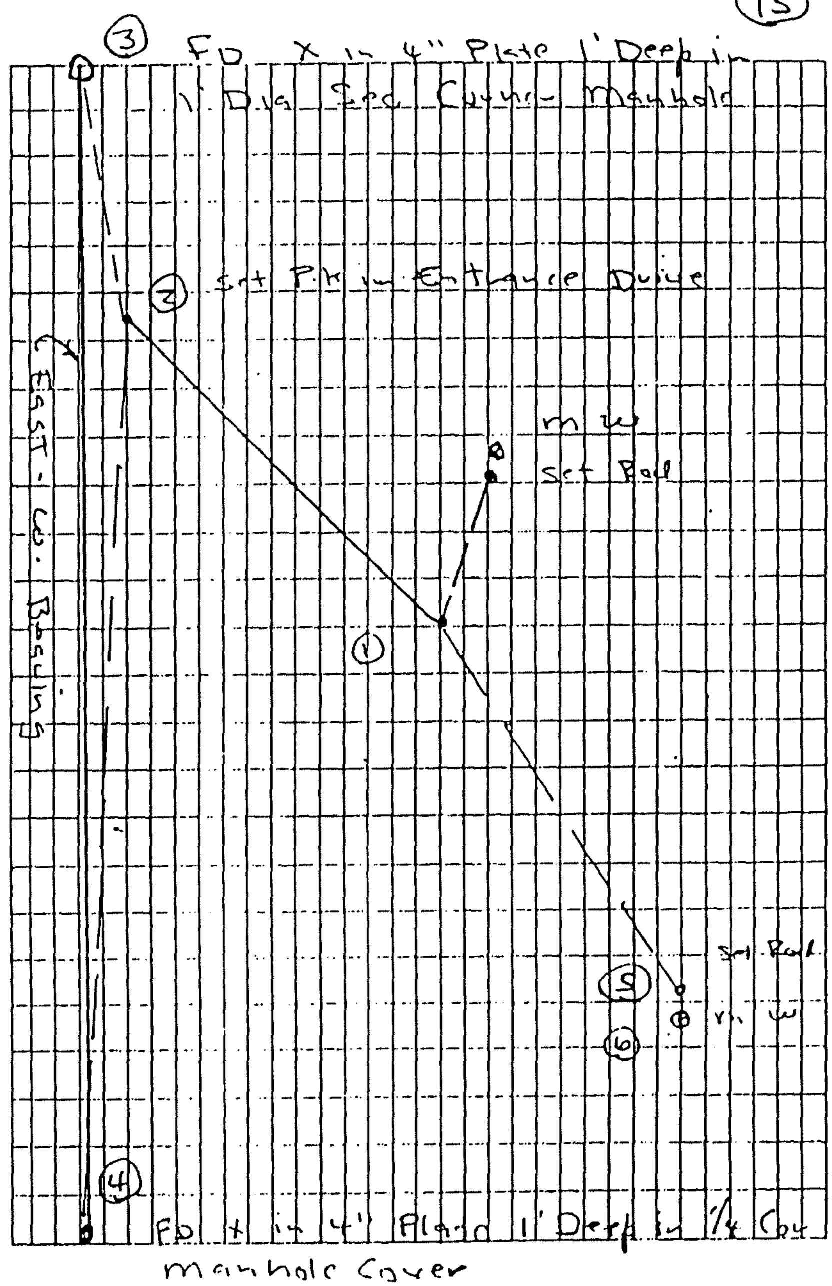
APPENDIX D

APPENDIX D

SURVEYING CALCULATIONS AND RESULTS

MENOMONEE FALLS

		Slope	ft	mt
	1-2	93-10-30	617.19	188.115
1/2/3	Fd Sec Corner "X" in Plate			
234-04-24		54-04-12		
0-00-37		180-00-24	2-3	91-39-00
234-03-47		234 03.48	ft	416.67
				mt. 127.000
1/2/4				
57-00-70		237-00-05		
0-00-37		180-00-24	2-4	91-24-30
56-59-43		56-59-41		2177.85
				663.813
2/1/5	Set Rod 1.96' w of well			
213-58-54		33-58-38		
0-00-39		180-00-26	1-5	90-21
213-58-15		213 58-12		588.01
				179.224
2/1/6	m.w			
214-01-17		34-01-03		
0-00-39		180-00-36	1-6	90-05-00
214-00-38		214-00-37		590.06
				179.852
2/1/7	m.w			
70-16-50		250-16-39		
0-00-38		180-00-26	1-7	92-22-10
70-16-12		70-16-13		116.56
				35.527
2/1/	Rod 2.11 E of Well			
70-16-50		250-16-36		
0-00-38		180-00-26	1-8	91-28-50
				114.37
70-16-12		70-16-10	same ∡	34.860



Road	Cover M.H.		13.43	201.08	
B.M	14.51	214.51		200.00	Sec Cor
	1.23	213.95	1.79	212.72	
	0.14	200.14	13.95	200.00	
	0.36	185.71	14.79	185.35	
	4.75	184.71	5.75	179.96	
		$\boxed{184.71}$			
W. M.W	#		4.28		
West Rod			6.48		
	5.51	184.82	5.40	179.31	
East M.W			8.77		
			11.15		
	8.80	184.85	8.77	176.05	
	5.44	184.75	5.54	179.31	
	6.34	186.30	4.79	179.96	
	14.82	200.16	0.96	185.34	
	14.80	214.79	0.17	199.99	
	2.23	214.83	2.09	212.70	
			13.88		201.08

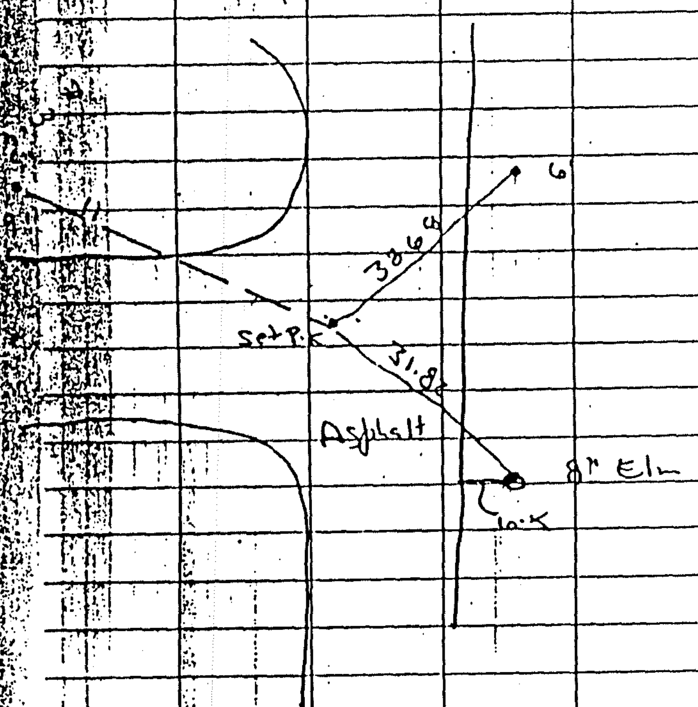
Assumed B.M on 4' Top Platt at SW Section Corner

Top of Standpipe of well
Rod 3.11 East of Well

Top of Standpipe of well
Rod W of Well

C.P #1

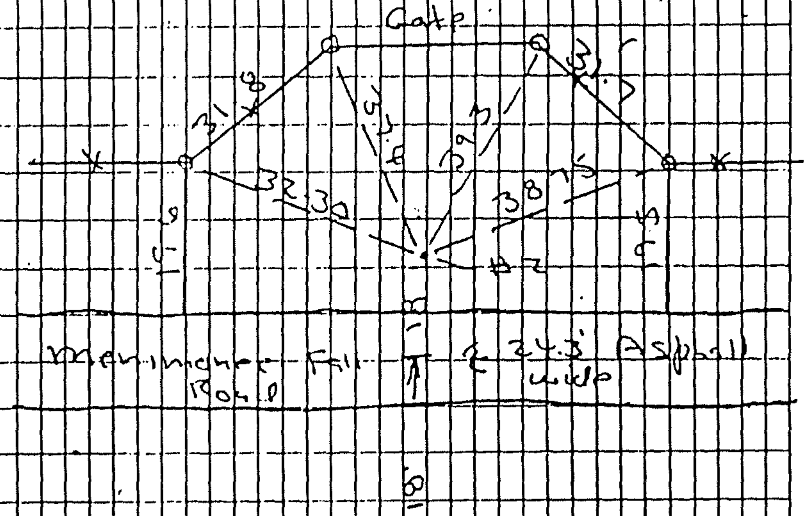
2/11	Tie		
	189-16-00	38.68	Ground Dist Elm: Set Nail in Clamp wood
		11	M.W #
	267-25	31.82	"



C.P #2

Set P.K in Asphalt Entrance to Old missile Site

Centers of 3" Dia Concr Steel Posts



Measure downs on well inside
to top of PVC Pipe

Orland Park
N. Well 0.14 Lower than cap
0.20 Lower than cap

VERNON HILLS
East Well 0.26 Lower
West Well 0.06 Lower

Franklin Wis
North Well 0.36 Lower
South well 0.60 Lower

Menominee Falls
West Well 0.2 Lower
East Well 0.11 Lower

couldn't get cap off Had to estimate

Start SW Corner of Sec 1000.00 1000.00

N90-00-00E 2593.23

1-2	N87-32-20E	416.50	1017.885	1416.115
2-1	N33-28-33E	616.24	1531.902	1756.024
	FD 1/4 Corner of Sec			
-4	S89-31-44E	2177.19	1000.00	3593.232
	Set Rod 2.10' Westerly of M. Well East			
-5	N67-26-48E	588.00	1757.425	2299.056
	Center of Monitoring well East			
-6	N67-29-11E	590.06	1757.837	2301.115
	Monitoring well West			
-7	N76-15-15W	116.46	1559.574	1642.900
	Set Rod 2.13' Ely of M.W West			
1-8	N76-15-15W	114.33	1559.068	1644.969

Elev. on W. Monitoring well Top 180.43

Rod 178 23

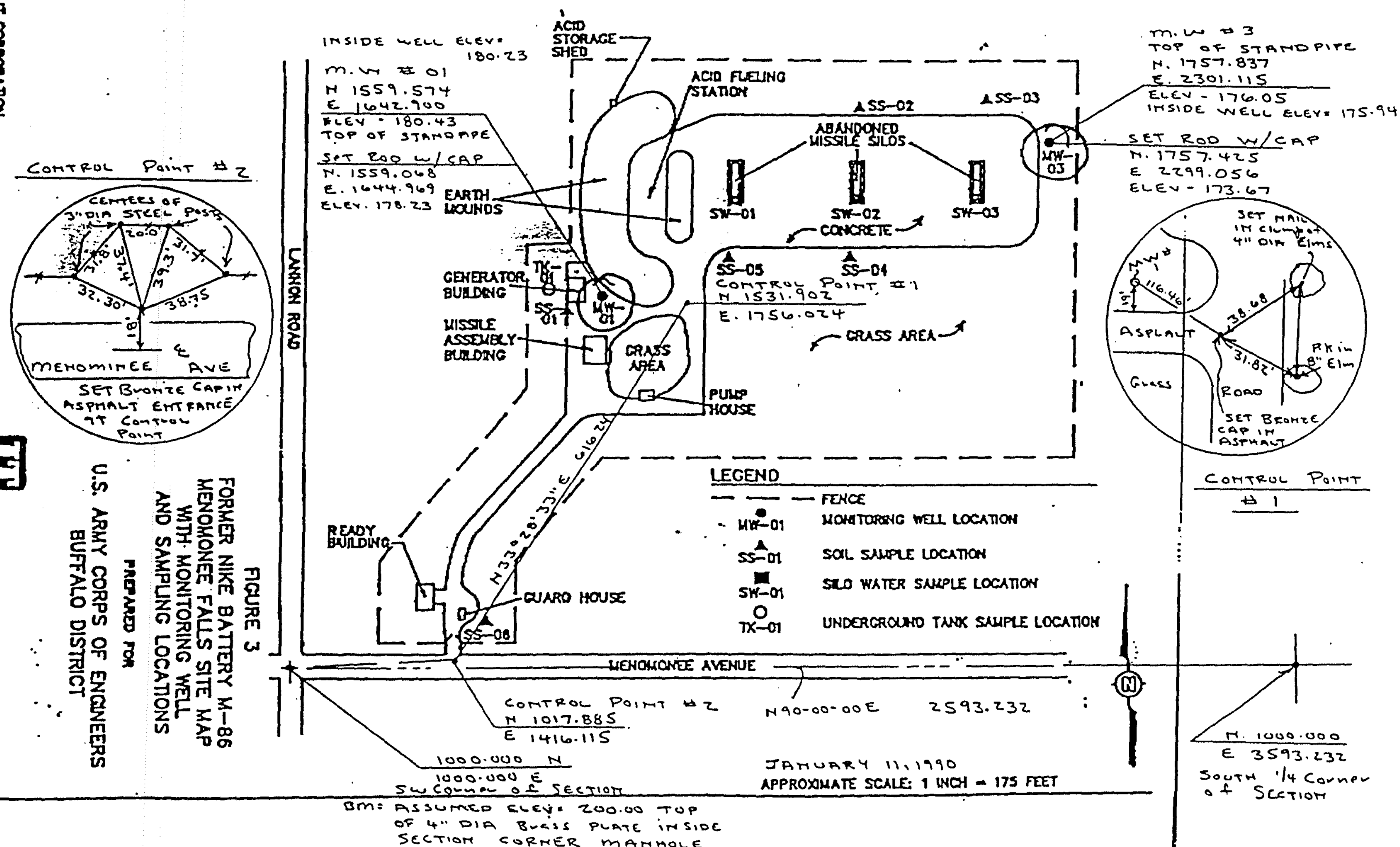
East M. Well 176.05

Rod by East W 173.67

~~Franklin~~ Menomonee Fall, Wisconsin

Assumed Top of Brass Plate at SW Corner of Section inside M.H to be Elev. 200.00

DRAWN BY	[illegible] 7/27/88	CHECKED BY / APPROVED BY			DRAWING NUMBER 302245-A13



JANUARY 11, 1990
APPROXIMATE SCALE: 1 INCH = 175 FEET

BM: ASSUMED ELEV= 200.00 TOP OF 4" DIA BRASS PLATE INSIDE SECTION CORNER MANHOLE

FIGURE 3
FORMER NIKE BATTERY M-86
MENOMONEE FALLS SITE MAP
WITH MONITORING WELL
AND SAMPLING LOCATIONS

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT

IT ...Creating a Safer Tomorrow

APPENDIX E

APPENDIX E
HYDRAULIC CONDUCTIVITY

Hydraulic Conductivity

Hydraulic conductivity testing is initiated by causing an instantaneous change in the water level of the well through the sudden introduction or removal of a known volume of water. Change in water level may also be induced by the introduction of a slug (a cylinder of plastic or other material used to displace the water). The recovery of the water level with time is then observed. When water is removed, the tests may be called bail tests or rising head tests; when water is added, tests are known as slug tests or falling head tests.

Hvorslev's time lag interpretation of well recovery data reasons that the rate of inflow (p) at any time (t) is proportional to the hydraulic conductivity (K) of the soil and to the unrecovered head difference H-h, so that $q(t) = \pi r^2 \frac{dh}{dt} = FK(H-h)$. F is a factor dependent on the shape and dimensions of the well. If q=qo at t=0, p(t) will decrease asymptotically toward zero as time goes on. Hvorslev defined the basic time lag To as $To = \frac{\pi r^2}{FK}$.

When this parameter is substituted into the previous equation, the equation which results, with the initial condition h=Ho at t=o is $\frac{H-h}{H-Ho} = e^{-t}/To$.

A plot of field recovery data, H-h versus t should therefore show an exponential decline in recovery rate with time. If the recovery is normalized to H-Ho and plotted on a logarithmic scale, a straight line plot results.

To interpret field recovery data, the data are plotted logarithmically. The value of To is measured graphically, and then K is determined from the equation $To = \frac{\pi r^2}{FK}$. For a well of length L and radius R with L/R > 8, Hvorslev evaluated the shape factor F. The resulting equation is $K = \frac{r^2 \ln(L/R)}{2LTo}$.

For the Menomonee Falls site, as stated in the text, hydraulic conductivity values were determined via a falling head test where a slug of plastic was added to the hole. A Compaq field computer and a downhole pressure transducer were used to record the changing water pressure as the water fell back to static level. The rate of falling head was then used through a computer program to determine hydraulic conductivity. Both the computer program used and the data files on disk are available to the COE should they wish to review this data.

Reference: Groundwater by R. Allan Freeze and John A. Cherry. Prentice-Hall, Inc., 1979, pp 339-341.

APPENDIX F

APPENDIX F

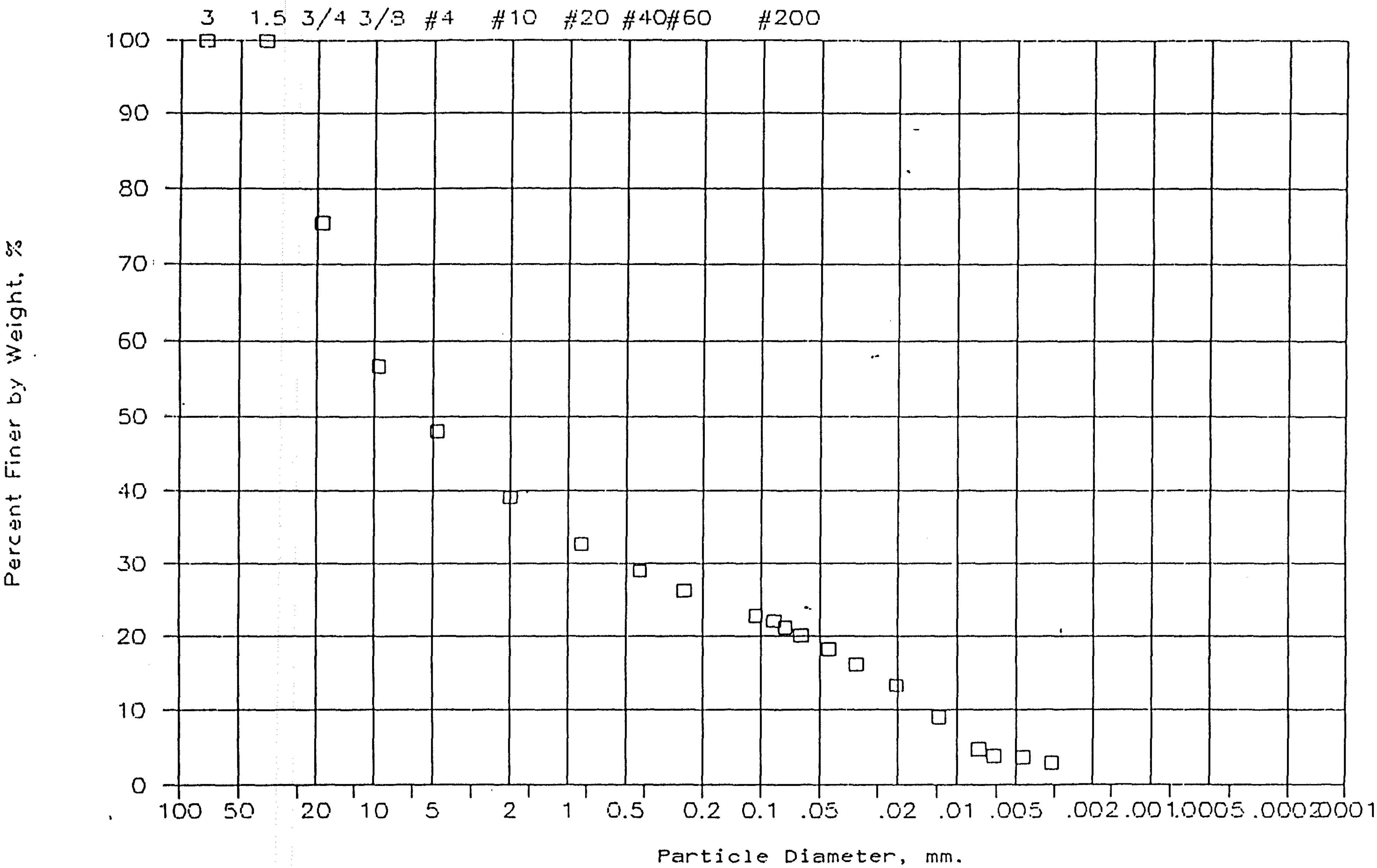
GEOTECHNICAL ANALYSIS

TABLE 16
GEOTECHNICAL ANALYSIS SUMMARY
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

SAMPLE IDENTIFICATION	WATER CONTENT %
M-86-SB01 *	7.0
M-86-SB02 *	14.0

*There was insufficient sample to run Atterberg Limits.

BUFFALO DERA Project No.: 302245



COBBLES	GRAVEL		SAND			SILT AND CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

BORING	SAMPLE ID	DEPTH	SOIL DESCRIPTION	USCS	WC%	CU	CZ
	M86-SB-02		BROWN SANDY GRAVEL SOME SILT		14.0	NOT CAL	NOT CAL

GRAIN SIZE ANALYSIS

PROJECT NAME: BUFFALO DERA   BORING NO.: 0

PROJECT NO.: 302245   DEPTH: 0

SAMPLE NO.: M86-SB-02   SPEC. GRAV. 2.65 ASSUMED

===========SIEVE ANALYSIS===========

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in.	75.000	100.0
1.5 in.	37.500	100.0
0.75 in.	19.000	75.6
0.375 in.	9.500	56.9
NO. 4	4.750	48.2
NO. 10	2.000	39.1
NO. 20	0.850	32.7
NO. 40	0.425	28.9
NO. 60	0.250	26.2
NO. 140	0.106	22.8
NO. 200	0.075	21.3

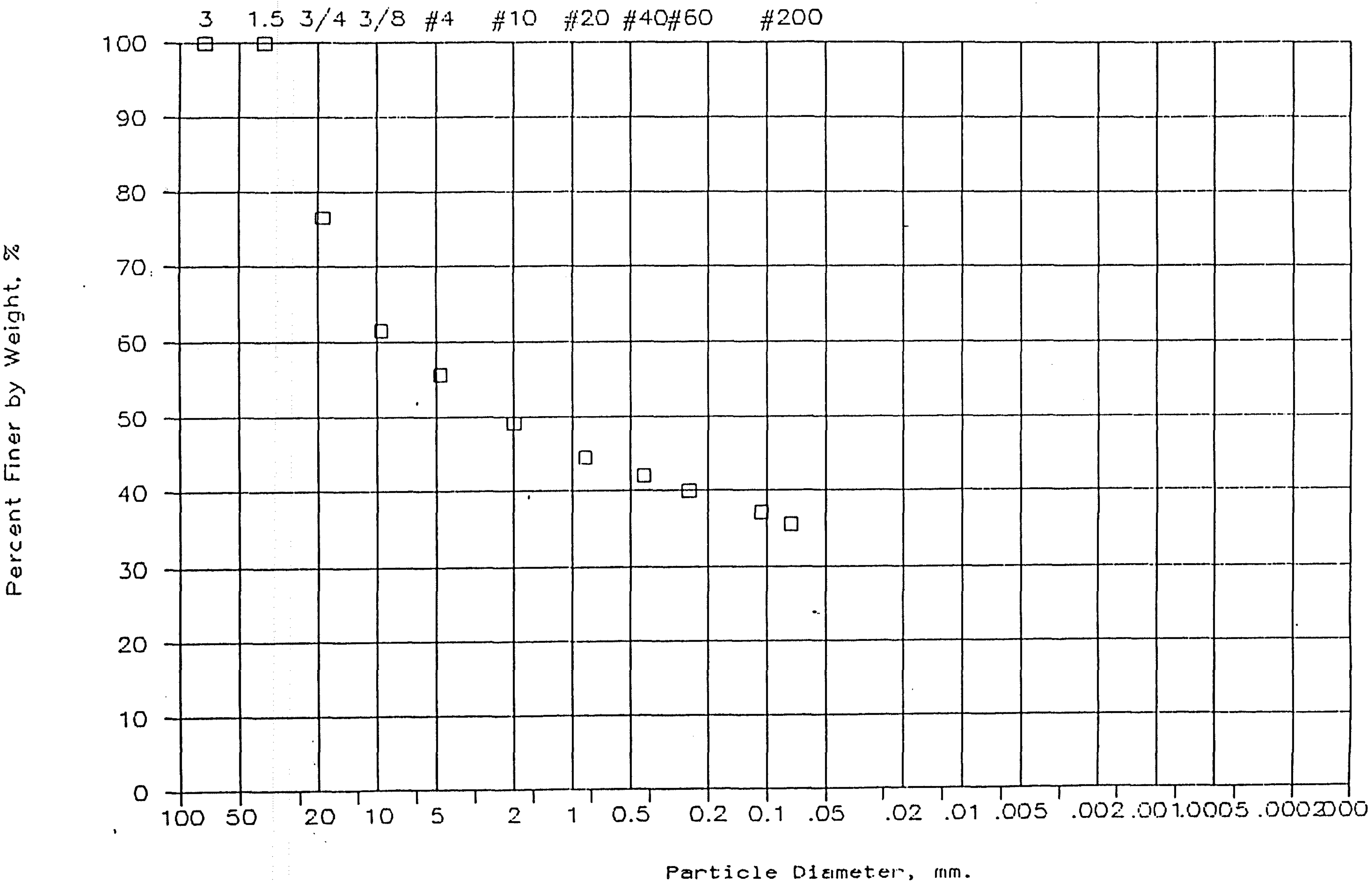
===========HYDROMETER ANALYSIS===========

DIAMETER (mm)	PERCENT FINER %	CORRECTED PERCENT %
0.0857	21.8	22.1
0.0621	19.9	20.1
0.0450	18.0	18.2
0.0325	16.0	16.2
0.0203	13.2	13.3
0.0123	8.9	9.0
0.0078	4.8	4.8
0.0065	3.8	3.9
0.0046	3.6	3.6
0.0033	2.9	2.9
0.0013	2.2	2.2

CORRECTION FACTOR =	1.013
WEIGHT OF SOIL FOR SIEVE ANALYSIS =	485.31 (gm)
WEIGHT OF SOIL FOR HYDROMETER ANALYSIS =	65.58 (gm)
VISCOSITY OF WATER =	9.426 (millipoises)

D60= 0.0342   CU= NOT CALC
D30= 0.0068   CZ= NOT CALC
D10= NOT CALC

BUFFALO DERA Project No.: 302245.03



COBBLES	GRAVEL		SAND			SILT AND CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

BORING	SAMPLE ID	DEPTH	SOIL DESCRIPTION	USCS	WC%	PI	LL
2	M86-SB-01		BROWN CLAYEY GRAVEL SOME SAND		7	0.0	0.0

INTERNATIONAL TECHNOLOGY CORPORATION

GRAIN SIZE ANALYSIS

.OJECT NAME: BUFFALO DERA
PROJECT NO.: 302245.03
SAMPLE NO.: M86-SB-01

BORING NO.: 2
DEPTH: 0
SPEC. GRAV. 2.68 ASSUMED

===========SIEVE ANALYSIS===========

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in.	75.000	100.0
1.5 in.	37.500	100.0
0.75 in.	19.000	76.6
0.375 in.	9.500	61.5
NO. 4	4.750	55.7
NO. 10	2.000	49.1
NO. 20	0.850	44.6
NO. 40	0.425	41.9
NO. 60	0.250	40.0
NO. 140	0.106	37.2
NO. 200	0.075	35.6

===========HYDROMETER ANALYSIS===========

DIAMETER (mm)	PERCENT FINER %	CORRECTED PERCENT %

CORRECTION FACTOR = N/A
WEIGHT OF SOIL FOR SIEVE ANALYSIS = 440.78 (gm)
WEIGHT OF SOIL FOR HYDROMETER ANALYSIS = N/A (gm)
VISCOSITY OF WATER = N/A (millipoises)

D60= NOT CALC
D30= NOT CALC
D10= NOT CALC

CU= NOT CALC
CZ= NOT CALC

APPENDIX
G

APPENDIX G

COMPLETE ANALYTICAL REPORT

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Chicago/Buffalo Dera - Menomonee Falls
450 E. Devon Ave.
Suite 200
Itasca, IL 60143
Attn: M. Jank

May 30, 1989

Job Number: P903049/050/078; P904022/030/031

The Certificate of Analysis is for the following:

Client Project ID: 302245
Date Received by Lab: 3/9,15; 4/7,8/89
Number of Samples: Twenty-eight (28)
Sample Type: Water/Soil/Oil

I. Introduction

On March 9, 11 and 15, 1989, nine soil, seventeen water, and two oil samples were received at ITAS Pittsburgh, labeled as follows:

Water:			Soil:		Oil:
M-86-SW-01	M-86-MW-01	M-86-SS-07	M-86-SS01	M-86-SB-01	M-86-TK-01
M-86-SW-02	M-86-MW-03	M-86-SS-09	M-86-SS02	M-86-SB-02	M-86-TK-03
M-86-SW-03	M-86-MW-04	M-86-WS-01	M-86-SS03		
M-86-SW-04	M-86-MW-05	M-86-TK-02	M-86-SS04		
M-86-SW-05	M-86-MW-06	M-86-TK-04	M-86-SS05		
M-86-SW-06			M-86-SS06		
M-86-SW-10			M-86-SS08		

II. Analytical Results/Methodology

Results are presented in the enclosed tables and were determined in accordance with recommended analytical procedures.

Reviewed and Approved:

David A. Dunlap, Project Manager

II. Analytical Results/Methodology (Continued)

Detection limits are based on sample concentration and expressed as follows:

milligrams per liter or parts per million
milligrams per kilogram or parts per million
micrograms per liter or parts per billion
micrograms per kilogram or parts per billion

ND denotes that the compound is not detected at or above the indicated detection limit. Duplicate results indicate duplicate analyses.

The reported values have not been "blank corrected."

Samples M-86-TK-01 and M-86-TK-03 were oil samples that were microwave digested prior to metals analysis. A duplicate and a matrix spike were also digested using the microwa procedure.

Metals analyses of the oil samples were carried out on a weight basis, therefore, the results are reported in units of mg/Kg. TPHC and VOA analyses were completed on a liqui basis, resulting in units of mg/L and µg/L, respectively.

All method blanks for the metals analyses of soil samples amd water samples had concentra tions below the reported detection limits. The exception was the method blank associate with samples M-86-SS07 and MS-86-WS01 which had a value for chromium of 0.01 mg/L.

Acetone, methylene chloride, and carbon disulfide are common volatile laboratory contaminants. Values just above the detection limit should be considered suspect.

III. Quality Control

QA/QC information relating to the analysis can be found immediately following the analytical data.

METHOD REFERENCE
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

Petroleum Hydro-Carbons, Total, Recoverable Spectrometric Infrared	Method 418.1, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.
Sample Preparation, Soil	Environmental Protection Agency, Contract Laboratory Program, Statement of Work No. 787, Exhibit-D, Section III, Part B, June 1987.
Percent Solids Determination Procedure	Environmental Protection Agency, Contract Laboratory Program, Statement of Work No. 787, Exhibit-D, Section IV, Part F, June 1987.
Inductively Coupled Plasma Method	Method 6010, Test Methods for Evaluating Solid Waste, USEPA SW-846 3rd Ed., 1986.
Arsenic (Furnace Method)	Method 7060, Test Methods for Evaluating Solid Waste, USEPA SW-846 3rd Ed., 1986.
Selenium (Furnace Method)	Method 7740, Test Methods for Evaluating Solid Waste, USEPA SW-846 3rd Ed., 1986.
Mercury in Solid or Semi-Solid Waste (Manual Cold Vapor Technique)	Method 7471, Test Methods for Evaluating Solid Waste, USEPA SW-846 3rd Ed., 1986.
Gas Chromatography/Mass Spectrometry for Volatile Organics	Method 8240, Test Methods for Evaluating Solid Waste, USEPA SW-846 3rd Ed., 1986.
Sample Preparation, Water	Environmental Protection Agency, Contract Laboratory Program, Statement of Work No. 787, Exhibit-D, Section III, Part A, June 1987.
Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Waste	Method 200.7, Methods for the Chemical Analysis of Water and Waste, United States Environmental Protection Agency - 600/4-79-020, 1983 Revision.

METHOD REFERENCE
(Continued)

Arsenic (Atomic Absorption, Furnace Technique)	Method 206.2, Methods for the Chemical Analysis of Water and Waste, United States Environmental Protection Agency - 600/4-79-020, 1983 Revision.
Selenium (Atomic Absorption, Furnace Technique)	Method 270.2, Methods for the Chemical Analysis of Water and Waste, United States Environmental Protection Agency - 600/4-79-020, 1983 Revision.
Mercury (Manual Cold Vapor Technique)	Method 245.1, Methods for the Chemical Analysis of Water and Waste, United States Environmental Protection Agency - 600/4-79-020, 1983 Revision.
Atterberg Limits	ASTM D4318-84, "Standard Test Methods for Liquid Limit, Plastic Limit, and Plastic Index of Soils," 1985 Annual Book of ASTM Standards Vol. 04.08 Soil and Rock; Building Stones.
Grain Size	ASTM D422-63, "Particle Size Analysis of Soils," 1985 Annual Book of ASTM Standards Vol. 04.08 Soil and Rocks; Building Stones.
Water Content Determination	ASTM D2216-80, "Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures," 1985 Annual Book of ASTM Standards Vol. 04.08 Soil and Rock; Building Stones.

TABLE 1
GENERAL CHEMISTRY ANALYSIS SUMMARY
OF TOTAL PETROLEUM HYDROCARBONS
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

Soil Samples

SAMPLE IDENTIFICATION	TOTAL PETROLEUM HYDROCARBONS mg/Kg
M-86-SS01	ND17
M-86-SS02	36
M-86-SS03	150/150
M-86-SS04	83
M-86-SS05	130
M-86-SS06	18
M-86-SS08	83
Method Blanks	ND17

	Matrix Spike Percent Recovery
M-86-SS05	97%

TABLE 2
TOTAL METALS ANALYSIS SUMMARY
OF SOIL SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

	SAMPLE IDENTIFICATION			
PARAMETER	M-86-SS01	M-86-SS02	M-86-SS03	M-86-SS04
	Concentration mg/Kg			
Arsenic	1.5	3.5	1.6	1.5
Barium	13	55	48	18
Cadmium	5	4	4	5
Chromium	28	27	26	30
Lead	44	33	37	47
Mercury	ND0.10	ND0.11	ND0.09	ND0.10
Selenium	ND1	ND1	ND1	ND1
Silver	4	3	3	5

TABLE 2
(Continued)

PARAMETER	SAMPLE IDENTIFICATION M-86-SS05	M-86-SS06	M-86-SS08	Method Blanks
	Concentration mg/Kg			
Arsenic	3.3	1.9/1.9	1.4	ND0.6
Barium	61	31/34	29	ND1
Cadmium	4	5/5	4	ND1
Chromium	30	27/29	23	ND2
Lead	37	37/38	32	ND10
Mercury	ND0.11	ND0.11/ND0.11	ND0.10	ND0.10
Selenium	ND1	ND1/ND1	ND1	ND1
Silver	3	3/3	3	ND2

TABLE 3
TOTAL METALS PERCENT RECOVERY SUMMARY
OF SOIL SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

	SAMPLE IDENTIFICATON		
	M-86-SS01	M-86-SS08	M-86-SS06
PARAMETER	ANALYTICAL SPIKE PERCENT RECOVERY		MATRIX SPIKE PERCENT RECOVERY
Arsenic	--	120%	81%
Barium	--	90%	90%
Cadmium	--	85%	89%
Chromium	--	86%	91%
Lead	--	102%	91%
Mercury	--	--	88%
Selenium	56%/56%[(1)]	--	56%/57%[(1)]
Silver	--	81%	86%

[(1)] The spike was prepared and analyzed in duplicate to confirm matrix interference.

TABLE 4

SOIL ANALYSIS SUMMARY
OF VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION M-86-SS01	M-86-SS02	M-86-SS03	M-86-SS04
		Concentration µg/Kg			
Acetone	67-64-1	ND13	ND12	ND11	ND11
Benzene	71-43-2	ND6.0	ND6.0	ND6.0	ND6.0
2-Butanone	78-93-3	ND13	ND12	ND11	ND11
Bromoform	75-25-2	ND6.0	ND6.0	ND6.0	ND6.0
Carbon disulfide	75-15-0	ND6.0	ND6.0	ND6.0	ND6.0
Carbon tetrachloride	56-23-5	ND6.0	ND6.0	ND6.0	ND6.0
Chlorobenzene	108-90-7	ND6.0	ND6.0	ND6.0	ND6.0
Chlorodibromomethane	124-48-1	ND6.0	ND6.0	ND6.0	ND6.0
Chloroethane	75-00-3	ND13	ND12	ND11	ND11
2-Chloroethylvinyl ether	110-75-8	ND13	ND12	ND11	ND11
Chloroform	67-66-3	ND6.0	ND6.0	ND6.0	ND6.0
is-1,3-dichloropropene	10061-01-5	ND6.0	ND6.0	ND6.0	ND6.0
Dichlorobromomethane	75-27-4	ND6.0	ND6.0	ND6.0	ND6.0
1,1-Dichloroethane	75-34-3	ND6.0	ND6.0	ND6.0	ND6.0
1,2-Dichloroethane	107-06-2	ND6.0	ND6.0	ND6.0	ND6.0
1,1-Dichloroethylene	75-35-4	ND6.0	ND6.0	ND6.0	ND6.0
1,2-Dichloropropane	78-87-5	ND6.0	ND6.0	ND6.0	ND6.0
Ethylbenzene	100-41-4	ND6.0	ND6.0	ND6.0	ND6.0

TABLE 4
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-SS01	M-86-SS02	M-86-SS03	M-86-SSO
		SAMPLE IDENTIFICATION			
		Concentration µg/Kg			
2-Hexanone	591-78-6	ND13	ND12	ND11	ND11
Methyl bromide	74-83-9	ND13	ND12	ND11	ND11
Methyl chloride	74-87-3	ND13	ND12	ND11	ND11
4-Methyl-2-pentanone	108-10-1	ND13	ND12	ND11	ND11
Methylene chloride	75-09-2	ND6.0	ND6.0	ND6.0	ND6.0
Styrene	100-42-5	ND6.0	ND6.0	ND6.0	ND6.0
1,1,2,2-Tetrachloroethane	79-34-5	ND6.0	ND6.0	ND6.0	ND6.0
Tetrachloroethylene	127-18-4	ND6.0	ND6.0	ND6.0	ND6.0
Toluene	108-88-3	ND6.0	ND6.0	ND6.0	ND6.0
trans-1,2-Dichloroethylene	156-60-5	ND6.0	ND6.0	ND6.0	ND6.0
trans-1,3-Dichloropropene	10061-02-6	ND6.0	ND6.0	ND6.0	ND6.0
1,1,1-Trichloroethane	71-55-6	ND6.0	ND6.0	ND6.0	ND6.0
1,1,2-Trichloroethane	79-00-5	ND6.0	ND6.0	ND6.0	ND6.0
Trichloroethylene	79-01-6	ND6.0	ND6.0	ND6.0	ND6.0
Vinyl acetate	108-05-4	ND13	ND12	ND11	ND11
inyl chloride	75-01-4	ND13	ND12	ND11	ND11
Total xylenes	95-47-6	ND6.0	ND6.0	ND6.0	ND6.0

TABLE 4
(Continued)

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION M-86-SS05	M-86-SS06	M-86-SS08
		Concentration µg/Kg		
Acetone	67-64-1	ND12	ND11	14
Benzene	71-43-2	ND6.0	ND6.0	ND6.0
2-Butanone	78-93-3	ND12	ND11	ND12
Bromoform	75-25-2	ND6.0	ND6.0	ND6.0
Carbon disulfide	75-15-0	ND6.0	ND6.0	ND6.0
Carbon tetrachloride	56-23-5	ND6.0	ND6.0	ND6.0
Chlorobenzene	108-90-7	ND6.0	ND6.0	ND6.0
Chlorodibromomethane	124-48-1	ND6.0	ND6.0	ND6.0
Chloroethane	75-00-3	ND12	ND11	ND12
2-Chloroethylvinyl ether	110-75-8	ND12	ND11	ND12
Chloroform	67-66-3	ND6.0	ND6.0	ND6.0
Cis-1,3-dichloropropene	10061-01-5	ND6.0	ND6.0	ND6.0
Dichlorobromomethane	75-27-4	ND6.0	ND6.0	ND6.0
1,1-Dichloroethane	75-34-3	ND6.0	ND6.0	ND6.0
1,2-Dichloroethane	107-06-2	ND6.0	ND6.0	ND6.0
1,1-Dichloroethylene	75-35-4	ND6.0	ND6.0	ND6.0
1,2-Dichloropropane	78-87-5	ND6.0	ND6.0	ND6.0
Ethylbenzene	100-41-4	ND6.0	ND6.0	ND6.0

TABLE 4
(Continued)

PARAMETER	CAS NUMBER(1)	SAMPLE IDENTIFICATION M-86-SS05	M-86-SS06	M-86-SS08
		Concentration µg/Kg		
2-Hexanone	591-78-6	ND12	ND11	ND12
Methyl bromide	74-83-9	ND12	ND11	ND12
Methyl chloride	74-87-3	ND12	ND11	ND12
4-Methyl-2-pentanone	108-10-1	ND12	ND11	ND12
Methylene chloride	75-09-2	ND6.0	ND6.0	ND6.0
Styrene	100-42-5	ND6.0	ND6.0	ND6.0
1,1,2,2-Tetrachloroethane	79-34-5	ND6.0	ND6.0	ND6.0
Tetrachloroethylene	127-18-4	ND6.0	ND6.0	ND6.0
Toluene	108-88-3	ND6.0	ND6.0	ND6.0
trans-1,2-Dichloroethylene	156-60-5	ND6.0	ND6.0	ND6.0
trans-1,3-Dichloropropene	10061-02-6	ND6.0	ND6.0	ND6.0
1,1,1-Trichloroethane	71-55-6	ND6.0	ND6.0	ND6.0
1,1,2-Trichloroethane	79-00-5	ND6.0	ND6.0	ND6.0
Trichloroethylene	79-01-6	ND6.0	ND6.0	ND6.0
Vinyl acetate	108-05-4	ND12	ND11	ND12
Vinyl chloride	75-01-4	ND12	ND11	ND12
Total xylenes	95-47-6	ND6.0	ND6.0	ND6.0

TABLE 4
(Continued)

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION Method Blank #1 3/16/89	Method Blank #2 3/18/89
		Concentration µg/Kg	
Acetone	67-64-1	ND10	ND10
Benzene	71-43-2	ND5.0	ND5.0
2-Butanone	78-93-3	ND10	ND10
Bromoform	75-25-2	ND5.0	ND5.0
Carbon disulfide	75-15-0	ND5.0	ND5.0
Carbon tetrachloride	56-23-5	ND5.0	ND5.0
Chlorobenzene	108-90-7	ND5.0	ND5.0
Chlorodibromomethane	124-48-1	ND5.0	ND5.0
Chloroethane	75-00-3	ND10	ND10
2-Chloroethylvinyl ether	110-75-8	ND10	ND10
Chloroform	67-66-3	ND5.0	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND5.0	ND5.0
Dichlorobromomethane	75-27-4	ND5.0	ND5.0
1,1-Dichloroethane	75-34-3	ND5.0	ND5.0
1,2-Dichloroethane	107-06-2	ND5.0	ND5.0
1,1-Dichloroethylene	75-35-4	ND5.0	ND5.0
1,2-Dichloropropane	78-87-5	ND5.0	ND5.0
Ethylbenzene	100-41-4	ND5.0	ND5.0

TABLE 4
(Continued)

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION Method Blank #1 3/16/89	Method Blank #2 3/18/89
		Concentration μg/Kg	
2-Hexanone	591-78-6	ND10	ND10
Methyl bromide	74-83-9	ND10	ND10
Methyl chloride	74-87-3	ND10	ND10
4-Methyl-2-pentanone	108-10-1	ND10	ND10
Methylene chloride	75-09-2	ND5.0	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND5.0	ND5.0
Tetrachloroethylene	127-18-4	ND5.0	ND5.0
Toluene	108-88-3	ND5.0	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND5.0	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND5.0	ND5.0
1,1,1-Trichloroethane	71-55-6	ND5.0	ND5.0
1,1,2-Trichloroethane	79-00-5	ND5.0	ND5.0
Trichloroethylene	79-01-6	ND5.0	ND5.0
Vinyl acetate	108-05-4	ND10	ND10
Vinyl chloride	75-01-4	ND10	ND10
Total xylenes	95-47-6	ND5.0	ND5.0

[1] The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstracts Index.

TABLE 5
VOLATILE SURROGATE SPIKE PERCENT RECOVERY SUMMARY
OF SOIL SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

SAMPLE IDENTIFICATION	METHOD BLANK REFERENCE	PARAMETER: 4-BROMOFLUOROBENZENE	1,2-DICHLOROETHANE-d_4	TOLUENE-d_8
		Percent Recovery		
M-86-SS01	#1	107%	96%	103%
M-86-SS02	#1	95%	97%	101%
M-86-SS03	#1	93%	103%	100%
M-86-SS04	#1	99%	99%	97%
M-86-SS05	#1	105%	97%	94%
M-86-SS06	#1	98%	102%	95%
M-86-SS08	#1	100%	100%	101%
M-86-SS08 MS	#1	102%	104%	92%
M-86-SS08 MSD	#2	103%	105%	112%
Method Blank #1	--	100%	99%	101%
Method Blank #2	—	114%	100%	110%

TABLE 6
VOLATILE MATRIX SPIKE PERCENT RECOVERY SUMMARY
OF SOIL SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

	SAMPLE IDENTIFICATION
	M-86-SS08
COMPOUND	PERCENT RECOVERY
Benzene	110%/99%
Chlorobenzene	111%/103%
1,1-Dichloroethene	111%/89%
Toluene	104%/103%
Trichloroethene	96%/99%

TABLE 7
GENERAL CHEMISTRY ANALYSIS SUMMARY
OF TOTAL PETROLEUM HYDROCARBONS
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

Water Samples

SAMPLE IDENTIFICATION	TOTAL PETROLEUM HYDROCARBONS mg/L
M-86-SW-01	10
M-86-SW-02	910
M-86-SW-03	ND0.2
M-86-SW-04	ND0.2
M-86-SW-05	2.4
M-86-MW-01	ND0.2
M-86-MW-03	0.3/0.3
M-86-MW-04	ND0.2
M-86-MW-05	ND0.2
M-86-SS-07	ND0.2/ND0.2
M-86-WS-01	ND0.2
M-86-TK-01	110,000
M-86-TK-02	ND0.2
M-86-TK-03	120,000
Method Blank	ND0.2

	Matrix Spike Percent Recovery
M-86-MW-04	96%
M-86-SW-01	77%

TABLE 8
TOTAL METALS ANALYSIS SUMMARY
OF WATER SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

PARAMETER	M-86-SW-01	M-86-SW-02	M-86-SW-03	M-86-SW-04	M-86-SW-05
	SAMPLE IDENTIFICATION				
	Concentration mg/L				
Arsenic	ND0.003	0.006	0.003	ND0.003	ND0.003
Barium	0.010	0.76	0.22	ND0.005	0.32
Cadmium	ND0.005	0.046	0.017	ND0.005	0.028
Chromium	0.01	0.07	0.02	ND0.01	0.09
Iron	15	56	4.4	0.07	7.5
Lead	0.08	3.2	0.81	ND0.05	1.7
Manganese	0.066	0.28	0.14	ND0.005	0.22
Mercury	ND0.0002	ND0.0002	ND0.0002	ND0.0002	ND0.0002
Selenium	ND0.005	ND0.005	ND0.005	ND0.005	ND0.005
Silver	ND0.01	ND0.01	ND0.01	ND0.01	ND0.01
Sodium	3.4	5.8	7.0	ND0.4	6.4

TABLE 8
(Continued)

PARAMETER	M-86-MW-01	M-86-MW-03	M-86-MW-04	M-86-MW-05
	SAMPLE IDENTIFICATION			
	Concentration mg/L			
Arsenic	ND0.003	ND0.003	ND0.003/ND0.003	ND0.003
Barium	0.62	0.77	ND0.005/ND0.005	0.62
Cadmium	0.073	0.056	ND0.005/ND0.005	0.075
Chromium	0.37	0.30	0.01/0.01	0.38
Iron	93	110	0.57/0.65	95
Lead	0.56	0.42	ND0.05/ND0.05	0.59
Manganese	6.9	5.2	ND0.005/ND0.005	7.0
Mercury	0.0002/ND0.0002	ND0.0002	ND0.0002	ND0.0002
Selenium	ND0.005	ND0.005	ND0.005/ND0.005	ND0.005
Silver	0.04	0.02	ND0.01/ND0.01	0.04
Sodium	12	8.7	ND0.4/ND0.4	12

TABLE 8
(Continued)

PARAMETER	M-86-SS-07	M-86-WS-01	M-86-TK-02	Method Blank
		SAMPLE IDENTIFICATION		
		Concentration mg/L		
Arsenic	ND0.003	ND0.003/ND0.003	ND0.003/ND0.003	ND0.003
Barium	0.008	0.040/0.040	ND0.005/ND0.005	ND0.005
Cadmium	ND0.005	0.006/0.007	ND0.005/ND0.005	ND0.005
Chromium	0.01	0.04/0.04	ND0.01/ND0.01	ND0.01/0.01
Iron	0.19	0.82/0.82	ND0.02/ND0.02	ND0.02
Lead	0.08	0.07/0.09	ND0.05/ND0.05	ND0.05
Manganese	0.008	0.091/0.091	ND0.005/ND0.005	ND0.005
Mercury	ND0.0002/ND0.0002	0.0002	0.0003	ND0.0002
Selenium	ND0.005	ND0.005/ND0.005	ND0.005/ND0.005	ND0.005
Silver	0.01	ND0.01/ND0.01	ND0.01/ND0.01	ND0.01
Sodium	0.4	23/23	ND0.4/ND0.4	ND0.4

TABLE 9
TOTAL METALS ANALYTICAL SPIKE PERCENT RECOVERY SUMMARY
OF WATER SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

	SAMPLE IDENTIFICATON			
	M-86-SW-02	M-86-SW-03	M-86-SW-05	M-86-SS-07
PARAMETER	ANALYTICAL SPIKE PERCENT RECOVERY			
Arsenic	112%	--	--	92%
Barium	--	105%	--	107%
Cadmium	--	108%	--	109%
Chromium	--	102%	--	103%
Iron	--	104%	--	106%
Lead	--	120%	--	123%
Manganese	--	108%	--	112%
Mercury	--	--	--	--
Selenium	--	--	96%	100%
Silver	--	98%	--	99%
Sodium	--	104%	--	104%

TABLE 10
TOTAL METALS MATRIX SPIKE PERCENT RECOVERY
OF WATER SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

	SAMPLE IDENTIFICATION		
	M-86-SW-03	M-86-WS-01	M-86-TK-02
PARAMETER	MATRIX SPIKE PERCENT RECOVERY		
Arsenic	--	87%	98%
Barium	--	92%	100%
Cadmium	--	100%	102%
Chromium	--	97%	103%
Iron	--	92%	91%
Lead	--	100%	100%
Manganese	--	104%	107%
Mercury	108%	56%/56%	--
Selenium	--	90%	99%
Silver	--	110%	96%
Sodium	--	99%	98%

TABLE 11

WATER ANALYSIS SUMMARY
OF VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

		SAMPLE IDENTIFICATION			
PARAMETER	CAS NUMBER(1)	M-86-SW-01	M-86-SW-02	M-86-SW-03	M-86-SW-04
		Concentration µg/L			
Acetone	67-64-1	ND10	ND10	23	ND10
Benzene	71-43-2	ND5.0	ND5.0	ND5.0	ND5.0
2-Butanone	78-93-3	ND10	ND10	ND10	ND10
Bromoform	75-25-2	ND5.0	ND5.0	ND5.0	ND5.0
Carbon disulfide	75-15-0	ND5.0	14	5.3	ND5.0
Carbon tetrachloride	56-23-5	ND5.0	ND5.0	ND5.0	ND5.0
Chlorobenzene	108-90-7	ND5.0	ND5.0	ND5.0	ND5.0
Chlorodibromomethane	124-48-1	ND5.0	ND5.0	ND5.0	ND5.0
Chloroethane	75-00-3	ND10	ND10	ND10	ND10
2-Chloroethylvinyl ether	110-75-8	ND10	ND10	ND10	ND10
Chloroform	67-66-3	ND5.0	ND5.0	ND5.0	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND5.0	ND5.0	ND5.0	ND5.0
ichlorobromomethane	75-27-4	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethane	75-34-3	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloroethane	107-06-2	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethylene	75-35-4	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloropropane	78-87-5	ND5.0	ND5.0	ND5.0	ND5.0
Ethylbenzene	100-41-4	ND5.0	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-SW-01	M-86-SW-02	M-86-SW-03	M-86-SW-(
		SAMPLE IDENTIFICATION			
		Concentration µg/L			
2-Hexanone	591-78-6	ND10	ND10	ND10	ND10
Methyl bromide	74-83-9	ND10	ND10	ND10	ND10
Methyl chloride	74-87-3	ND10	ND10	ND10	ND10
4-Methyl-2-pentanone	108-10-1	ND10	ND10	ND10	ND10
Methylene chloride	75-09-2	ND5.0	ND5.0	ND5.0	ND5.0
Styrene	100-42-5	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND5.0	ND5.0	ND5.0	ND5.0
Tetrachloroethylene	127-18-4	ND5.0	ND5.0	ND5.0	ND5.0
Toluene	108-88-3	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,1-Trichloroethane	71-55-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2-Trichloroethane	79-00-5	ND5.0	ND5.0	ND5.0	ND5.0
Trichloroethylene	79-01-6	ND5.0	ND5.0	ND5.0	ND5.0
Vinyl acetate	108-05-4	ND10	ND10	ND10	ND10
Vinyl chloride	75-01-4	ND10	ND10	ND10	ND10
Total xylenes	95-47-6	ND5.0	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION M-86-SW-05	M-86-SW-06	M-86-SW-10
		Concentration µg/L		
Acetone	67-64-1	12	13	ND10
Benzene	71-43-2	ND5.0	ND5.0	ND5.0
2-Butanone	78-93-3	ND10	ND10	ND10
Bromoform	75-25-2	ND5.0	ND5.0	ND5.0
Carbon disulfide	75-15-0	ND5.0	ND5.0	ND5.0
Carbon tetrachloride	56-23-5	ND5.0	ND5.0	ND5.0
Chlorobenzene	108-90-7	ND5.0	ND5.0	ND5.0
Chlorodibromomethane	124-48-1	ND5.0	ND5.0	ND5.0
Chloroethane	75-00-3	ND10	ND10	ND10
2-Chloroethylvinyl ether	110-75-8	ND10	ND10	ND10
Chloroform	67-66-3	ND5.0	ND5.0	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND5.0	ND5.0	ND5.0
Dichlorobromomethane	75-27-4	ND5.0	ND5.0	ND5.0
1,1-Dichloroethane	75-34-3	ND5.0	ND5.0	ND5.0
1,2-Dichloroethane	107-06-2	ND5.0	ND5.0	ND5.0
1,1-Dichloroethylene	75-35-4	ND5.0	ND5.0	ND5.0
1,2-Dichloropropane	78-87-5	ND5.0	ND5.0	ND5.0
Ethylbenzene	100-41-4	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-SW-05	M-86-SW-06	M-86-SW-10
		SAMPLE IDENTIFICATION		
		Concentration μg/L		
2-Hexanone	591-78-6	ND10	ND10	ND10
Methyl bromide	74-83-9	ND10	ND10	ND10
Methyl chloride	74-87-3	ND10	ND10	ND10
4-Methyl-2-pentanone	108-10-1	ND10	ND10	ND10
Methylene chloride	75-09-2	ND5.0	ND5.0	ND5.0
Styrene	100-42-5	ND5.0	ND5.0	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND5.0	ND5.0	ND5.0
Tetrachloroethylene	127-18-4	ND5.0	ND5.0	ND5.0
Toluene	108-88-3	ND5.0	ND5.0	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND5.0	ND5.0	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND5.0	ND5.0	ND5.0
1,1,1-Trichloroethane	71-55-6	ND5.0	ND5.0	ND5.0
1,1,2-Trichloroethane	79-00-5	ND5.0	ND5.0	ND5.0
Trichloroethylene	79-01-6	ND5.0	ND5.0	ND5.0
Vinyl acetate	108-05-4	ND10	ND10	ND10
Vinyl chloride	75-01-4	ND10	ND10	ND10
Total xylenes	95-47-6	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-MW-01	M-86-MW-03	M-86-MW-04	M-86-MW-05
		SAMPLE IDENTIFICATION Concentration μg/L			
Acetone	67-64-1	160	ND10	ND10	91
Benzene	71-43-2	ND5.0	ND5.0	ND5.0	ND5.0
2-Butanone	78-93-3	ND10	ND10	ND10	ND10
Bromoform	75-25-2	ND5.0	ND5.0	ND5.0	ND5.0
Carbon disulfide	75-15-0	13	ND5.0	ND5.0	ND5.0
Carbon tetrachloride	56-23-5	ND5.0	ND5.0	ND5.0	ND5.0
Chlorobenzene	108-90-7	ND5.0	ND5.0	ND5.0	ND5.0
Chlorodibromomethane	124-48-1	ND5.0	ND5.0	ND5.0	ND5.0
Chloroethane	75-00-3	ND10	ND10	ND10	ND10
2-Chloroethylvinyl ether	110-75-8	ND10	ND10	ND10	ND10
Chloroform	67-66-3	ND5.0	ND5.0	ND5.0	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND5.0	ND5.0	ND5.0	ND5.0
Dichlorobromomethane	75-27-4	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethane	75-34-3	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloroethane	107-06-2	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethylene	75-35-4	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloropropane	78-87-5	ND5.0	ND5.0	ND5.0	ND5.0
Ethylbenzene	100-41-4	ND5.0	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-MW-01	M-86-MW-03	M-86-MW-04	M-86-MW-05
		SAMPLE IDENTIFICATION			
		Concentration μg/L			
2-Hexanone	591-78-6	ND10	ND10	ND10	ND10
Methyl bromide	74-83-9	ND10	ND10	ND10	ND10
Methyl chloride	74-87-3	ND10	ND10	ND10	ND10
4-Methyl-2-pentanone	108-10-1	ND10	ND10	ND10	ND10
Methylene chloride	75-09-2	ND5.0	ND5.0	ND5.0	ND5.0
Styrene	100-42-5	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND5.0	ND5.0	ND5.0	ND5.0
Tetrachloroethylene	127-18-4	ND5.0	ND5.0	ND5.0	ND5.0
Toluene	108-88-3	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,1-Trichloroethane	71-55-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2-Trichloroethane	79-00-5	ND5.0	ND5.0	ND5.0	ND5.0
Trichloroethylene	79-01-6	ND5.0	ND5.0	ND5.0	ND5.0
Vinyl acetate	108-05-4	ND10	ND10	ND10	ND10
Vinyl chloride	75-01-4	ND10	ND10	ND10	ND10
Total xylenes	95-47-6	ND5.0	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-MW-06	M-86-WS-01	M-86-SS-07	M-86-SS-0
		SAMPLE IDENTIFICATION			
		Concentration μg/L			
Acetone	67-64-1	11	ND10/ND10	ND10	ND10
Benzene	71-43-2	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
2-Butanone	78-93-3	ND10	ND10/ND10	ND10	ND10
Bromoform	75-25-2	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Carbon disulfide	75-15-0	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Carbon tetrachloride	56-23-5	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Chlorobenzene	108-90-7	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Chlorodibromomethane	124-48-1	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Chloroethane	75-00-3	ND10	ND10/ND10	ND10	ND10
2-Chloroethylvinyl ether	110-75-8	ND10	ND10/ND10	ND10	ND10
Chloroform	67-66-3	ND5.0	ND5.0/ND5.0	7.0	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Dichlorobromomethane	75-27-4	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
1,1-Dichloroethane	75-34-3	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
1,2-Dichloroethane	107-06-2	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
1,1-Dichloroethylene	75-35-4	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
1 Dichloropropane	78-87-5	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Ethylbenzene	100-41-4	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-MW-06	M-86-WS-01	M-86-SS-07	M-86-SS-(
		SAMPLE IDENTIFICATION Concentration µg/L			
2-Hexanone	591-78-6	ND10	ND10/ND10	ND10	ND10
Methyl bromide	74-83-9	ND10	ND10/ND10	ND10	ND10
Methyl chloride	74-87-3	ND10	ND10/ND10	ND10	ND10
4-Methyl-2-pentanone	108-10-1	ND10	ND10/ND10	ND10	ND10
Methylene chloride	75-09-2	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Styrene	100-42-5	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Tetrachloroethylene	127-18-4	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Toluene	108-88-3	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
1,1,1-Trichloroethane	71-55-6	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
1,1,2-Trichloroethane	79-00-5	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Trichloroethylene	79-01-6	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0
Vinyl acetate	108-05-4	ND10	ND10/ND10	ND10	ND10
Vinyl chloride	75-01-4	ND10	ND10/ND10	ND10	ND10
Total xylenes	95-47-6	ND5.0	ND5.0/ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION M-86-TK-01	M-86-TK-02	M-86-TK-03	M-86-TK-04
		Concentration µg/L			
Acetone	67-64-1	ND12000	ND10	ND50000	ND10
Benzene	71-43-2	ND6200	ND5.0	ND25000	ND5.0
2-Butanone	78-93-3	ND12000	ND10	ND50000	ND10
Bromoform	75-25-2	ND6200	ND5.0	ND25000	ND5.0
Carbon disulfide	75-15-0	ND6200	ND5.0	34,000	ND5.0
Carbon tetrachloride	56-23-5	ND6200	ND5.0	ND25000	ND5.0
Chlorobenzene	108-90-7	ND6200	ND5.0	ND25000	ND5.0
Chlorodibromomethane	124-48-1	ND6200	ND5.0	ND25000	ND5.0
Chloroethane	75-00-3	ND12000	ND10	ND50000	ND10
2-Chloroethylvinyl ether	110-75-8	ND12000	ND10	ND50000	ND10
Chloroform	67-66-3	ND6200	ND5.0	ND25000	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND6200	ND5.0	ND25000	ND5.0
Dichlorobromomethane	75-27-4	ND6200	ND5.0	ND25000	ND5.0
1,1-Dichloroethane	75-34-3	ND6200	ND5.0	ND25000	ND5.0
1,2-Dichloroethane	107-06-2	ND6200	ND5.0	ND25000	ND5.0
1,1-Dichloroethylene	75-35-4	ND6200	ND5.0	ND25000	ND5.0
1,2-Dichloropropane	78-87-5	ND6200	ND5.0	ND25000	ND5.0
Ethylbenzene	100-41-4	80,000	ND5.0	170,000	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	M-86-TK-01	M-86-TK-02	M-86-TK-03	M-86-TK-04
		SAMPLE IDENTIFICATION			
		Concentration µg/L			
2-Hexanone	591-78-6	ND12000	ND10	ND50000	ND10
Methyl bromide	74-83-9	ND12000	ND10	ND50000	ND10
Methyl chloride	74-87-3	ND12000	ND10	ND50000	ND10
4-Methyl-2-pentanone	108-10-1	ND12000	ND10	ND50000	ND10
Methylene chloride	75-09-2	ND6200	ND5.0	ND25000	ND5.0
Styrene	100-42-5	ND6200	ND5.0	ND25000	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND6200	ND5.0	ND25000	ND5.0
Tetrachloroethylene	127-18-4	ND6200	ND5.0	ND25000	ND5.0
Toluene	108-88-3	9,900	ND5.0	ND25000	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND6200	ND5.0	ND25000	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND6200	ND5.0	ND25000	ND5.0
1,1,1-Trichloroethane	71-55-6	ND6200	ND5.0	ND25000	ND5.0
1,1,2-Trichloroethane	79-00-5	ND6200	ND5.0	ND25000	ND5.0
Trichloroethylene	79-01-6	ND6200	ND5.0	ND25000	ND5.0
Vinyl acetate	108-05-4	ND12000	ND10	ND50000	ND10
Vinyl chloride	75-01-4	ND12000	ND10	ND50000	ND10
Total xylenes	95-47-6	500,000	ND5.0	230,000	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION Method Blank #1	Method Blank #2	Method Blank #3	Method Blank #4
		Concentration µg/L			
Acetone	67-64-1	ND10	ND10	ND10	ND10
Benzene	71-43-2	ND5.0	ND5.0	ND5.0	ND5.0
2-Butanone	78-93-3	ND10	ND10	ND10	ND10
Bromoform	75-25-2	ND5.0	ND5.0	ND5.0	ND5.0
Carbon disulfide	75-15-0	ND5.0	ND5.0	ND5.0	ND5.0
Carbon tetrachloride	56-23-5	ND5.0	ND5.0	ND5.0	ND5.0
Chlorobenzene	108-90-7	ND5.0	ND5.0	ND5.0	ND5.0
Chlorodibromomethane	124-48-1	ND5.0	ND5.0	ND5.0	ND5.0
Chloroethane	75-00-3	ND10	ND10	ND10	ND10
2-Chloroethylvinyl ether	110-75-8	ND10	ND10	ND10	ND10
Chloroform	67-66-3	ND5.0	ND5.0	ND5.0	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND5.0	ND5.0	ND5.0	ND5.0
Dichlorobromomethane	75-27-4	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethane	75-34-3	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloroethane	107-06-2	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethylene	75-35-4	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloropropane	78-87-5	ND5.0	ND5.0	ND5.0	ND5.0
Ethylbenzene	100-41-4	ND5.0	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	Method Blank #1	Method Blank #2	Method Blank #3	Method Blank #4
		SAMPLE IDENTIFICATION			
		Concentration µg/L			
2-Hexanone	591-78-6	ND10	ND10	ND10	ND10
Methyl bromide	74-83-9	ND10	ND10	ND10	ND10
Methyl chloride	74-87-3	ND10	ND10	ND10	ND10
4-Methyl-2-pentanone	108-10-1	ND10	ND10	ND10	ND10
Methylene chloride	75-09-2	ND5.0	ND5.0	ND5.0	ND5.0
Styrene	100-42-5	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND5.0	ND5.0	ND5.0	ND5.0
Tetrachloroethylene	127-18-4	ND5.0	ND5.0	ND5.0	ND5.0
Toluene	108-88-3	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,1-Trichloroethane	71-55-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2-Trichloroethane	79-00-5	ND5.0	ND5.0	ND5.0	ND5.0
Trichloroethylene	79-01-6	ND5.0	ND5.0	ND5.0	ND5.0
Vinyl acetate	108-05-4	ND10	ND10	ND10	ND10
Vinyl chloride	75-01-4	ND10	ND10	ND10	ND10
Total xylenes	95-47-6	ND5.0	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	Method Blank #5	Method Blank #6	Method Blank #7	Method Blank #8
		SAMPLE IDENTIFICATION			
		Concentration µg/L			
Acetone	67-64-1	ND10	ND10	ND10	ND10
Benzene	71-43-2	ND5.0	ND5.0	ND5.0	ND5.0
2-Butanone	78-93-3	ND10	ND10	ND10	ND10
Bromoform	75-25-2	ND5.0	ND5.0	ND5.0	ND5.0
Carbon disulfide	75-15-0	ND5.0	ND5.0	ND5.0	ND5.0
Carbon tetrachloride	56-23-5	ND5.0	ND5.0	ND5.0	ND5.0
Chlorobenzene	108-90-7	ND5.0	ND5.0	ND5.0	ND5.0
Chlorodibromomethane	124-48-1	ND5.0	ND5.0	ND5.0	ND5.0
Chloroethane	75-00-3	ND10	ND10	ND10	ND10
2-Chloroethylvinyl ether	110-75-8	ND10	ND10	ND10	ND10
Chloroform	67-66-3	ND5.0	ND5.0	ND5.0	ND5.0
Cis-1,3-dichloropropene	10061-01-5	ND5.0	ND5.0	ND5.0	ND5.0
Dichlorobromomethane	75-27-4	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethane	75-34-3	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloroethane	107-06-2	ND5.0	ND5.0	ND5.0	ND5.0
1,1-Dichloroethylene	75-35-4	ND5.0	ND5.0	ND5.0	ND5.0
1,2-Dichloropropane	78-87-5	ND5.0	ND5.0	ND5.0	ND5.0
Ethylbenzene	100-41-4	ND5.0	ND5.0	ND5.0	ND5.0

TABLE 11
(Continued)

PARAMETER	CAS NUMBER[1]	SAMPLE IDENTIFICATION Method Blank #5	Method Blank #6	Method Blank #7	Method Blank #8
		Concentration µg/L			
2-Hexanone	591-78-6	ND10	ND10	ND10	ND10
Methyl bromide	74-83-9	ND10	ND10	ND10	ND10
Methyl chloride	74-87-3	ND10	ND10	ND10	ND10
4-Methyl-2-pentanone	108-10-1	ND10	ND10	ND10	ND10
Methylene chloride	75-09-2	ND5.0	ND5.0	ND5.0	ND5.0
Styrene	100-42-5	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND5.0	ND5.0	ND5.0	ND5.0
Tetrachloroethylene	127-18-4	ND5.0	ND5.0	ND5.0	ND5.0
Toluene	108-88-3	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,2-Dichloroethylene	156-60-5	ND5.0	ND5.0	ND5.0	ND5.0
trans-1,3-Dichloropropene	10061-02-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,1-Trichloroethane	71-55-6	ND5.0	ND5.0	ND5.0	ND5.0
1,1,2-Trichloroethane	79-00-5	ND5.0	ND5.0	ND5.0	ND5.0
Trichloroethylene	79-01-6	ND5.0	ND5.0	ND5.0	ND5.0
Vinyl acetate	108-05-4	ND10	ND10	ND10	ND10
Vinyl chloride	75-01-4	ND10	ND10	ND10	ND10
Total xylenes	95-47-6	ND5.0	ND5.0	ND5.0	ND5.0

(1) The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstracts Index.

TABLE 12
VOLATILE SURROGATE SPIKE PERCENT RECOVERY SUMMARY
OF WATER SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

SAMPLE IDENTIFICATION	METHOD BLANK REFERENCE	PARAMETER 4-BROMOFLUOROBENZENE	1,2-DICHLOROETHANE-d_4 Percent Recovery	TOLUENE-d_8
M-86-SW-01	#1	94%	80%	95%
M-86-SW-02	#2	100%	105%	100%
M-86-SW-03	#1	100%	109%	95%
M-86-SW-04	#1	93%	81%	94%
M-86-SW-05	#6	105%	93%	97%
M-86-SW-06	#4	111%	111%	106%
M-86-SW-10	#3	92%	96%	97%
M-86-MW-01	#2	104%	96%	101%
M-86-MW-03	#1	93%	84%	94%
M-86-MW-04	#6	112%	96%	95%
M-86-MW-04 MS	#5	113%	113%	104%
M-86-MW-04 MSD	#5	109%	101%	101%
M-86-MW-05	#1	94%	79%	91%
M-86-MW-06	#6	107%	95%	90%
M-86-WS-01	#8	98%/94%	87%/86%	97%/98%
M-86-SS-07	#8	96%	86%	97%
M-86-SS-09	#8	95%	87%	99%
M-86-TK-01	#7	114%	103%	101%
M-86-TK-02	#5	112%	108%	105%
M-86-TK-03	#7	111%	100%	99%
M-86-TK-04	#1	107%	90%	95%
Method Blank 1	--	97%	89%	98%
Method Blank 2	--	107%	96%	102%
Method Blank 3	--	98%	92%	103%
Method Blank 4	—	95%	86%	98%
Method Blank 5	--	106%	97%	100%
Method Blank 6	--	104%	96%	94%
Method Blank 7	--	114%	99%	102%
Method Blank 8	—	101%	90%	104%

TABLE 13
VOLATILE MATRIX SPIKE PERCENT RECOVERY
OF WATER SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

	SAMPLE IDENTIFICATION
	M-86-MW-04
COMPOUND	PERCENT RECOVERY
Benzene	106%/109%
Chlorobenzene	116%/120%
1,1-Dichloroethene	119%/120%
Toluene	114%/112%
Trichloroethene	103%/105%

TABLE 14
TOTAL METALS ANALYSIS SUMMARY
OF OIL SAMPLES
FOR IT CHICAGO/BUFFALO DERA
PROJECT NO. 302245

	SAMPLE IDENTIFICATION		
PARAMETER	M-86-TK-01	M-86-TK-03	Method Blanks
	Concentration mg/Kg		
Arsenic	ND1/ND1	ND1	ND1
Barium	ND1/ND1	ND1	ND1
Cadmium	ND1/ND1	ND1	ND1
Chromium	ND2/ND2	ND2	ND2
Iron	37/22	8	ND4
Lead	ND9/ND9	ND10	ND10
Manganese	ND1/ND1	ND1	ND1
Mercury	ND0.02/ND0.02	ND0.02/ND0.02	ND0.02
Selenium	ND1/ND1	ND1	ND1
Silver	ND2/ND2	ND2	ND2
Sodium	ND76/ND75	140	ND80

TABLE 15
TOTAL METALS PERCENT RECOVERY SUMMARY
FOR OIL SAMPLES

	SAMPLE IDENTIFICATION	
	M-86-TK-03	M-86-TK-01
PARAMETER	ANALYTICAL SPIKE PERCENT RECOVERY	MATRIX SPIKE PERCENT RECOVERY
Arsenic	100%	104%
Barium	108%	99%
Cadmium	100%	86%
Chromium	94%	87%
Iron	102%	73%
Lead	107%	84%
Manganese	104%	97%
Mercury	--	103%
Selenium	80%	98%
Silver	89%	64%
Sodium	100%	95%

APPENDIX H

APPENDIX H

REPORT OF COE MISSOURI RIVER DIVISION LABORATORY

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
P.O. BOX 103, DOWNTOWN STATION
OMAHA, NEBRASKA 68101-0103

MAILROOM-NCBIM-S

REPLY TO
ATTENTION OF

18 SEP 89 11 28

CEMRD-ED-GL (200)

8 September 1989

MEMORANDUM FOR Commander, US Army Engineer District, Buffalo, ATTN: CENCB-ED-HQ (Sophie Baj), 1776 Niagara Street, Buffalo, NY 14207-3199

SUBJECT: Former Nike Battery M-86, Menomonee Falls, Wisconsin, QA/QC Final Report

1. This is in response to the request from CENCB-ED-HQ for quality assurance testing.

2. Enclosed is a copy of the QA/QC Final Report, SAB.

3. IT Corporation was both Contractor and laboratory for this project.

4. The Contractor's data partially met the Quality Control criteria as specified in the approved QCP.

5. Reported data generally agreed, however, there were eleven minor data disagreements and five major data disagreements. A few minor sample shipping and chain-of-custody errors were noted.

6. The Quality Assurance raw data report was sent under separate cover on or about 1 September 1989.

7. If there are any questions or comments, please call Joe Solsky, (402) 444-4304.

FOR THE COMMANDER:

Encl
QA/QC Report

WILLIAM P. TODSEN, P.E.
Chief, Engineering Division

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

31 AUG 1989

Subject: QA/QC Final Report

Project: Former Nike Battery M-86, Menomonee Falls, Wisconsin
Intended Use: DERP-FUDS
Source of Material:

Submitted by: Sophie Baj, CENCB-ED-HQ
Date Sampled: ____________, **Date Received:** 9 Mar to 8 Apr 89
Method of Test or Specification: See attached Tables 1 - 11

References: MRDRM DF dated 03 Oct 88

-- REMARKS --

1. CONTRACTOR DATA EVALUATION: The contractor performed the analyses using the EPA methods called for in the contract document. Proper Quality Control procedures were followed and documented in some cases. n overall evaluation of the Contractors data indicates that the data partially met the requirements specified in the approved QCP.

a. ACCURACY: Recoveries of surrogates for volatile organics were acceptable. Recoveries of matrix spikes for volatile organics were acceptable. Recoveries of matrix spikes for petroleum hydrocarbons were acceptable. Recoveries of matrix spikes for metals were acceptable except for recovery of selenium in a soil sample where the recovery was fifty-six percent, mercury in a waste sample where the recovery was fifty-six percent, and silver and iron in an oil sample where the recoveries were sixty-four and seventy-three percent respectively.

b. PRECISION: Data for laboratory duplicates were not reported. Except for the tank samples (only one tank sampled), it was not clear which environmental sample was split to produce the QC and QA split samples. Therefore, no conclusions regarding the results of the field duplicates can be formed. Recoveries of matrix spike duplicates for volatile organics on the one soil sample and one water sample tested were acceptable. No matrix spike duplicate recoveries were reported for petroleum hydrocarbons or metals analyses.

c. LABORATORY CONTAMINATION: Instrument/method blanks were acceptable.

Solsky/lav/444-4304

2. QA/QC DATA COMPARISON: Data for petroleum hydrocarbons had one major disagreement and one minor disagreement in seven samples. Volatile organic data agreed. Data for metals had four major disagreements and ten minor disagreements in eight samples. Some of the data discrepancies noted may be due to different phases of the same sample being analyzed by the respective QA and QC laboratories.

3. OTHER PROBLEMS:

a. Trip blanks and rinsates were free of volatile organic contamination except for trace levels of common laboratory contaminants. A low level of petroleum hydrocarbons was reported by the QA Laboratory in one of three rinsate samples. Significant quantities of iron and sodium along with trace levels of four other metals was reported in one of the three rinsates.

b. Sample shipping and chain-of-custody errors included the following: (1) bubbles were found in both VOA vials for one sample and two trip blanks, (2) the project name was not included on one chain-of-custody form and the wrong project name was listed on the request for analysis form accompanying that chain of custody, and (3) the custody seal on one shipping container was broken prior to receipt (no transparent tape was used) and the drain on that same shipping container was not taped shut.

4. CORRECTIVE ACTION: Sampling and shipping problems were discussed with the responsible Corps of Engineers Project Manager. Subsequent samples had fewer problems.

Submitted by:

R. K. SCHLENKER, P.E.
Director, MRD Laboratory

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-SS-10 (Rinsate) Contractor's Sample ID.: M-86-SS-07
Material Description: Water Date Sampled: 08 Mar 89

Analysis	QA Lab Result		Contractor Result	Units
MISCELLANEOUS				
Petroleum Hydrocarbons	-		<0.2	mg/L

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
VOLATILE ORGANICS									
Acetone	BDL		<10	µg/L	1,2-Dichloropropane	<5.0		<5.0	µg/L
Benzene	<1.0		<5.0	µg/L	cis-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromodichloromethane	<1.0		<5.0	µg/L	trans-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromoform	<2.0		<5.0	µg/L	Ethylbenzene	<2.0		<5.0	µg/L
Bromomethane	<2.0		<10	µg/L	2-Hexanone	BDL		<10	µg/L
2-Butanone	BDL		<10	µg/L	Methylene chloride	<2.0		<5.0	µg/L
Carbon disulfide	BDL		<5.0	µg/L	4-Methyl-2-pentanone	BDL		<10	µg/L
Carbon tetrachloride	<1.0		<5.0	µg/L	Styrene	<2.0		<5.0	µg/L
Chlorobenzene	<2.0		<5.0	µg/L	1,1,2,2-Tetrachloroethane	<2.0		<5.0	µg/L
Chloroethane	<5.0		<10	µg/L	Tetrachloroethene	<2.0		<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0		<10	µg/L	Toluene	<2.0		<5.0	µg/L
Chloroform	5.3	C	7.0	µg/L	1,1,1-Trichloroethane	<1.0		<5.0	µg/L
Chloromethane	<10.0		<10	µg/L	1,1,2-Trichloroethane	<5.0		<5.0	µg/L
Dibromochloromethane	<2.0		<5.0	µg/L	Trichloroethene	<2.0		<5.0	µg/L
1,1-Dichloroethane	<1.0		<5.0	µg/L	Vinyl acetate	BDL		<10	µg/L
1,2-Dichloroethane	<2.0		<5.0	µg/L	Vinyl chloride	<10.0		<10	µg/L
1,1-Dichloroethene	<2.0		<5.0	µg/L	Total Xylenes	<2.0		<5.0	µg/L
Total 1,2-Dichloroethene	<2.0		<5.0	µg/L	Trichlorofluoromethane	8.7	C	-	µg/L

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
METALS									
Arsenic	<3.0		<3	µg/L	Manganese	<1.2	*	8	µg/L
Barium	<16.5		8	µg/L	Mercury	<0.2		<0.2	µg/L
Cadmium	-		<5	µg/L	Selenium	<1.8		<5	µg/L
Chromium	<4.1		10	µg/L	Silver	<3.8		10	µg/L
Iron	142		190	µg/L	Sodium	425 B		400	µg/L
Lead	<14.2	*	80	µg/L					

COMMENTS: *: Data disagreement.
BDL: Below Detection Limit, instrument detection limit not established.
B: Compound also found in method or instrument blank.
C: Common laboratory contaminant.
-: Not analyzed or not reported.
Volatile organics: Data agreed.
Metals: The QA Lab reported analysis of Beryllium (<0.7 µg/L) rather than Cadmium.

Table 2

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-SS-11
Material Description: Soil
Contractor's Sample ID.: M-86-SS-08
Date Sampled: 08 Mar 89

Analysis	QA Lab Result		Contractor Result	Units
MISCELLANEOUS				
Petroleum Hydrocarbons	<20	*	83	mg/kg

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
VOLATILE ORGANICS									
Acetone	BDL	C	14	µg/kg	1,2-Dichloropropane	<5.0		<6.0	µg/kg
Benzene	<1.0		<6.0	µg/kg	cis-1,3-Dichloropropene	<1.0		<6.0	µg/kg
Bromodichloromethane	<1.0		<6.0	µg/kg	trans-1,3-Dichloropropene	<1.0		<6.0	µg/kg
Bromoform	<2.0		<6.0	µg/kg	Ethylbenzene	<2.0		<6.0	µg/kg
Bromomethane	<2.0		<12	µg/kg	2-Hexanone	BDL		<12	µg/kg
2-Butanone	BDL		<12	µg/kg	Methylene chloride	<2.0		<6.0	µg/kg
Carbon disulfide	BDL		<6.0	µg/kg	4-Methyl-2-pentanone	BDL		<12	µg/kg
Carbon tetrachloride	<1.0		<6.0	µg/kg	Styrene	<2.0		<6.0	µg/kg
Chlorobenzene	<2.0		<6.0	µg/kg	1,1,2,2-Tetrachloroethane	<2.0		<6.0	µg/kg
Chloroethane	<5.0		<12	µg/kg	Tetrachloroethene	<2.0		<6.0	µg/kg
2-Chloroethyl vinyl ether	<5.0		<12	µg/kg	Toluene	<2.0		<6.0	µg/kg
Chloroform	<1.0		<6.0	µg/kg	1,1,1-Trichloroethane	<1.0		<6.0	µg/kg
Chloromethane	<10.0		<12	µg/kg	1,1,2-Trichloroethane	<5.0		<6.0	µg/kg
Dibromochloromethane	<2.0		<6.0	µg/kg	Trichloroethene	<2.0		<6.0	µg/kg
1,1-Dichloroethane	<1.0		<6.0	µg/kg	Vinyl acetate	BDL		<12	µg/kg
1,2-Dichloroethane	<2.0		<6.0	µg/kg	Vinyl chloride	<10.0		<12	µg/kg
1,1-Dichloroethene	<2.0		<6.0	µg/kg	Total Xylenes	<2.0		<6.0	µg/kg
Total 1,2-Dichloroethene	<2.0		<6.0	µg/kg					

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
METALS									
Arsenic	1.3		1.4	mg/kg	Manganese	39.2		-	mg/kg
Barium	18.4		29	mg/kg	Mercury	0.05		<0.10	mg/kg
Cadmium	<0.0043	*	4	mg/kg	Selenium	<0.15		<1	mg/kg
Chromium	3.3	*	23	mg/kg	Silver	<0.0038	*	3	mg/kg
Iron	350		-	mg/kg	Sodium	97.2 B		-	mg/kg
Lead	3.1	*	32	mg/kg					

COMMENTS: *: Data disagreement.
BDL: Below Detection Limit, instrument detection limit not established.
B: Compound also found in method or instrument blank.
C: Common laboratory contaminant.
-: Not analyzed or not reported.

Volatile organics: Data agreed. The QA Lab called this a sludge sample and consequently treated it as a "water" sample. The reported units were therefore µg/L rather than µg/kg. But all analytes were BDL anyway.

Metals: The detection limits reported by the QA Lab for Cadmium and Silver are much lower than expected for a soil sample, and this may be at least part of the reason for the data disagreement on these two metals.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-SS-12 (Trip Blank)
Contractor's Sample ID.: M-86-SS-09
Material Description: Water
Date Sampled: 02 Mar 89

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	BDL	<10	µg/L	1,2-Dichloropropane	<5.0	<5.0	µg/L
Benzene	<1.0	<5.0	µg/L	cis-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromodichloromethane	<1.0	<5.0	µg/L	trans-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromoform	<2.0	<5.0	µg/L	Ethylbenzene	<2.0	<5.0	µg/L
Bromomethane	<2.0	<10	µg/L	2-Hexanone	BDL	<10	µg/L
2-Butanone	BDL	<10	µg/L	Methylene chloride	<2.0	<5.0	µg/L
Carbon disulfide	BDL	<5.0	µg/L	4-Methyl-2-pentanone	BDL	<10	µg/L
Carbon tetrachloride	<1.0	<5.0	µg/L	Styrene	<2.0	<5.0	µg/L
Chlorobenzene	<2.0	<5.0	µg/L	1,1,2,2-Tetrachloroethane	<2.0	<5.0	µg/L
Chloroethane	<5.0	<10	µg/L	Tetrachloroethene	<2.0	<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0	<10	µg/L	Toluene	<2.0	<5.0	µg/L
Chloroform	<1.0	<5.0	µg/L	1,1,1-Trichloroethane	<1.0	<5.0	µg/L
Chloromethane	<10.0	<10	µg/L	1,1,2-Trichloroethane	<5.0	<5.0	µg/L
Dibromochloromethane	<2.0	<5.0	µg/L	Trichloroethene	<2.0	<5.0	µg/L
1,1-Dichloroethane	<1.0	<5.0	µg/L	Vinyl acetate	BDL	<10	µg/L
1,2-Dichloroethane	<2.0	<5.0	µg/L	Vinyl chloride	<10.0	<10	µg/L
1,1-Dichloroethene	<2.0	<5.0	µg/L	Total Xylenes	<2.0	<5.0	µg/L
Total 1,2-Dichloroethene	<2.0	<5.0	µg/L				

COMMENTS: Data agreed.
BDL: Below Detection Limit, instrument detection limit not established.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-SW-08 | Contractor's Sample ID.: M-86-SW-05
Material Description: Water | Date Sampled: 06 Apr 89

Analysis	QA Lab Result	Contractor Result	Units
MISCELLANEOUS			
Petroleum Hydrocarbons	0.646	2.4	mg/L

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	BDL C	12	µg/L	1,2-Dichloropropane	<5.0	<5.0	µg/L
Benzene	<1.0	<5.0	µg/L	cis-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromodichloromethane	<1.0	<5.0	µg/L	trans-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromoform	<2.0	<5.0	µg/L	Ethylbenzene	<2.0	<5.0	µg/L
Bromomethane	<2.0	<10	µg/L	2-Hexanone	BDL	<10	µg/L
2-Butanone	BDL	<10	µg/L	Methylene chloride	<2.0	<5.0	µg/L
Carbon disulfide	BDL	<5.0	µg/L	4-Methyl-2-pentanone	BDL	<10	µg/L
Carbon tetrachloride	<1.0	<5.0	µg/L	Styrene	<2.0	<5.0	µg/L
Chlorobenzene	<2.0	<5.0	µg/L	1,1,2,2-Tetrachloroethane	<2.0	<5.0	µg/L
Chloroethane	<5.0	<10	µg/L	Tetrachloroethene	<2.0	<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0	<10	µg/L	Toluene	<2.0	<5.0	µg/L
Chloroform	<1.0	<5.0	µg/L	1,1,1-Trichloroethane	<1.0	<5.0	µg/L
Chloromethane	<10.0	<10	µg/L	1,1,2-Trichloroethane	<5.0	<5.0	µg/L
Dibromochloromethane	<2.0	<5.0	µg/L	Trichloroethene	<2.0	<5.0	µg/L
1,1-Dichloroethane	<1.0	<5.0	µg/L	Vinyl acetate	BDL	<10	µg/L
1,2-Dichloroethane	<2.0	<5.0	µg/L	Vinyl chloride	<10.0	<10	µg/L
1,1-Dichloroethene	<2.0	<5.0	µg/L	Total Xylenes	<2.0	<5.0	µg/L
Total 1,2-Dichloroethene	<2.0	<5.0	µg/L	Trichlorofluoromethane	4.9 C	-	µg/L

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
METALS							
Arsenic	<3.0	<3	µg/L	Manganese	200	220	µg/L
Barium	328	320	µg/L	Mercury	0.2	<0.2	µg/L
Cadmium	32.2	28	µg/L	Selenium	<1.8	<5	µg/L
Chromium	41.0	90	µg/L	Silver	<3.8	<10	µg/L
Iron	9320	7500	µg/L	Sodium	5740	6400	µg/L
Lead	1690	1700	µg/L				

COMMENTS: Data agreed.
BDL: Below Detection Limit, instrument detection limit not established.
C: Common laboratory contaminant.
-: Not analyzed or not reported.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-MW-08
Material Description: Water
Contractor's Sample ID.: M-86-MW-05
Date Sampled: 06 Apr 89

Analysis	QA Lab Result		Contractor Result	Units
MISCELLANEOUS				
Petroleum Hydrocarbons	0.550		<0.2	mg/L

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
VOLATILE ORGANICS									
Acetone	BDL	C	91	µg/L	1,2-Dichloropropane	<5.0		<5.0	µg/L
Benzene	<1.0		<5.0	µg/L	cis-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromodichloromethane	<1.0		<5.0	µg/L	trans-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromoform	<2.0		<5.0	µg/L	Ethylbenzene	<2.0		<5.0	µg/L
Bromomethane	<2.0		<10	µg/L	2-Hexanone	BDL		<10	µg/L
2-Butanone	BDL		<10	µg/L	Methylene chloride	<2.0		<5.0	µg/L
Carbon disulfide	BDL		<5.0	µg/L	4-Methyl-2-pentanone	BDL		<10	µg/L
Carbon tetrachloride	<1.0		<5.0	µg/L	Styrene	<2.0		<5.0	µg/L
Chlorobenzene	<2.0		<5.0	µg/L	1,1,2,2-Tetrachloroethane	<2.0		<5.0	µg/L
Chloroethane	<5.0		<10	µg/L	Tetrachloroethene	<2.0		<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0		<10	µg/L	Toluene	<2.0		<5.0	µg/L
Chloroform	<1.0		<5.0	µg/L	1,1,1-Trichloroethane	<1.0		<5.0	µg/L
Chloromethane	<10.0		<10	µg/L	1,1,2-Trichloroethane	<5.0		<5.0	µg/L
Dibromochloromethane	<2.0		<5.0	µg/L	Trichloroethene	<2.0		<5.0	µg/L
1,1-Dichloroethane	<1.0		<5.0	µg/L	Vinyl acetate	BDL		<10	µg/L
1,2-Dichloroethane	<2.0		<5.0	µg/L	Vinyl chloride	<10.0		<10	µg/L
1,1-Dichloroethene	<2.0		<5.0	µg/L	Total Xylenes	<2.0		<5.0	µg/L
Total 1,2-Dichloroethene	<2.0		<5.0	µg/L	Trichlorofluoromethane	6.4	C	-	µg/L

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
METALS									
Arsenic	15.6	*	<3	µg/L	Manganese	4320		7000	µg/L
Barium	491		620	µg/L	Mercury	<0.2		<0.2	µg/L
Cadmium	<4.3	**	75	µg/L	Selenium	<1.8		<5	µg/L
Chromium	19.4	**	380	µg/L	Silver	<3.8	*	40	µg/L
Iron	68200		95000	µg/L	Sodium	10400		12000	µg/L
Lead	38.4	*	590	µg/L					

COMMENTS:
*: Data disagreement.
**: Major data disagreement.
BDL: Below Detection Limit, instrument detection limit not established.
C: Common laboratory contaminant.
-: Not analyzed or not reported.

Petroleum Hydrocarbons: Data agreed. QA results very close to detection limits.
Volatile Organics: Data agreed. 91 µg/L of acetone is higher than normal lab contamination levels.

Table 6

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-MW-07 (Rinsate) Contractor's Sample ID.: M-86-MW-04
Material Description: Water Date Sampled: 06 Apr 89

Analysis	QA Lab Result	Contractor Result	Units
MISCELLANEOUS			
Petroleum Hydrocarbons	<0.5	<0.2	mg/L

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	BDL	<10	µg/L	1,2-Dichloropropane	<5.0	<5.0	µg/L
Benzene	<1.0	<5.0	µg/L	cis-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromodichloromethane	<1.0	<5.0	µg/L	trans-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromoform	<2.0	<5.0	µg/L	Ethylbenzene	1.1J	<5.0	µg/L
Bromomethane	<2.0	<10	µg/L	2-Hexanone	BDL	<10	µg/L
2-Butanone	BDL	<10	µg/L	Methylene chloride	<2.0	<5.0	µg/L
Carbon disulfide	BDL	<5.0	µg/L	4-Methyl-2-pentanone	BDL	<10	µg/L
Carbon tetrachloride	<1.0	<5.0	µg/L	Styrene	<2.0	<5.0	µg/L
Chlorobenzene	<2.0	<5.0	µg/L	1,1,2,2-Tetrachloroethane	<2.0	<5.0	µg/L
Chloroethane	<5.0	<10	µg/L	Tetrachloroethene	<2.0	<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0	<10	µg/L	Toluene	<2.0	<5.0	µg/L
Chloroform	<1.0	<5.0	µg/L	1,1,1-Trichloroethane	<1.0	<5.0	µg/L
loromethane	<10.0	<10	µg/L	1,1,2-Trichloroethane	<5.0	<5.0	µg/L
bromochloromethane	<2.0	<5.0	µg/L	Trichloroethene	<2.0	<5.0	µg/L
1,1-Dichloroethane	<1.0	<5.0	µg/L	Vinyl acetate	BDL	<10	µg/L
1,2-Dichloroethane	<2.0	<5.0	µg/L	Vinyl chloride	<10.0	<10	µg/L
1,1-Dichloroethene	<2.0	<5.0	µg/L	Total Xylenes	<2.0	<5.0	µg/L
Total 1,2-Dichloroethene	<2.0	<5.0	µg/L	Trichlorofluoromethane	4.3 C	-	µg/L

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
METALS							
Arsenic	<3.0	<3	µg/L	Manganese	<1.2	<5	µg/L
Barium	<16.5	<5	µg/L	Mercury	<0.2	<0.2	µg/L
Cadmium	<4.3	<5	µg/L	Selenium	<1.8	<5	µg/L
Chromium	<4.1	10	µg/L	Silver	<3.8	<10	µg/L
Iron	100 *	570	µg/L	Sodium	199 B	<400	µg/L
Lead	<14.2	<50	µg/L				

COMMENTS: *: Data disagreement.
BDL: Below Detection Limit, instrument detection limit not established.
B: Compound also found in method or instrument blank.
C: Common laboratory contaminant.
J: Estimated concentration below the quantifiable detection limit.
-: Not analyzed or not reported.
Petroleum Hydrocarbons and Volatile Organics: Data agreed.
Metals: Rinsate sample should not have any iron in it.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-MW-09 (Trip Blank) Contractor's Sample ID.: M-86-MW-06
Material Description: Water Date Sampled: 02 Mar 89

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Unit
VOLATILE ORGANICS									
Acetone	BDL	C	11	µg/L	1,2-Dichloropropane	<5.0		<5.0	µg/L
Benzene	<1.0		<5.0	µg/L	cis-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromodichloromethane	<1.0		<5.0	µg/L	trans-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromoform	<2.0		<5.0	µg/L	Ethylbenzene	<2.0		<5.0	µg/L
Bromomethane	<2.0		<10	µg/L	2-Hexanone	BDL		<10	µg/L
2-Butanone	BDL		<10	µg/L	Methylene chloride	<2.0		<5.0	µg/L
Carbon disulfide	BDL		<5.0	µg/L	4-Methyl-2-pentanone	BDL		<10	µg/L
Carbon tetrachloride	<1.0		<5.0	µg/L	Styrene	<2.0		<5.0	µg/L
Chlorobenzene	<2.0		<5.0	µg/L	1,1,2,2-Tetrachloroethane	<2.0		<5.0	µg/L
Chloroethane	<5.0		<10	µg/L	Tetrachloroethene	<2.0		<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0		<10	µg/L	Toluene	<2.0		<5.0	µg/L
Chloroform	<1.0		<5.0	µg/L	1,1,1-Trichloroethane	<1.0		<5.0	µg/L
Chloromethane	<10.0		<10	µg/L	1,1,2-Trichloroethane	<5.0		<5.0	µg/L
Dibromochloromethane	<2.0		<5.0	µg/L	Trichloroethene	<2.0		<5.0	µg/L
1,1-Dichloroethane	<1.0		<5.0	µg/L	Vinyl acetate	BDL		<10	µg/L
1,2-Dichloroethane	<2.0		<5.0	µg/L	Vinyl chloride	<10.0		<10	µg/L
1,1-Dichloroethene	<2.0		<5.0	µg/L	Total Xylenes	<2.0		<5.0	µg/L
Total 1,2-Dichloroethene	<2.0		<5.0	µg/L	Trichlorofluoromethane	2.0	C	-	µg/L

COMMENTS: Data agreed.
BDL: Below Detection Limit, instrument detection limit not established.
C: Common laboratory contaminant.
-: Not analyzed or not reported.

Table 8

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-TK-07 (Trip Blank) Contractor's Sample ID.: M-86-TK-04
Material Description: Water Date Sampled: 02 Mar 89

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
VOLATILE ORGANICS								
Acetone	BDL	<10	µg/L	1,2-Dichloropropane	<5.0		<5.0	µg/L
Benzene	<1.0	<5.0	µg/L	cis-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromodichloromethane	<1.0	<5.0	µg/L	trans-1,3-Dichloropropene	<1.0		<5.0	µg/L
Bromoform	<2.0	<5.0	µg/L	Ethylbenzene	<2.0		<5.0	µg/L
Bromomethane	<2.0	<10	µg/L	2-Hexanone	BDL		<10	µg/L
2-Butanone	BDL	<10	µg/L	Methylene chloride	<2.0		<5.0	µg/L
Carbon disulfide	BDL	<5.0	µg/L	4-Methyl-2-pentanone	BDL		<10	µg/L
Carbon tetrachloride	<1.0	<5.0	µg/L	Styrene	<2.0		<5.0	µg/L
Chlorobenzene	<2.0	<5.0	µg/L	1,1,2,2-Tetrachloroethane	<2.0		<5.0	µg/L
Chloroethane	<5.0	<10	µg/L	Tetrachloroethene	<2.0		<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0	<10	µg/L	Toluene	<2.0		<5.0	µg/L
Chloroform	<1.0	<5.0	µg/L	1,1,1-Trichloroethane	<1.0		<5.0	µg/L
Chloromethane	<10.0	<10	µg/L	1,1,2-Trichloroethane	<5.0		<5.0	µg/L
Dibromochloromethane	<2.0	<5.0	µg/L	Trichloroethene	<2.0		<5.0	µg/L
1,1-Dichloroethane	<1.0	<5.0	µg/L	Vinyl acetate	BDL		<10	µg/L
1,2-Dichloroethane	<2.0	<5.0	µg/L	Vinyl chloride	<10.0		<10	µg/L
1,1-Dichloroethene	<2.0	<5.0	µg/L	Total Xylenes	<2.0		<5.0	µg/L
Total 1,2-Dichloroethene	<2.0	<5.0	µg/L	Trichlorofluoromethane	1.8	C	-	µg/L

COMMENTS: Data agreed.
BDL: Below Detection Limit, instrument detection limit not established.
C: Common laboratory contaminant.
-: Not analyzed or not reported.

Table 9

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-TK-06 — Contractor's Sample ID.: M-86-TK-03
Material Description: Water — Date Sampled: 07 Apr 89

Analysis	QA Lab Result		Contractor Result	Units
MISCELLANEOUS				
Petroleum Hydrocarbons	8.857	**	120,000	mg/L

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
VOLATILE ORGANICS									
Acetone	BDL		<50	mg/L	1,2-Dichloropropane	<5.0		<25	mg/L
Benzene	<1.0		<25	mg/L	cis-1,3-Dichloropropene	<1.0		<25	mg/L
Bromodichloromethane	<1.0		<25	mg/L	trans-1,3-Dichloropropene	<1.0		<25	mg/L
Bromoform	<2.0		<25	mg/L	Ethylbenzene	60		170	mg/L
Bromomethane	<2.0		<50	mg/L	2-Hexanone	BDL		<50	mg/L
2-Butanone	BDL		<50	mg/L	Methylene chloride	<2.0		<25	mg/L
Carbon disulfide	BDL	C	34	mg/L	4-Methyl-2-pentanone	BDL		<50	mg/L
Carbon tetrachloride	<1.0		<25	mg/L	Styrene	<2.0		<25	mg/L
Chlorobenzene	<2.0		<25	mg/L	1,1,2,2-Tetrachloroethane	<2.0		<25	mg/L
Chloroethane	<5.0		<50	mg/L	Tetrachloroethene	<2.0		<25	mg/L
2-Chloroethyl vinyl ether	<5.0		<50	mg/L	Toluene	5.3		<25	mg/L
Chloroform	<1.0		<25	mg/L	1,1,1-Trichloroethane	<1.0		<25	mg/L
Chloromethane	<10.0		<50	mg/L	1,1,2-Trichloroethane	<5.0		<25	mg/L
Dibromochloromethane	<2.0		<25	mg/L	Trichloroethene	<2.0		<25	mg/L
1,1-Dichloroethane	<1.0		<25	mg/L	Vinyl acetate	BDL		<50	mg/L
1,2-Dichloroethane	<2.0		<25	mg/L	Vinyl chloride	<10.0		<50	mg/L
1,1-Dichloroethene	<2.0		<25	mg/L	Total Xylenes	330		230	mg/L
Total 1,2-Dichloroethene	<2.0		<25	mg/L					

Analysis	QA Lab Result		Contractor Result	Units	Analysis	QA Lab Result		Contractor Result	Units
METALS									
Arsenic	<3.0		<1000	µg/L	Manganese	<1.2		<1000	µg/L
Barium	<16.5		<1000	µg/L	Mercury	0.4		<20	µg/L
Cadmium	<4.3		<1000	µg/L	Selenium	<1.8		<1000	µg/L
Chromium	<4.1		<2000	µg/L	Silver	<3.8		<2000	µg/L
Iron	<9.4	**	8000	µg/L	Sodium	178 B	**	140,000	µg/L
Lead	<14.2		<10000	µg/L					

COMMENTS: NOTE the high detection limits (1000x normal) for volatile organics in this oil sample.

**: Major data disagreement.
BDL: Below Detection Limit, instrument detection limit not established.
B: Compound also found in method or instrument blank.
C: Common laboratory contaminant.

Petroleum Hydrocarbons: QA Lab may have sampled a water layer from the sample container whereas the contractor lab probably sampled the oil layer.

Volatile Organics: The contractor lab results on sample M-86-TK-01 were 80 mg/L Ethylbenzene, 9.9 mg/L toluene, 500 mg/L Total Xylenes, and BDL on all other analytes with detection limits approximately 4x lower than those quoted above. TK-01 is apparently the sample that was split into TK-03 and TK-06. Combining these results, the QA and QC data agreed. The QA Lab also reported six TICs with total concentration of 1.7 g/L.

Metals: The contract lab calculated the concentrations on a "per weight" basis. The values were reported with mg/kg units. The results shown above have been changed to µg/kg units. Note the large difference in detection limits as well as the poor data agreement.

Table 11

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Former Nike Battery M-86, Menomonee Falls, WI
QA Sample ID.: M-86-SW-07 (Rinsate) Contractor's Sample ID.: M-86-SW-04
Material Description: Water Date Sampled: 07 Apr 89

Analysis	QA Lab Result	Contractor Result	Units
MISCELLANEOUS			
Petroleum Hydrocarbons	<0.5	<0.2	mg/L

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	BDL	<10	µg/L	1,2-Dichloropropane	<5.0	<5.0	µg/L
Benzene	<1.0	<5.0	µg/L	cis-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromodichloromethane	<1.0	<5.0	µg/L	trans-1,3-Dichloropropene	<1.0	<5.0	µg/L
Bromoform	<2.0	<5.0	µg/L	Ethylbenzene	<2.0	<5.0	µg/L
Bromomethane	<2.0	<10	µg/L	2-Hexanone	BDL	<10	µg/L
2-Butanone	BDL	<10	µg/L	Methylene chloride	<2.0	<5.0	µg/L
Carbon disulfide	BDL	<5.0	µg/L	4-Methyl-2-pentanone	BDL	<10	µg/L
Carbon tetrachloride	<1.0	<5.0	µg/L	Styrene	<2.0	<5.0	µg/L
Chlorobenzene	<2.0	<5.0	µg/L	1,1,2,2-Tetrachloroethane	2.7	<5.0	µg/L
Chloroethane	<5.0	<10	µg/L	Tetrachloroethene	<2.0	<5.0	µg/L
2-Chloroethyl vinyl ether	<5.0	<10	µg/L	Toluene	<2.0	<5.0	µg/L
Chloroform	<1.0	<5.0	µg/L	1,1,1-Trichloroethane	<1.0	<5.0	µg/L
Chloromethane	<10.0	<10	µg/L	1,1,2-Trichloroethane	<5.0	<5.0	µg/L
Dibromochloromethane	<2.0	<5.0	µg/L	Trichloroethene	<2.0	<5.0	µg/L
1,1-Dichloroethane	<1.0	<5.0	µg/L	Vinyl acetate	BDL	<10	µg/L
1,2-Dichloroethane	<2.0	<5.0	µg/L	Vinyl chloride	<10.0	<10	µg/L
1,1-Dichloroethene	<2.0	<5.0	µg/L	Total Xylenes	<2.0	<5.0	µg/L
Total 1,2-Dichloroethene	<2.0	<5.0	µg/L	Trichlorofluoromethane	3.2 C	-	µg/L

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
METALS							
Arsenic	<3.0	<3	µg/L	Manganese	<1.2	<5	µg/L
Barium	<16.5	<5	µg/L	Mercury	<0.2	<0.2	µg/L
Cadmium	<4.3	<5	µg/L	Selenium	<1.8	<5	µg/L
Chromium	<4.1	<10	µg/L	Silver	<3.8	<10	µg/L
Iron	25.4 B	70	µg/L	Sodium	56.0 B	<400	µg/L
Lead	<14.2	<50	µg/L				

COMMENTS: Data agreed.
BDL: Below Detection Limit, instrument detection limit not established.
B: Compound also found in method or instrument blank.
C: Common laboratory contaminant.
-: Not analyzed or not reported.

MRD LAB NO. 89/2

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

31 AUG 1989

Subject: Quality Assurance Test Results

Project: Former Nike Battery M-86, Menomonee Falls, Wisconsin
Intended Use: DERP-FUDS
Source of Material:

Submitted by: Sophie Baj, CENCB-ED-HQ
Date Sampled: , Date Received: 9 Mar 89 to 8 Apr 89
Method of Test or Specification: See attached report sheets.

References: MRD RM DF dated 3 Oct 88

-- REMARKS --

1. The samples arrived in good condition. However, there were some sample identification, chain-of-custody and test parameter problems.

2. Enclosed please find the following:

   Part A: Sample Receipt Information (1 page)
   Part B: Chain-of-Custody Information (16 pages)
   Part C: Quality Assurance Test Results (43 pages)
   Part D: Sample Quality Control Information (2 pages)

3. The final QA/QC report will be forwarded to you under separate cover on or about 7 September 1989.

Submitted by:

R. K. SCHLENKER, P.E.
Director, MRD Laboratory

8 SEP 89 09 17

MAILROOM-NCBIM-S

Solsky/gm/444-4304

PART A

SAMPLE RECEIPT INFORMATION

QA/QC Table #	Customer Sample #	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	QA Test Results Page Number
001	M-86-SS-10	08 Mar 89	Water	890309-012	Metals (to EHRT)	C2
				890309-013	TRPH (not analyzed)	
				890309-014	VOA (to EHRT)	C7-C10
002	M-86-SS-11	08 Mar 89	Soil	890309-015	Metals (to EHRT)	C4
				890309-015	TRPH (to EHRT)	C11
				890309-016	VOA (to EHRT)	C12-C13
003	M-86-SS-12 (Trip Blank)	02 Mar 89	Water	890309-017	VOA (to EHRT)	C14-C15
004	M-86-SW-08	06 Apr 89	Water	890407-001	VOA (to EHRT)	C16-C17
				890407-002	TRPH (to EHRT)	C18
				890407-003	Metals (to EHRT)	C20
005	M86-MW-08	06 Apr 89	Water	890407-004	VOA (to EHRT)	C29-C30
				890407-005	TRPH (to EHRT)	C18
				890407-006	Metals (to EHRT)	C21
006	M86-MW-07	06 Apr 89	Water	890407-007	VOA (to EHRT)	C31-C32
				890407-008	TRPH (to EHRT)	C18
				890407-009	Metals (to EHRT)	C22
007	M86-MW-09 (Travel Blank)	02 Mar 89	Water	890407-010	VOA (to EHRT)	C33-C34
008	M86-TK-07 (Travel Blank)	02 Mar 89	Water	890410-001	VOA (to EHRT)	C35-C36
009	M86-TK-06	07 Apr 89	Water	890410-002	VOA (to EHRT)	C37-C39
				890410-003	TRPH (to EHRT)	C18
				890410-004	Metals (to EHRT)	C23
010	M86-TK-05	07 Apr 89	Water	890410-005	VOA (to EHRT)	C40-C41
				890410-006	TRPH (to EHRT)	C18
				890410-007	Metals (to EHRT)	C24
011	M86-SW-07	07 Apr 89	Water	890410-008	VOA (to EHRT)	C42-C43
				890410-009	TRPH (to EHRT)	C18
				890410-010	Metals (to EHRT)	C25

PART B

CHAIN-OF-CUSTODY INFORMATION

Page No.	Chain-of-Custody No.	Date Signed
B1	029872	08 Mar 89
B6	027158	06 Apr 89
B7	027162	06 Apr 89
B11	004575	07 Apr 89
B12	009224	07 Apr 89

CORPORATION

CHAIN-OF-CUSTODY RECORD

H/A Control No. 014512

C/C Control No. 029872

ROJECT NAME/NUMBER COE-Buffalo/302245.04

LAB DESTINATION COE-Missouri River Division

AMPLE TEAM MEMBERS M. Jank / T Slavik

CARRIER/WAYBILL NO. 1893798546

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.
M86-SS-10	soils rinsate	3/8/89 16:00	~~Filter~~ water	1 gal plastic		
M86-SS-10	soils rinsate	3/8/89 16:00	water	1 liter glass		
M86-SS-10	soils rinsate	3/8/89 16:00	water	2 40ml vials		
M86-SS-11	soil sample/QA split	3/8/89 14:20	soils	1 8oz glass		
M86-SS-11	soil sample/QA split	3/8/89 14:20	soils	1 8oz glass		
M86-SS-11	soil sample/QA split	3/8/89 14:20	soils	2 40ml vials		
M86-SS-12	~~water~~ travel blank	3/8/89	water	2 40ml vials		

pecial Instructions: none

ossible Sample Hazards: None

GNATURES: (Name, Company, Date and Time)

Relinquished By: Mary E. Jank 3/8/89, 21:00

Received By:

Relinquished By:

Received By:

3. Relinquished By:

Received by:

4. Relinquished By:

Received By: [signature] Thomas 3-9-89 Fed 1300

Fed X

TE - To accompany samples
LOW - Field copy

[redacted] CORPORATION

PROJECT NAME	COE Buffalo DERA - ~~Franklin~~ Menomonee Falls	DATE SAMPLES SHIPPED	3/8/89
PROJECT NUMBER	302245.03	LAB DESTINATION	COE - Missouri River Divisio
PROJECT MANAGER	Michael Schwartz	LABORATORY CONTACT	Prim Arora
BILL TO		SEND LAB REPORT TO	~~Same~~
PURCHASE ORDER NO.		DATE REPORT REQUIRED	Standard Turnaround
		PROJECT CONTACT	M. Jank
		PROJECT CONTACT PHONE NO.	(312) 250-7788

C/C Control No. 024812

Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
M86-SS-10	Water	1 liter	H_2SO_4	TPHC	
M86-SS-10	Water	1 liter	HNO_3	Metals	
M86-SS-10	Water	80ml (2 vials)	None	VOA	
M86-SS-11	soil	8oz	None	TPHC	
M86-SS-11	soil	8oz	None	Metals	
M86-SS-11	soil	80ml (2 vials)	None	VOA	
M86-SS-12	~~Water~~ water	80ml (2 vials)	None	VOA	

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.)

Normal ✓ Rush ______ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard ✓ Flammable ______ Skin Irritant ______ Highly Toxic ______ Other ______ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client ______ Disposal by Lab ✓

FOR LAB USE ONLY

Received By ______ Date/Time ______

WHITE - Original, to accompany samples
YELLOW - Field Copy

COOLER RECEIPT FORM

MRD Cooler # 3

PROJECT: Nike Site M-86 Date received: 3-9-89

USE OTHER SIDE OF THIS FORM TO NOTE FURTHER DETAILS CONCERNING CHECK-IN PROBLEMS AND TO SPECIFY AND DESCRIBE ANY ACTION(S) REGARDING THE RESOLUTION(S) OF PROBLEMS. IF SHIPMENT WAS ACCEPTED AND IF REQUESTED, NOTE ON BACK THE ADDRESS WHERE THE EMPTY COOLER WAS RETURNED AND LIKEWISE IF THE SHIPMENT WAS REJECTED.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 3-9-89

by (print) Lisa Thomas (sign) Lisa Thomas

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

If YES, attach & enter carrier & air bill number here: Federal Express 1893798546

2. Were custody seals on outside of cooler? .... YES NO

If YES, how many & where: two (one front, one back)

If YES, enter the following: seal date: 3-8-89, seal name: Theodore M Squik

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO

4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO

5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO

6. Did you sign custody papers in the appropriate place? .... YES ~~NO~~

7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. ~~YES~~ NO

8. Have designated person initial here to acknowledge receipt of cooler: ________ (date) ________

B. LOG-IN PHASE: Date samples were logged-in: 3-9-89 by (all those involved must sign below):

(print) Lisa Thomas (sign) Lisa Thomas

9. Describe packing: peanuts

10. If required, was enough ice used? .... regular ice + blue ice .... YES NO

11. Were all bottles sealed in separate plastic bags? .... YES NO

12. Did all bottles arrive unbroken & in good condition? .... YES NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO

14. Did all bottle labels agree with custody papers? If NO, indicate discrepancies on back. .... YES NO

15. Were correct containers used for the tests indicated? .... YES NO

16. Were correct preservatives used when required? .... YES NO

17. Was a sufficient amount of sample sent for tests indicated? .... YES NO

18. Bubbles absent in VOA vials? If NO, list by QA#: 890309-017 YES NO

19. Was the project manager called and status discussed? If NO, give details on the back of this form. YES NO

20. Who was called? Sophie Baj By whom? Tom Leuschen on (date) 3/13/89

3/17/89

- Outside of cooler stated No Dry Ice. Is contractor using Dry Ice for contractor lab?

- no times or sample analysis indicated on bottle labels. Sample analysis written on soil samples. C-of-C complete

- bottle labels written in maker so smeared when ~~wet~~ wet.

- ~~wet~~ wet soil appears to have leaked into plastic bag of soil sample for TRPH and metals.

- preservatives not stated on bottle labels when applicable.

- bottle label for trip blank states date/time as 3-2-89/1435 whereas C-of-C says 3-8-89/—

MARY JANK
geologist
IT

March 17, 1989

Tom Leuschen, Project Coordinator, 402-444-4318
MRD Laboratory

Sophie Baj, CENCNB-ED-H, 716-876-5454
Project Manager, Buffalo District, 314-263-5526
alternate: Steve Yaksich (major problems only)
Project: Nike Site M-86, Menomonee Falls, Wi

Bottle labels were missing analysis and sampling time.

Preservatives were not stated on bottle labels when applicable.

IT TECHNOLOGY CORPORATION

CHAIN-OF-CUSTODY RECORD

R/A Control No. [illegible]

C/C Control No. 027158

PROJECT NAME/NUMBER Buffalo DERA- Menomonee Falls M-86 302245.03

LAB DESTINATION COE - MRD

SAMPLE TEAM MEMBERS M. Jank / T Slavik

CARRIER/WAYBILL NO. Fed Ex 1893798465

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.
M86-MW-08	Split	4/6/89 14:00	water	(2) 40ml vials		
M86-MW-08	Split	4/6/89 14:00	water	1 liter glass		
M86-MW-08	Split	4/6/89 14:00	water	1 liter plastic		
M86-MW-07	Rinsate	4/6/89 15:30	water	(2) 40ml vials		
M86-MW-07	Rinsate	4/6/89 15:30	water	1 liter glass		
M86-MW-07	Rinsate	4/6/89 15:30	water	1 liter plastic		
M86-MW-09	Travel Blank		water	(2) 40ml vials		

Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: M. Jank / IT / 4/6/89 9:00pm

   Received By:

2. Relinquished By:

   Received By:

3. Relinquished By:

   Received by:

4. Relinquished By: Federal Ex

   Received By: Tanya Stephens 4-7-89

WHITE - To accompany samples
YELLOW - Field copy

IT TECHNOLOGY CORPORATION

CHAIN-OF-CUSTODY RECORD

R/A Control No. 008416

C/C Control No. 027162

PROJECT NAME/NUMBER Buffalo DERA - Menomonee Falls M-36 302245.05 LAB DESTINATION COE-MRD

SAMPLE TEAM MEMBERS M. Jank / T Skweh CARRIER/WAYBILL NO. FedEx

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.
M86-SW-08	Split	4/6 16:15	Water	(2) 40 ml vials		
M86-SW-08	Split	4/6 16:15	Water	1 liter glass		
M86-SW-08	Split	4/6 16:15	Water	1 liter plastic		
~~M86-SW-07~~	~~Rinsate~~		~~Water~~	~~(2) 40 ml vials~~		
~~M86-SW-07~~	~~Rinsate~~		~~Water~~	~~1 liter glass~~		
~~M86-SW-07~~	~~Rinsate~~		~~Water~~	~~1 liter plastic~~		
M86-SW-09	~~[illegible] Blank~~		~~Water~~	~~(2) 40 ml vials~~		

Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: M. Jank, IT, 4/6/89 9:00 pm

   Received By:

2. Relinquished By:

   Received By:

3. Relinquished By:

   Received by:

4. Relinquished By:

   Received By:

WHITE - To accompany samples
YELLOW - Field copy

[redacted] CORPORATION

C/C Control No. 000407 027158

PROJECT NAME	Buffalo DERA - Menomonee FALLS M-86	DATE SAMPLES SHIPPED	4/6/89
PROJECT NUMBER	302245.03	LAB DESTINATION	COE-MRD ~~EPAS Exportek~~
PROJECT MANAGER	George FitzGerald	LABORATORY CONTACT	Prim Arora
BILL TO		SEND LAB REPORT TO	
PURCHASE ORDER NO.		DATE REPORT REQUIRED	Normal Turnaround
		PROJECT CONTACT	MJANK
		PROJECT CONTACT PHONE NO.	(312) 250-7788

Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
M86-MW-08	water	(2) 40ml vials	none	VOA	
M86-MW-08	water	1 liter	H_2SO_4	TPHC	
M86-MW-08	water	1 liter	HNO_3	Metals	
M86-MW-07	water	(2) 40ml vials	none	VOA	
M86-MW-07	water	1 liter	H_2SO_4	TPHC	
M86-MW-07	water	1 liter	HNO_3	Metals	
M86-MW-09	water	(2) 40ml vials	none	VOA	

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.)

Normal ✓ Rush ____ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard ✓ Flammable ____ Skin Irritant ____ Highly Toxic ____ Other ____ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client ____ Disposal by Lab ✓

FOR LAB USE ONLY

Received By ____ Date/Time ____

WHITE - Original, to accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

REQUEST FOR ANALYSIS

R/A Control No. 008416
C/C Control No. 027162

PROJECT NAME	Buffalo DERA - Menomonee Falls M.86	DATE SAMPLES SHIPPED	
PROJECT NUMBER	302245.03	LAB DESTINATION	~~[illegible]~~ COE - MRD
PROJECT MANAGER	George FitzGerald	LABORATORY CONTACT	Prim Arora
BILL TO		SEND LAB REPORT TO	
PURCHASE ORDER NO.		DATE REPORT REQUIRED	Normal Turnaround
		PROJECT CONTACT	M. Jank
		PROJECT CONTACT PHONE NO.	(312) 250-7788

Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
M86-SW-08	water	(2) 40ml	none	VOA	
M86-SW-08	water	1 liter	H_2SO_4	TPHC	
M86-SW-08	water	1 liter	HNO_3	Metals	
~~M86-SW-07~~	~~water~~	~~(2) 40ml~~	~~none~~	~~VOA~~	
~~M86-SW-07~~	~~water~~	~~1 liter~~	~~H_2SO_4~~	~~TPHC~~	
~~M86-SW-07~~	~~water~~	~~1 liter~~	~~HNO_3~~	~~Metals~~	
~~M86-SW-09~~	~~water~~	~~(2) 40ml~~	~~none~~	VOA	

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.)

Normal ✓ Rush ____ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard ✓ Flammable ____ Skin Irritant ____ Highly Toxic ____ Other ____ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client ____ Disposal by Lab ✓

FOR LAB USE ONLY

Received By ____ Date/Time ____

WHITE - Original, accompany samples
YELLOW - Field copy

COOLER RECEIPT FORM

MRD Cooler # 15

PROJECT: Nike Site M-86 Date received: 4-7-89

USE OTHER SIDE OF THIS FORM TO NOTE FURTHER DETAILS CONCERNING CHECK-IN PROBLEMS AND TO SPECIFY AND DESCRIBE ANY ACTION(S) REGARDING THE RESOLUTION(S) OF PROBLEMS. IF SHIPMENT WAS ACCEPTED AND IF REQUESTED, NOTE ON BACK THE ADDRESS WHERE THE EMPTY COOLER WAS RETURNED AND LIKEWISE IF THE SHIPMENT WAS REJECTED.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 4-7-87

by (print) Tanya Stephens / Lisa Thomas (sign) Tanya Stephens / Lisa Thomas

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

If YES, attach & enter carrier & air bill number here: Federal Express 1893798465

2. Were custody seals on outside of cooler? ..evidence tape.......... YES NO

If YES, how many & where: 2 (front & back)

If YES, enter the following: seal date: 4-6-89, seal name: MJ

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO

4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO

5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO

6. Did you sign custody papers in the appropriate place? .... YES NO

7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO

8. Have designated person initial here to acknowledge receipt of cooler: ________(date)________

B. LOG-IN PHASE: Date samples were logged-in: 4-7-89 by (all those involved must sign below):

(print) Tanya Stephens / Lisa Thomas (sign) Tanya Stephens / Lisa Thomas

9. Describe packing: peanuts

10. If required, was enough ice used? ....blue ice.......... YES NO

11. Were all bottles sealed in separate plastic bags? .... YES NO

12. Did all bottles arrive unbroken & in good condition? .... YES NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO

14. Did all bottle labels agree with custody papers? If NO, indicate discrepancies on back. .... YES NO

15. Were correct containers used for the tests indicated? .... YES NO

16. Were correct preservatives used when required? .... YES NO

17. Was a sufficient amount of sample sent for tests indicated? .... YES NO

18. Bubbles absent in VOA vials? If NO, list by QA#: 890407:010 YES NO

19. Was the project manager called and status discussed? If NO, give details on the back of this form. YES NO

20. Who was called? ________ By whom? ________ on (date)________.

CORPORATION

CHAIN-OF-CUSTODY RECORD

C/C Control No. 004575

PROJECT NAME/NUMBER Buffalo DERA - M-86 Menomonee FALLS 302245.03

LAB DESTINATION ODE-MRD

SAMPLE TEAM MEMBERS M. Jank / T. Slavik

CARRIER/WAYBILL NO. FedEX

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.
M86-TK-06	Split	4/7/89 16:00	water	(2) 40ml vials		
M86-TK-06	Split	4/7/89 16:00	water	1 liter glass		
M86-TK-06	Split	4/7/89 16:00	water	1 liter plastic		
M86-TK-05	Rinsate	4/7/89 16:15	water	(2) 40ml vials		
M86-TK-05	Rinsate	4/7/89 16:15	water	1 liter glass		
M86-TK-05	Rinsate	4/7/89 16:15	water	1 liter plastic		
M86-TK-07	Travel Blank	3/2/89	water	(2) 40ml vials		

Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: M. Jank / IT / 4-7-89 / 21:00

   Received By: FEDX

2. Relinquished By:

   Received By:

3. Relinquished By:

   Received by:

4. Relinquished By:

   Received By: [signature] 4/10/89 7:00

WHITE - To accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

2020

CHAIN-OF-CUSTODY RECORD

R/A Control No. 014180

C/C Control No. 009224

PROJECT NAME/NUMBER Buffalo DERA - Menomonee Falls M-86 302245.03

LAB DESTINATION COE - MRD

SAMPLE TEAM MEMBERS M. JANK / T. Slavik

CARRIER/WAYBILL NO. Fed Ex

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.
M86-SW-07	Rinsate	4/7/89 14:15	Water	(2) 40ml vials		
M86-SW-07	Rinsate	4/7/89 14:15	Water	1 Liter glass		
M86-SW-07	Rinsate	4/7/89 14:15	Water	1 Liter plastic		

Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: M E Jank / IT / 4-7-89 / 21:00

   Received By: FED X

2. Relinquished By:

   Received By:

3. Relinquished By:

   Received by:

4. Relinquished By:

   Received By: [signature] 4/10/89 7:00

WHITE - To accomp[...] samples
YELLOW - Field co[...]

CORPORATION REQUEST FOR ANALYSIS

A/A Control No. 008412

C/C Control No. ~~004595~~

PROJECT NAME	Buffalo DERA - Menominee Falls M-86	DATE SAMPLES SHIPPED	4/7/89
PROJECT NUMBER	302245.03	LAB DESTINATION	COE - MRD
PROJECT MANAGER	George Fitz-Gerald	LABORATORY CONTACT	Prem Arora
BILL TO		SEND LAB REPORT TO	
PURCHASE ORDER NO.		DATE REPORT REQUIRED	Normal Turnaround
		PROJECT CONTACT	M. Jank
		PROJECT CONTACT PHONE NO.	(312) 250-7788

Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
M86-TK-06	water	(2) 40ml	none	VOA	
M86-TK-06	water	1 liter	H_2SO_4	TPHC	
M86-TK-06	water	1 liter	HNO_3	Metals	
M86-TK-05	water	(2) 40ml	none	VOA	
M86-TK-05	water	1 liter	H_2SO_4	TPHC	
M86-TK-05	water	1 liter	HNO_3	Metals	
M86-TK-07	water	(2) 40ml	none	VOA	

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.)

Normal ✓ Rush ____ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard ✓ Flammable ____ Skin Irritant ____ Highly Toxic ____ Other ____ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client ____ Disposal by Lab ✓

FOR LAB USE ONLY

Received By ____ Date/Time ____

WHITE - Original, to accompany samples
YELLOW - Field copy

TECHNOLOGY CORPORATION

REQUEST FOR ANALYSIS

C/C Control No. ______

PROJECT NAME	Buffalo DERA - Menomonee Falls m-86	DATE SAMPLES SHIPPED	4-7-89
PROJECT NUMBER	302245.03	LAB DESTINATION	CDE - MRD
PROJECT MANAGER	George Fitz Gerald	LABORATORY CONTACT	Prem Arora
BILL TO		SEND LAB REPORT TO	
PURCHASE ORDER NO.		DATE REPORT REQUIRED	Normal Turnaround
		PROJECT CONTACT	M. Janik
		PROJECT CONTACT PHONE NO.	(312) 250-7788

Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
m86-SW-07	water	(2) 40ml vials	none	VOA	
m86-SW-07	water	1 liter	H_2SO_4	TPHC	
m86-SW-07	water	1 liter	HNO_3	metals	
~~m86-SW-07~~					

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.)

Normal ✓ Rush ______ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard ✓ Flammable ______ Skin Irritant ______ Highly Toxic ______ Other ______ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client ______ Disposal by Lab ✓

FOR LAB USE ONLY

Received By ______ Date/Time ______

WHITE - Original, to accompany samples
YELLOW - Field

B15

COOLER RECEIPT FORM

MRD Cooler # —

PROJECT: M-86 Menomonee Falls Date received: 4-8-89

USE OTHER SIDE OF THIS FORM TO NOTE FURTHER DETAILS CONCERNING CHECK-IN PROBLEMS AND TO SPECIFY AND DESCRIBE ANY ACTION(S) REGARDING THE RESOLUTION(S) OF PROBLEMS. IF SHIPMENT WAS ACCEPTED AND IF REQUESTED, NOTE ON BACK THE ADDRESS WHERE THE EMPTY COOLER WAS RETURNED AND LIKEWISE IF THE SHIPMENT WAS REJECTED.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 4-8-89

by (print) R. D. Kissinger (sign) RD Kissinger
Lisa Thomas Lisa Thomas

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

If YES, attach & enter carrier & air bill number here: FEDERAL EXPRESS 2668460080
CUSTOMER PACKAGE TRACKING NUMBER — PULL UP, PURPLE T

2. Were custody seals on outside of cooler? .... YES NO

If YES, how many & where: 1 front - "Sample" tape. (A)
1 back

If YES, enter the following: seal date: ________, seal name: ________

3. Were custody seals unbroken and intact at the date and time of arrival? See Note (A) .... YES NO

4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO

5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO

6. Did you sign custody papers in the appropriate place? .... YES NO

7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO

8. Have designated person initial here to acknowledge receipt of cooler: ________(date)________

B. LOG-IN PHASE: Date samples were logged-in: 4-10-89 by (all those involved must sign below):

(print) Lisa Thomas / Tanya Stephens / Adalia Asuncion (sign) Lisa Thomas / Tanya Stephens / A. Asuncion

9. Describe packing: peanuts

10. If required, was enough ice used? .... YES NO

11. Were all bottles sealed in separate plastic bags? .... YES NO

12. Did all bottles arrive unbroken & in good condition? .... YES NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO

14. Did all bottle labels agree with custody papers? If NO, indicate discrepancies on back. .... YES NO

15. Were correct containers used for the tests indicated? .... YES NO

16. Were correct preservatives used when required? .... YES NO

17. Was a sufficient amount of sample sent for tests indicated? .... YES NO

18. Bubbles absent in VOA vials? If NO, list by QA#: 890410:001, ~~004~~ -002 8/17/89 YES NO

19. Was the project manager called and status discussed? If NO, give details on the back of this form. YES NO

20. Who was called? ________ By whom? ________ on (date)________

(K) · Seal on back of cooler broken
· Seals not covered with transparent tape

Cooler drain not taped shut

PART C

QUALITY ASSURANCE TEST RESULTS

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0340 SAS No.: 10396_ SDG No.: 16981

SOW No.: _____

EPA Sample No.	Lab Sample ID.
__309012__	16981_____
__309012D_	16981D____
__309015__	16984_____

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:
NIKE_SITE_M-86_
ICP_M.RISK_NB93_PG.53_METHOD_1060__FURNACE_N.LAC_NB93_PG.53_METHOD____
AS7060_SE_7740__COLD_VAPOR_M.COOPER_NB95_PG.27__METHOD_7471_AND_7470__

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: [signature]

Date: 4/12/89

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

309013

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0340 SAS No.: 10396_ SDG No.: 16961_

Matrix (soil/water): WATER Lab Sample ID: 16961______

Level (low/med): ______ Date Received: 03/09/89

% Solids: ______

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_		_		NR
7440-38-2	Arsenic__	3.0_	U		F_
7440-39-3	Barium___	16.5_	U		F_
7440-41-7	Beryllium	0.70_	U		F_
7440-43-9	Cadmium__		_		NR
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	4.1_	U		F_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___		_		NR
7439-89-6	Iron_____	142_	_		F_
7439-92-1	Lead_____	14.2_	U		F_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese	1.2_	U		F_
7439-97-6	Mercury__	0.2_	U		CV
7440-02-0	Nickel___		_		NR
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	3.8_	U		F_
7440-23-5	Sodium___	425_	B		F_
7440-28-0	Thallium_		_		NR
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____		_		NR
	Cyanide__		_		NR

Color Before: ________ Clarity Before: ______ Texture: ______

Color After: ________ Clarity After: ______ Artifacts: ____

Comments:

890309-012___M-86-85-10

U.S. EPA - CLP

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DUPLICATES

EPA SAMPLE NO.

30901ZD

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194

Lab Code: W88   Case No.: WC340   SAS No.: 10396   SDG No.: 16951

Matrix (soil/water): WATER   Level (low/med): ______

% Solids for Sample: ______   % Solids for Duplicate: ______

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic	10.0	3.0000	U	3.0000	U			P
Barium	200.0	16.5000	U	16.5000	U			P
Beryllium	5.0	0.7000	U	0.7000	U			P
Cadmium								NR
Calcium								NR
Chromium	10.0	4.1000	U	4.1000	U			P
Cobalt								NR
Copper								NR
Iron	100.0	142.0000		127.0000		11.2		P
Lead	5.0	14.2000	U	14.2000	U			P
Magnesium								NR
Manganese	15.0	1.2000	U	1.2000	U			P
Mercury								NR
Nickel								NR
Potassium								NR
Selenium	5.0	1.8000	U	1.8000	U			P
Silver	10.0	3.8000	U	3.8000	U			P
Sodium	5000.0	425.0000	B	457.5000	B	7.4		P
Thallium								NR
Vanadium								NR
Zinc								NR
Cyanide								NR

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

309015

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0340 SAS No.: 10396_ SDG No.: 16981_

Matrix (soil/water): SOIL_ Lab Sample ID: 16984_____

Level (low/med): _____ Date Received: 03/09/89

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__	1.3_			F_
7440-39-3	Barium___	18.4_			P_
7440-41-7	Beryllium				NR
7440-43-9	Cadmium__	0.0043_	U		P_
7440-70-2	Calcium__				NR
7440-47-3	Chromium_	3.3_			P_
7440-48-4	Cobalt___				NR
7440-50-8	Copper___				NR
7439-89-6	Iron_____	350_			P_
7439-92-1	Lead_____	3.1_			P_
7439-95-4	Magnesium				NR
7439-96-5	Manganese	39.2_			P_
7439-97-6	Mercury__	0.05			CV
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	0.15_	U		F_
7440-22-4	Silver___	0.0038_	U		P_
7440-23-5	Sodium___	97.2_	B		P_
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: _________ Clarity Before: ______ Texture: ______

Color After: _________ Clarity After: ______ Artifacts: ___

Comments:

890309-015_____M-86-SS-11

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U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W89___   Case No.: WD340   SAS No.: 10396_   SDG No.: 169

Initial Calibration Source: EPA_WP1083__

Continuing Calibration Source: EPA_WP1083__

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	
Aluminum									N
Antimony									N
Arsenic	20.0	21.10	105.5	20.0	20.80	104.0			P
Barium	500.0	463.00	92.6	500.0	448.00	89.6			P
Beryllium									N
Cadmium	500.0	499.00	99.8	500.0	486.00	97.2			P
Calcium									N
Chromium	500.0	513.00	102.6	500.0	513.00	102.6			P
Cobalt									N
Copper									N
Iron									N
Lead	500.0	464.00	92.8	500.0	483.00	96.6			P
Magnesium									N
Manganese	500.0	468.00	93.6	500.0	472.00	94.4			P
Mercury	5.0	5.03	100.6	5.0	4.85	97.0			C
Nickel									NF
Potassium									NF
Selenium	20.0	20.70	103.5	20.0	20.50	102.5			P
Silver	500.0	525.00	105.0	500.0	579.00	115.8			P
Sodium	500.0	589.00	117.8	500.0	553.00	110.6			P
Thallium									NF
Vanadium									NF
Zinc									NF
Cyanide									NF

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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U.S. EPA - CLP

3
BLANKS

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0340 SAS No.: 10396_ SDG No.: 16981_

Preparation Blank Matrix (soil/water): WATER

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	3.0	U	3.0	U					3.000	U	P
Barium	16.5	U	16.5	U					16.500	U	P
Beryllium											NR
Cadmium	4.3	U	4.3	U					4.300	U	P
Calcium											NR
Chromium	4.1	U	4.1	U					4.100	U	P
Cobalt											NR
Copper											NR
Iron	9.4	U	9.4	U					9.400	U	P
Lead	14.2		14.2						14.200		P
Magnesium											NR
Manganese	1.2	U	1.2	U					1.200	U	P
Mercury	0.2	U	0.2	U					0.200	U	CV
Nickel											NR
Potassium											NR
Selenium	1.8	U	1.8	U					1.800	U	P
Silver	3.8	U	3.8	U					3.800	U	P
Sodium	42.2	U	42.2	U					42.200	U	P
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

C7

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 03-21-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-10 (890309-014) EHRT NO.: 16983A

RESULTS (ug/L)

Chloromethane - BDL	Bromomethane - BDL
Vinyl Chloride - BDL	Chloroethane - BDL
Methylene Chloride - BDL	Trichlorofluoromethane - 8.7
1,1-Dichloroethylene - BDL	1,1-Dichloroethane - BDL
1,2-Dichloroethylene - BDL	Chloroform - 5.3
1,2-Dichloroethane - BDL	1,1,1-Trichloroethane - BDL
Carbontetrachloride - BDL	Bromodichloromethane - BDL
1,2-Dichloropropane - BDL	Trans-1,3-Dichloropropene - BDL
Trichloroethylene - BDL	Cis-1,3-Dichloropropene - BDL
Benzene - BDL	Chlorodibromomethane - BDL
1,1,2-Trichloroethane - BDL	2-Chloroethylvinylether - BDL
Bromoform - BDL	1,1,2,2-Tetrachloroethane - BDL
Tetrachloroethylene - BDL	Toluene - BDL
Chlorobenzene - BDL	Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 83.5%
Toluene-d_8 - 98.9%
Bromofluorobenzene - 103.6%

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 03-21-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-10 (890309-014) EHRT NO.: 16983A

RESULTS (ug/L)

Acetone - BDL

Acrylonitrile - BDL

Carbon Disulfide - BDL

1,4-Dichloro-2-Butene - BDL

Ethanol - BDL

2-Hexanone - BDL

4-Methyl-2-Pentanone - BDL

1,2,3-Trichloropropane - BDL

Xylene - BDL

Acrolein - BDL

2-Butanone - BDL

Dibromomethane - BDL

Dichlorodifluoromethane - BDL

Ethylmethacrylate - BDL

Iodomethane - BDL

Styrene - BDL

Vinyl Acetate - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 4/12/89

C C

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER DUPLICATE DATE ANALYZED: 03-22-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-10 (890309-014) EHRT NO.: 16983B

RESULTS (ug/L)

Chloromethane - BDL

Vinyl Chloride - BDL

Methylene Chloride - BDL

1,1-Dichloroethylene - BDL

1,2-Dichloroethylene - BDL

1,2-Dichloroethane - BDL

Carbontetrachloride - BDL

1,2-Dichloropropane - BDL

Trichloroethylene - BDL

Benzene - BDL

1,1,2-Trichloroethane - BDL

Bromoform - BDL

Tetrachloroethylene - BDL

Chlorobenzene - BDL

Bromomethane - BDL

Chloroethane - BDL

Trichlorofluoromethane - 8.2

1,1-Dichloroethane - BDL

Chloroform - 4.9

1,1,1-Trichloroethane - BDL

Bromodichloromethane - BDL

Trans-1,3-Dichloropropene - BDL

Cis-1,3-Dichloropropene - BDL

Chlorodibromomethane - BDL

2-Chloroethylvinylether - BDL

1,1,2,2-Tetrachloroethane - BDL

Toluene - BDL

Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES

1,2-Dichloroethane-d_4 - ----%

Toluene-d_8 - 96.1%

Bromofluorobenzene - 100.9%

C/1

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER DUPLICATE DATE ANALYZED: 03-22-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-10 (890309-014) EHRT NO.: 16983B

RESULTS (ug/L)

Acetone - BDL	Acrolein - BDL
Acrylonitrile - BDL	2-Butanone - BDL
Carbon Disulfide - BDL	Dibromomethane - BDL
1,4-Dichloro-2-Butene - BDL	Dichlorodifluoromethane - BDL
Ethanol - BDL	Ethylmethacrylate - BDL
2-Hexanone - BDL	Iodomethane - BDL
4-Methyl-2-Pentanone - BDL	Styrene - BDL
1,2,3-Trichloropropane - BDL	Vinyl Acetate - BDL
Xylene - BDL	

QUALITY CONTROL OFFICER: [signature]

DATE: 4/12/89

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10396

ANALYSIS PERFORMED: TRPH

ANALYZED: April 4, 1989 METHOD NO.: 9071/418.1

ANALYST: Jim Burns LAB NOTEBOOK NO.: 107

SAMPLE NOS. EHRT NO.	CUSTOMER NO.	STATION LOCATION	MATRIX	RESULTS mg/kg
16984	890309-015	M-86-SS-11	SOIL	BDL

D.L. WATER: 0.5 mg/L SOIL: 20 mg/kg

QUALITY CONTROL OFFICER: [signature]

DATE: 4/13/89

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 03-22-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-11 (890309-016) EHRT NO.: 16985

RESULTS (ug/L)

Chloromethane - BDL
Vinyl Chloride - BDL
Methylene Chloride - BDL
1,1-Dichloroethylene - BDL
1,2-Dichloroethylene - BDL
1,2-Dichloroethane - BDL
Carbontetrachloride - BDL
1,2-Dichloropropane - BDL
Trichloroethylene - BDL
Benzene - BDL
1,1,2-Trichloroethane - BDL
Bromoform - BDL
Tetrachloroethylene - BDL
Chlorobenzene - BDL

Bromomethane - BDL
Chloroethane - BDL
Trichlorofluoromethane - BDL
1,1-Dichloroethane - BDL
Chloroform - BDL
1,1,1-Trichloroethane - BDL
Bromodichloromethane - BDL
Trans-1,3-Dichloropropene - BDL
Cis-1,3-Dichloropropene - BDL
Chlorodibromomethane - BDL
2-Chloroethylvinylether - BDL
1,1,2,2-Tetrachloroethane - BDL
Toluene - BDL
Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 84%
Toluene-d_8 - 103%
Bromofluorobenzene - 102%

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 03-22-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-11 (890309-016) EHRT NO.: 16985

RESULTS (ug/L)

Acetone - BDL

Acrolein - BDL

Acrylonitrile - BDL

2-Butanone - BDL

Carbon Disulfide - BDL

Dibromomethane - BDL

1,4-Dichloro-2-Butene - BDL

Dichlorodifluoromethane - BDL

Ethanol - BDL

Ethylmethacrylate - BDL

2-Hexanone - BDL

Iodomethane - BDL

4-Methyl-2-Pentanone - BDL

Styrene - BDL

1,2,3-Trichloropropane - BDL

Vinyl Acetate - BDL

Xylene - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 4/12/89

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 03-22-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-12 (TRIP BLANK #3) (890309-017) EHRT NO.: 16986

RESULTS (ug/L)

Chloromethane - BDL	Bromomethane - BDL
Vinyl Chloride - BDL	Chloroethane - BDL
Methylene Chloride - BDL	Trichlorofluoromethane - BDL
1,1-Dichloroethylene - BDL	1,1-Dichloroethane - BDL
1,2-Dichloroethylene - BDL	Chloroform - BDL
1,2-Dichloroethane - BDL	1,1,1-Trichloroethane - BDL
Carbontetrachloride - BDL	Bromodichloromethane - BDL
1,2-Dichloropropane - BDL	Trans-1,3-Dichloropropene - BDL
Trichloroethylene - BDL	Cis-1,3-Dichloropropene - BDL
Benzene - BDL	Chlorodibromomethane - BDL
1,1,2-Trichloroethane - BDL	2-Chloroethylvinylether - BDL
Bromoform - BDL	1,1,2,2-Tetrachloroethane - BDL
Tetrachloroethylene - BDL	Toluene - BDL
Chlorobenzene - BDL	Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 76%
Toluene-d_8 - 94%
Bromofluorobenzene - 106%

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ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 340 PROJECT NO.: 10395

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 03-22-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 40

CUSTOMER SAMPLE NO.: M-86-SS-12 (TRIP BLANK #3) (890309-017) EHRT NO.: 16986

RESULTS (ug/L)

Acetone - BDL

Acrolein - BDL

Acrylonitrile - BDL

2-Butanone - BDL

arbon Disulfide - BDL

Dibromomethane - BDL

1,4-Dichloro-2-Butene - BDL

Dichlorodifluoromethane - BDL

Ethanol - BDL

Ethylmethacrylate - BDL

2-Hexanone - BDL

Iodomethane - BDL

4-Methyl-2-Pentanone - BDL

Styrene - BDL

1,2,3-Trichloropropane - BDL

Vinyl Acetate - BDL

Xylene - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 4/12/89

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ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER/SED SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-SW-08 (890407-001) EHRT NO.: 17610

RESULTS (ug/L)

Chloromethane - BDL

Vinyl Chloride - BDL

Methylene Chloride - BDL

1,1-Dichloroethylene - BDL

1,2-Dichloroethylene - BDL

1,2-Dichloroethane - BDL

Carbontetrachloride - BDL

1,2-Dichloropropane - BDL

Trichloroethylene - BDL

Benzene - BDL

1,1,2-Trichloroethane - BDL

Bromoform - BDL

Tetrachloroethylene - BDL

Chlorobenzene - BDL

Bromomethane - BDL

Chloroethane - BDL

Trichlorofluoromethane - 4.9

1,1-Dichloroethane - BDL

Chloroform - BDL

1,1,1-Trichloroetnane - BDL

Bromodichloromethane - BDL

Trans-1,3-Dichloropropene - BDL

Cis-1,3-Dichloropropene - BDL

Chlorodibromomethane - BDL

2-Chloroethylvinylether - BDL

1,1,2,2-Tetrachloroethane - BDL

Toluene - BDL

Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 81%
Toluene-d_8 - 108%
Bromofluorobenzene - 101%

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

STOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER/SED SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-SW-08 (890407-001) EHRT NO.: 17610

RESULTS (ug/L)

Acetone - BDL	Acrolein - BDL
Acrylonitrile - BDL	2-Butanone - BDL
Carbon Disulfide - BDL	Dibromomethane - BDL
1,4-Dichloro-2-Butene - BDL	Dichlorodifluoromethane - BDL
Ethanol - BDL	Ethylmethacrylate - BDL
2-Hexanone - BDL	Iodomethane - BDL
4-Methyl-2-Pentanone - BDL	Styrene - BDL
1,2,3-Trichloropropane - BDL	Vinyl Acetate - BDL
Xylene - BDL	

QUALITY CONTROL OFFICER: Ivan Risk

DATE: 5/12/89

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ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382   PROJECT NO.: 10466

ANALYSIS PERFORMED: TRPH

ANALYZED: April 16, 1989   METHOD NO.: 9071/418.1

ANALYST: Jim Burns   LAB NOTEBOOK NO.: 107

SAMPLE NOS. EHRT NO.	CUSTOMER NO.	STATION LOCATION	MATRIX	RESULTS
17602	890410-003	M86-TK-06	WATER/SED	8.857 mg/L
17605	890410-006	M-86-TK-05	WATER	0.996 mg/L
17608	890410-009	M-86-SW-07	WATER	BDL mg/L
17601	890407-002	M-86-SW-08	WATER/SED	0.646 mg/L
17614	890407-005	M-86-MW-08	WATER/SED	0.550 mg/L
17617	890407-008	M-86-MW-07	WATER	BDL mg/L

Detection Limit for WATER: 0.5 mg/L
Detection Limit for SOIL: 20 mg/kg

QUALITY CONTROL OFFICER: [signature]

DATE: 5 | 12 | 89

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0382 SAS No.: 10466_ SDG No.: 000000

SOW No.: _____

EPA Sample No.	Lab Sample ID.
__407003__	17612_____
__407006__	17615_____
__407009__	17618_____
__410004__	17603_____
__410007__	17606_____
__410010__	17609A____
__410010D_	17609B____
__________	__________
__________	__________
__________	__________
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__________	__________
__________	__________

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:
NIKE_SITE_M-86___DATE_OF_ANALYSIS_APRIL_28,_1989____________________
ICP_G.LUNA_NB110_PG.2_METHOD_6010_FURNACE_N.LAC_NB93_PG.62_METHOD_AS__
7060_SE_7740_COLD_VAPOR_M.COOPER_NB95_PG.30_METHOD_7470_AND_7471______
____

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: [illegible signature]

Date: 5/13/89

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

407003

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0382 SAS No.: 10466_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 17612_____

Level (low/med): _____ Date Received: 04/11/89

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__	3.0_	U		F_
7440-39-3	Barium___	328_			P_
7440-41-7	Beryllium				NR
7440-43-9	Cadmium__	32.2_			P_
7440-70-2	Calcium__				NR
7440-47-3	Chromium_	41.0_			P_
7440-48-4	Cobalt___				NR
7440-50-8	Copper___				NR
7439-89-6	Iron_____	9320_			P_
7439-92-1	Lead_____	1690_			P_
7439-95-4	Magnesium				NR
7439-96-5	Manganese	200_			P_
7439-97-6	Mercury__	0.2_			CV
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	3.8_	U		P_
7440-23-5	Sodium___	5740_			P_
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: _________ Clarity Before: ______ Texture: ______

Color After: _________ Clarity After: ______ Artifacts: ___

Comments:

890407-003__M-86-SW-08

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

407006

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194_____

Lab Code: W88___ Case No.: W0382 SAS No.: 10466_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 17615____

Level (low/med): _____ Date Received: 04/11/89

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__	15.6_			F_
7440-39-3	Barium___	491_			P_
7440-41-7	Beryllium				NR
7440-43-9	Cadmium__	4.3_	U		P_
7440-70-2	Calcium__				NR
7440-47-3	Chromium_	19.4_			P_
7440-48-4	Cobalt___				NR
7440-50-8	Copper___				NR
7439-89-6	Iron_____	68200_			P_
7439-92-1	Lead_____	38.4_			P_
7439-95-4	Magnesium				NR
7439-96-5	Manganese	4320_			P_
7439-97-6	Mercury__	0.2_	U		CV
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	3.8_	U		P_
7440-23-5	Sodium___	10400_			P_
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: ________ Clarity Before: ______ Texture: ______

Color After: ________ Clarity After: ______ Artifacts: ___

Comments:

890407-~~003~~__M-86-MW-08
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JL 8/17/89

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

407009

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194_____

Lab Code: W88__ Case No.: W0382 SAS No.: 10466_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 17618_____

Level (low/med): _____ Date Received: 04/11/89

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__	3.0_	U		F_
7440-39-3	Barium___	16.5_	U		P_
7440-41-7	Beryllium				NR
7440-43-9	Cadmium__	4.3_	U		P_
7440-70-2	Calcium__				NR
7440-47-3	Chromium_	4.1_	U		P_
7440-48-4	Cobalt___				NR
7440-50-8	Copper___				NR
7439-89-6	Iron_____	100_			P_
7439-92-1	Lead_____	14.2_	U		P_
7439-95-4	Magnesium				NR
7439-96-5	Manganese	1.2_	U		P_
7439-97-6	Mercury__	0.2_	U		CV
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	3.8_	U		P_
7440-23-5	Sodium___	199_	B		P_
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc____				NR
	Cyanide__				NR

Color Before: _________ Clarity Before: ______ Texture: ______

Color After: _________ Clarity After: ______ Artifacts: ___

Comments:

890407-009___M-86-MW-07

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

410004

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194_____

Lab Code: W88___ Case No.: W0382 SAS No.: 10466_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 17603_____

Level (low/med): _____ Date Received: 04/11/89

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	_____________	_	______	NR
7440-36-0	Antimony_	_____________	_	______	NR
7440-38-2	Arsenic__	_________3.0_	U	______	F_
7440-39-3	Barium___	________16.5_	U	______	P_
7440-41-7	Beryllium	_____________	_	______	NR
7440-43-9	Cadmium__	_________4.3_	U	______	P_
7440-70-2	Calcium__	_____________	_	______	NR
7440-47-3	Chromium_	_________4.1_	U	______	P_
7440-48-4	Cobalt___	_____________	_	______	NR
7440-50-8	Copper___	_____________	_	______	NR
7439-89-6	Iron_____	_________9.4_	U	______	P_
7439-92-1	Lead_____	________14.2_	U	______	P_
7439-95-4	Magnesium	_____________	_	______	NR
7439-96-5	Manganese	_________1.2_	U	______	P_
7439-97-6	Mercury__	_________0.4_	_	______	CV
7440-02-0	Nickel___	_____________	_	______	NR
7440-09-7	Potassium	_____________	_	______	NR
7782-49-2	Selenium_	_________1.8_	U	______	F_
7440-22-4	Silver___	_________3.8_	U	______	P_
7440-23-5	Sodium___	_________178_	B	______	P_
7440-28-0	Thallium_	_____________	_	______	NR
7440-62-2	Vanadium_	_____________	_	______	NR
7440-66-6	Zinc_____	_____________	_	______	NR
_________	Cyanide__	_____________	_	______	NR
_________	_________	_____________	_	______	__

Color Before: _________ Clarity Before: ______ Texture: ______

Color After: _________ Clarity After: ______ Artifacts: ___

Comments:

890410-004___M_86-TK-06________________________________

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U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

410007

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W88___   Case No.: W0382   SAS No.: 10466_   SDG No.: 000000

Matrix (soil/water): WATER   Lab Sample ID: 17606_____

Level (low/med): _____   Date Received: 04/11/89

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__	3.0_	U		F_
7440-39-3	Barium___	16.5_	U		P_
7440-41-7	Beryllium				NR
7440-43-9	Cadmium__	4.3_	U		P_
7440-70-2	Calcium__				NR
7440-47-3	Chromium_	4.1_	U		P_
7440-48-4	Cobalt___				NR
7440-50-8	Copper___				NR
7439-89-6	Iron_____	13.0_	B		P_
7439-92-1	Lead_____	14.2_	U		P_
7439-95-4	Magnesium				NR
7439-96-5	Manganese	1.2_	U		P_
7439-97-6	Mercury__	0.2_	U		CV
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	3.8_	U		P_
7440-23-5	Sodium___	85.1_	B		P_
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: _________   Clarity Before: ______   Texture: ______

Color After: _________   Clarity After: ______   Artifacts: ___

Comments:

890410-007__M-86-TK-05

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

410010

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W88___   Case No.: W0382   SAS No.: 10466_   SDG No.: 000000

Matrix (soil/water): WATER   Lab Sample ID: 17609A____

Level (low/med): _____   Date Received: 04/11/89

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_				NR
7440-36-0	Antimony_				NR
7440-38-2	Arsenic__	3.0_	U		F_
7440-39-3	Barium___	16.5_	U		P_
7440-41-7	Beryllium				NR
7440-43-9	Cadmium__	4.3_	U		P_
7440-70-2	Calcium__				NR
7440-47-3	Chromium_	4.1_	U		P_
7440-48-4	Cobalt___				NR
7440-50-8	Copper___				NR
7439-89-6	Iron_____	25.4_	B		P_
7439-92-1	Lead_____	14.2_	U		P_
7439-95-4	Magnesium				NR
7439-96-5	Manganese	1.2_	U		P_
7439-97-6	Mercury__	0.2_	U		CV
7440-02-0	Nickel___				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	3.8_	U		P_
7440-23-5	Sodium___	56.0_	B		P_
7440-28-0	Thallium_				NR
7440-62-2	Vanadium_				NR
7440-66-6	Zinc_____				NR
	Cyanide__				NR

Color Before: ________   Clarity Before: ______   Texture: ______

Color After: ________   Clarity After: ______   Artifacts: ___

Comments:

890410-010__M-86-SW-07

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

410010D

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W88___   Case No.: W0382   SAS No.: 10466_   SDG No.: 000000

Matrix (soil/water): WATER   Level (low/med): _____

% Solids for Sample: _____   % Solids for Duplicate: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic	10.0	3.0000	U	3.0000	U			F
Barium	200.0	16.5000	U	16.5000	U			P
Beryllium								NR
Cadmium	5.0	4.3000	U	4.3000	U			P
Calcium								NR
Chromium	10.0	4.1000	U	4.1000	U			P
Cobalt								NR
Copper								NR
Iron	100.0	25.4000	B	18.0000	B	34.1		P
Lead	5.0	14.2000	U	14.2000	U			P
Magnesium								NR
Manganese	15.0	1.2000	U	1.2000	U			P
Mercury	0.2	0.2000	U	0.2000	U			CV
Nickel								NR
Potassium								NR
Selenium	5.0	1.8000	U	1.8000	U			F
Silver	10.0	3.8000	U	3.8000	U			P
Sodium	5000.0	56.0000	B	53.0000	B	5.5		P
Thallium								NR
Vanadium								NR
Zinc								NR
Cyanide								NR

C27

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: Y88___ Case No.: W0382 SAS No.: 10466_ SDG No.: 000000

Initial Calibration Source: EPA_WP1083__

Continuing Calibration Source: EPA_WP1083__

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic	20.0	21.20	106.0	20.0	18.40	92.0			F
Barium	500.0	479.60	95.9	500.0	479.60	95.9			P
Beryllium									NR
Cadmium	500.0	471.90	94.4	500.0	471.90	94.4			P
Calcium									NR
Chromium	500.0	485.20	97.0	500.0	485.20	97.0			P
Cobalt									NR
Copper									NR
Iron	500.0	473.80	94.8	500.0	473.80	94.8			P
Lead	500.0	475.20	95.0	500.0	482.10	96.4			P
Magnesium									NR
Manganese	500.0	477.50	95.5	500.0	487.10	97.4			P
Mercury	5.0	4.68	93.6	5.0	4.72	94.4			CV
Nickel									NR
Potassium									NR
Selenium	20.0	19.60	98.0	20.0	19.50	97.5			F
Silver	50.0	48.10	96.2	50.0	45.90	91.8			P
Sodium	500.0	483.20	96.6	500.0	492.00	98.4			P
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

3
BLANKS

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0382 SAS No.: 10466_ SDG No.: 000000

Preparation Blank Matrix (soil/water): WATER

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	3.0	U	3.0	U					3.000	U	F
Barium	16.5	U	16.5	U					16.500	U	P
Beryllium											NR
Cadmium	4.3	U	4.3	U					4.300	U	P
Calcium											NR
Chromium	4.1	U	4.1	U					4.100	U	P
Cobalt											NR
Copper											NR
Iron	9.4	U	9.4	U					9.400	U	P
Lead	14.2		14.2						14.200		P
Magnesium	34.0	U	34.0	U					34.000	U	P
Manganese											NR
Mercury	0.2	U	0.2	U					0.200	U	CV
Nickel											NR
Potassium											NR
Selenium	1.8	U	1.8	U					1.800	U	F
Silver	3.8	U	3.8	U					3.800	U	P
Sodium	42.2	U	42.2	U					42.200	U	P
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER/SED SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-MW-08 (890407-004) EHRT NO.: 17613

RESULTS (ug/L)

Chloromethane - BDL

Vinyl Chloride - BDL

Methylene Chloride - BDL

1,1-Dichloroethylene - BDL

1,2-Dichloroethylene - BDL

1,2-Dichloroethane - BDL

Carbontetrachloride - BDL

1,2-Dichloropropane - BDL

Trichloroethylene - BDL

Benzene - BDL

1,1,2-Trichloroethane - BDL

Bromoform - BDL

Tetrachloroethylene - BDL

Chlorobenzene - BDL

Bromomethane - BDL

Chloroethane - BDL

Trichlorofluoromethane - 6.4

1,1-Dichloroethane - BDL

Chloroform - BDL

1,1,1-Trichloroetnane - BDL

Bromodichloromethane - BDL

Trans-1,3-Dichloropropene - BDL

Cis-1,3-Dichloropropene - BDL

Chlorodibromomethane - BDL

2-Chloroethylvinylether - BDL

1,1,2,2-Tetrachloroethane - BDL

Toluene - BDL

Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 76%
Toluene-d_8 - 107%
Bromofluorobenzene - 103%

C3

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER/SED SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-MW-08 (890407-004) EHRT NO.: 17613

RESULTS (ug/L)

Acetone - BDL

Acrolein - BDL

Acrylonitrile - BDL

2-Butanone - BDL

Carbon Disulfide - BDL

Dibromomethane - BDL

1,4-Dichloro-2-Butene - BDL

Dichlorodifluoromethane - BDL

Ethanol - BDL

Ethylmethacrylate - BDL

2-Hexanone - BDL

Iodomethane - BDL

4-Methyl-2-Pentanone - BDL

Styrene - BDL

1,2,3-Trichloropropane - BDL

Vinyl Acetate - BDL

Xylene - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 5/12/89

C3

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-MW-07 (890407-007) EHRT NO.: 17616

RESULTS (ug/L)

Chloromethane - BDL	Bromomethane - BDL
Vinyl Chloride - BDL	Chloroethane - BDL
Methylene Chloride - BDL	Trichlorofluoromethane - 4.3
1,1-Dichloroethylene - BDL	1,1-Dichloroethane - BDL
1,2-Dichloroethylene - BDL	Chloroform - BDL
1,2-Dichloroethane - BDL	1,1,1-Trichloroetnane - BDL
Carbontetrachloride - BDL	Bromodichloromethane - BDL
1,2-Dichloropropane - BDL	Trans-1,3-Dichloropropene - BDL
Trichloroethylene - BDL	Cis-1,3-Dichloropropene - BDL
Benzene - BDL	Chlorodibromomethane - BDL
1,1,2-Trichloroethane - BDL	2-Chloroethylvinylether - BDL
Bromoform - BDL	1,1,2,2-Tetrachloroethane - BDL
Tetrachloroethylene - BDL	Toluene - BDL
Chlorobenzene - BDL	Ethylbenzene - 1.1

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 80%
Toluene-d_8 - 108%
Bromofluorobenzene - 103%

C3?

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-MW-07 (890407-007) EHRT NO.: 17616

RESULTS (ug/L)

Acetone - BDL

Acrylonitrile - BDL

Carbon Disulfide - BDL

1,4-Dichloro-2-Butene - BDL

Ethanol - BDL

2-Hexanone - BDL

4-Methyl-2-Pentanone - BDL

1,2,3-Trichloropropane - BDL

Xylene - BDL

Acrolein - BDL

2-Butanone - BDL

Dibromomethane - BDL

Dichlorodifluoromethane - BDL

Ethylmethacrylate - BDL

Iodomethane - BDL

Styrene - BDL

Vinyl Acetate - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 5/12/89

C

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-MW-09 (890407-010) EHRT NO.: 17619

RESULTS (ug/L)

Chloromethane - BDL	Bromomethane - BDL
Vinyl Chloride - BDL	Chloroethane - BDL
Methylene Chloride - BDL	Trichlorofluoromethane - 2.0
1,1-Dichloroethylene - BDL	1,1-Dichloroethane - BDL
1,2-Dichloroethylene - BDL	Chloroform - BDL
1,2-Dichloroethane - BDL	1,1,1-Trichloroetnane - BDL
Carbontetrachloride - BDL	Bromodichloromethane - BDL
1,2-Dichloropropane - BDL	Trans-1,3-Dichloropropene - BDL
Trichloroethylene - BDL	Cis-1,3-Dichloropropene - BDL
Benzene - BDL	Chlorodibromomethane - BDL
1,1,2-Trichloroethane - BDL	2-Chloroethylvinylether - BDL
Bromoform - BDL	1,1,2,2-Tetrachloroethane - BDL
Tetrachloroethylene - BDL	Toluene - BDL
Chlorobenzene - BDL	Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 78%
Toluene-d_8 - 105%
Bromofluorobenzene - 100%

C

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 05-09-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 96, Pg. 13

CUSTOMER SAMPLE NO.: M-86-MW-09 (890407-010) EHRT NO.: 17619

RESULTS (ug/L)

Acetone - BDL

Acrylonitrile - BDL

Carbon Disulfide - BDL

1,4-Dichloro-2-Butene - BDL

Ethanol - BDL

2-Hexanone - BDL

4-Methyl-2-Pentanone - BDL

1,2,3-Trichloropropane - BDL

Xylene - BDL

Acrolein - BDL

2-Butanone - BDL

Dibromomethane - BDL

Dichlorodifluoromethane - BDL

Ethylmethacrylate - BDL

Iodomethane - BDL

Styrene - BDL

Vinyl Acetate - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 5/12/89

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 04-27-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 41

CUSTOMER SAMPLE NO.: M86-TK-07 (890410-001) EHRT NO.: 17600

RESULTS (ug/L)

Chloromethane - BDL	Bromomethane - BDL
Vinyl Chloride - BDL	Chloroethane - BDL
Methylene Chloride - BDL	Trichlorofluoromethane - 1.8
1,1-Dichloroethylene - BDL	1,1-Dichloroethane - BDL
1,2-Dichloroethylene - BDL	Chloroform - BDL
1,2-Dichloroethane - BDL	1,1,1-Trichloroetnane - BDL
Carbontetrachloride - BDL	Bromodichloromethane - BDL
1,2-Dichloropropane - BDL	Trans-1,3-Dichloropropene - BDL
Trichloroethylene - BDL	Cis-1,3-Dichloropropene - BDL
Benzene - BDL	Chlorodibromomethane - BDL
1,1,2-Trichloroethane - BDL	2-Chloroethylvinylether - BDL
Bromoform - BDL	1,1,2,2-Tetrachloroethane - BDL
Tetrachloroethylene - BDL	Toluene - BDL
Chlorobenzene - BDL	Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 86%
Toluene-d_8 - 102%
Bromofluorobenzene - 101%

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 04-27-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 41

CUSTOMER SAMPLE NO.: M86-TK-07 (890410-001) EHRT NO.: 17600

RESULTS (ug/L)

Acetone - BDL

Acrylonitrile - BDL

Carbon Disulfide - BDL

1,4-Dichloro-2-Butene - BDL

Ethanol - BDL

2-Hexanone - BDL

4-Methyl-2-Pentanone - BDL

1,2,3-Trichloropropane - BDL

Xylene - BDL

Acrolein - BDL

2-Butanone - BDL

Dibromomethane - BDL

Dichlorodifluoromethane - BDL

Ethylmethacrylate - BDL

Iodomethane - BDL

Styrene - BDL

Vinyl Acetate - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 5/12/89

COMPUTER SEARCH

HEXANE - APPROX 16 ug/L

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER/SED SAMPLE* DATE ANALYZED: 04-24-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 41

CUSTOMER SAMPLE NO.: M86-TK-06 (890410-002) EHRT NO.: 17601

RESULTS (ug/L)

Chloromethane - BDL
Vinyl Chloride - BDL
Methylene Chloride - BDL
1,1-Dichloroethylene - BDL
1,2-Dichloroethylene - BDL
1,2-Dichloroethane - BDL
Carbontetrachloride - BDL
1,2-Dichloropropane - BDL
Trichloroethylene - BDL
Benzene - BDL
1,1,2-Trichloroethane - BDL
Bromoform - BDL
Tetrachloroethylene - BDL
Chlorobenzene - BDL
Bromomethane - BDL
Chloroethane - BDL
Trichlorofluoromethane - BDL
1,1-Dichloroethane - BDL
Chloroform - BDL
1,1,1-Trichloroetnane - BDL
Bromodichloromethane - BDL
Trans-1,3-Dichloropropene - BDL
Cis-1,3-Dichloropropene - BDL
Chlorodibromomethane - BDL
2-Chloroethylvinylether - BDL
1,1,2,2-Tetrachloroethane - BDL
Toluene - 5,300
Ethylbenzene - 60,000

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 104%
Toluene-d_8 - 108%
Bromofluorobenzene - 106%

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ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER/SED SAMPLE* DATE ANALYZED: 04-24-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 41

CUSTOMER SAMPLE NO.: M86-TK-06 (890410-002) EHRT NO.: 17601

RESULTS (ug/L)

Acetone - BDL

Acrylonitrile - BDL

Carbon Disulfide - BDL

1,4-Dichloro-2-Butene - BDL

Ethanol - BDL

2-Hexanone - BDL

4-Methyl-2-Pentanone - BDL

1,2,3-Trichloropropane - BDL

Xylene - 330,000

Acrolein - BDL

2-Butanone - BDL

Dibromomethane - BDL

Dichlorodifluoromethane - BDL

Ethylmethacrylate - BDL

Iodomethane - BDL

Styrene - BDL

Vinyl Acetate - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 5/12/89

*DETECTION LIMIT RAISED 1,000X DUE TO SAMPLE DILUTION.

COMPUTER SEARCH

Methyl pentadiene - approx. 9,000 ug/L

Ethyl cyclohexane - approx. 48,000 ug/L

Butyl cyclooctane - approx. 240,000 ug/L

Methyl ethyl cyclohexane - approx. 160,000 ug/L

Dimethyl cyclohexanone - approx. 240,000 ug/L

Tetramethyl cyclohexane - approx. 1,000,000 ug/L

1697

C40

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 04-27-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 41

CUSTOMER SAMPLE NO.: M-86-TK-05 (890410-005) EHRT NO.: 17604

RESULTS (ug/L)

Chloromethane - BDL	Bromomethane - BDL
Vinyl Chloride - BDL	Chloroethane - BDL
Methylene Chloride - BDL	Trichlorofluoromethane - 9.7
1,1-Dichloroethylene - BDL	1,1-Dichloroethane - BDL
1,2-Dichloroethylene - BDL	Chloroform - BDL
1,2-Dichloroethane - BDL	1,1,1-Trichloroetnane - BDL
Carbontetrachloride - BDL	Bromodichloromethane - BDL
1,2-Dichloropropane - BDL	Trans-1,3-Dichloropropene - BDL
Trichloroethylene - BDL	Cis-1,3-Dichloropropene - BDL
Benzene - BDL	Chlorodibromomethane - BDL
1,1,2-Trichloroethane - BDL	2-Chloroethylvinylether - BDL
Bromoform - BDL	1,1,2,2-Tetrachloroethane - BDL
Tetrachloroethylene - BDL	Toluene - BDL
Chlorobenzene - BDL	Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 87%
Toluene-d_8 - 104%
Bromofluorobenzene - 108%

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ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 04-27-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 41

CUSTOMER SAMPLE NO.: M-86-TK-05 (890410-005) EHRT NO.: 17604

RESULTS (ug/L)

Acetone - BDL

Acrylonitrile - BDL

Carbon Disulfide - BDL

1,4-Dichloro-2-Butene - BDL

Ethanol - BDL

2-Hexanone - BDL

4-Methyl-2-Pentanone - BDL

1,2,3-Trichloropropane - BDL

Xylene - BDL

Acrolein - BDL

2-Butanone - BDL

Dibromomethane - BDL

Dichlorodifluoromethane - BDL

Ethylmethacrylate - BDL

Iodomethane - BDL

Styrene - BDL

Vinyl Acetate - BDL

QUALITY CONTROL OFFICER: [signature]

DATE: 5/12/89

C4·

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

WORK ORDER NO.: 382 PROJECT NO.: 10466

SAMPLE TYPE: WATER SAMPLE DATE ANALYZED: 04-24-89

ANALYSIS PERFORMED: Volatile Organics Analysis METHOD NO.: EPA 8240

ANALYST: J. Tobler LAB NOTEBOOK NO.: 98, Pg. 41

CUSTOMER SAMPLE NO.: M-86-SW-07 (890410-008) EHRT NO.: 17607

RESULTS (ug/L)

Chloromethane - BDL	Bromomethane - BDL
Vinyl Chloride - BDL	Chloroethane - BDL
Methylene Chloride - BDL	Trichlorofluoromethane - 3.2
1,1-Dichloroethylene - BDL	1,1-Dichloroethane - BDL
1,2-Dichloroethylene - BDL	Chloroform - BDL
1,2-Dichloroethane - BDL	1,1,1-Trichloroetnane - BDL
Carbontetrachloride - BDL	Bromodichloromethane - BDL
1,2-Dichloropropane - BDL	Trans-1,3-Dichloropropene - BDL
Trichloroethylene - BDL	Cis-1,3-Dichloropropene - BDL
Benzene - BDL	Chlorodibromomethane - BDL
1,1,2-Trichloroethane - BDL	2-Chloroethylvinylether - BDL
Bromoform - BDL	1,1,2,2-Tetrachloroethane - 2.7
Tetrachloroethylene - BDL	Toluene - BDL
Chlorobenzene - BDL	Ethylbenzene - BDL

SURROGATE STANDARDS - % RECOVERIES
1,2-Dichloroethane-d_4 - 113%
Toluene-d_8 - 95%
Bromofluorobenzene - 106%

C4

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: NIKE SITE M-86 - DR. JOE SOLSKY

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CUSTOMER SAMPLE NO.: M-86-SW-07 (890410-008) EHRT NO.: 17607

RESULTS (ug/L)

Acetone - BDL

Acrylonitrile - BDL

Carbon Disulfide - BDL

1,4-Dichloro-2-Butene - BDL

Ethanol - BDL

2-Hexanone - BDL

4-Methyl-2-Pentanone - BDL

1,2,3-Trichloropropane - BDL

Xylene - BDL

Acrolein - BDL

2-Butanone - BDL

Dibromomethane - BDL

Dichlorodifluoromethane - BDL

Ethylmethacrylate - BDL

Iodomethane - BDL

Styrene - BDL

Vinyl Acetate - BDL

QUALITY CONTROL OFFICER: Jane Risk

DATE: 5/12/89

PART D

SAMPLE QUALITY CONTROL INFORMATION

D

VOLATILE ORGANICS DETECTION LIMITS

	METHOD 624 WATER (ug/L)	METHOD 8240 SOIL (ug/kg)
Chloromethane -	10.0	10.0
Bromomethane -	2.0	2.0
Vinyl Chloride -	10.0	10.0
Chloroethane -	5.0	5.0
Methylene Chloride -	2.0	2.0
Trichlorofluoromethane -	1.0	1.0
1,1-Dichloroethylene -	2.0	2.0
1,1-Dichloroethane -	1.0	1.0
Trans-1,2-Dichloroethylene -	2.0	2.0
Chloroform -	1.0	1.0
1,2-Dichloroethane -	2.0	2.0
1,1,1-Trichloroethane -	1.0	1.0
Carbontetrachloride -	1.0	1.0
Bromodichloromethane -	1.0	1.0
1,2-Dichloropropane -	5.0	5.0
Trans-1,3-Dichloropropene -	1.0	1.0
Trichloroethylene -	2.0	2.0
Cis-1,3-Dichloropropene -	1.0	1.0
Benzene -	1.0	1.0
Chlorodibromomethane -	2.0	2.0
1,1,2-Trichloroethane -	5.0	5.0
2-Chloroethylvinylether -	5.0	5.0
Bromoform -	2.0	2.0
1,1,2,2-Tetrachloroethane -	2.0	2.0

D

VOLATILE ORGANICS - CONTINUED

Tetrachloroethylene -	2.0	2.0
Toluene -	2.0	2.0
Chlorobenzene -	2.0	2.0
Ethylbenzene -	2.0	2.0
Styrene -	2.0	2.0
Xylene -	2.0	2.0

WAUKESHA CO.

FID# 268328940

FORMER NIKE Battery M-86
N84 W20260 MENOMONEE AVE.

MENOMONEE FALLS

Site Screening Worksheet

Answering yes to any of the questions below indicates the site has a high potential of causing or threatening to cause environmental pollution (mark yes in Box V. on form 4430-4).

1. Evidence (attributable to site) of groundwater within 1200 feet exceeding a preventive action limit (PAL) for any substance of public health concern or public welfare concern listed in ss. NR 140.10 and 140.12. — Yes [X] No []

2. Evidence (attributable to site) of surface water within 1200 feet exceeding water quality standards contained in chs. NR 102, 103 and 104. — Yes [] No []

3. Evidence (attributable to site) of air within 1200 feet exceeding air quality standards contained in chs. NR 400 to 499. — Yes [] No []

4. Qualitative analysis of: Size of site, depth to groundwater, surface and underlying soils, distance to nearest private or public water supply, population within ¼ mile, type or characteristics and volume of waste, proximity to protected natural resources or environments, or any other appropriate factors. Some examples:

   a. Waste disposal area is less than 5 acres and nearest water supply used for human consumption is within 600 feet.

   b. Waste disposal area is between 5 and 10 acres and nearest water supply used for human consumption is within 1200 feet.

   c. There is insufficient (less than 5 feet) confining layer of silt or clay separating the bottom of the site from bedrock or groundwater table.

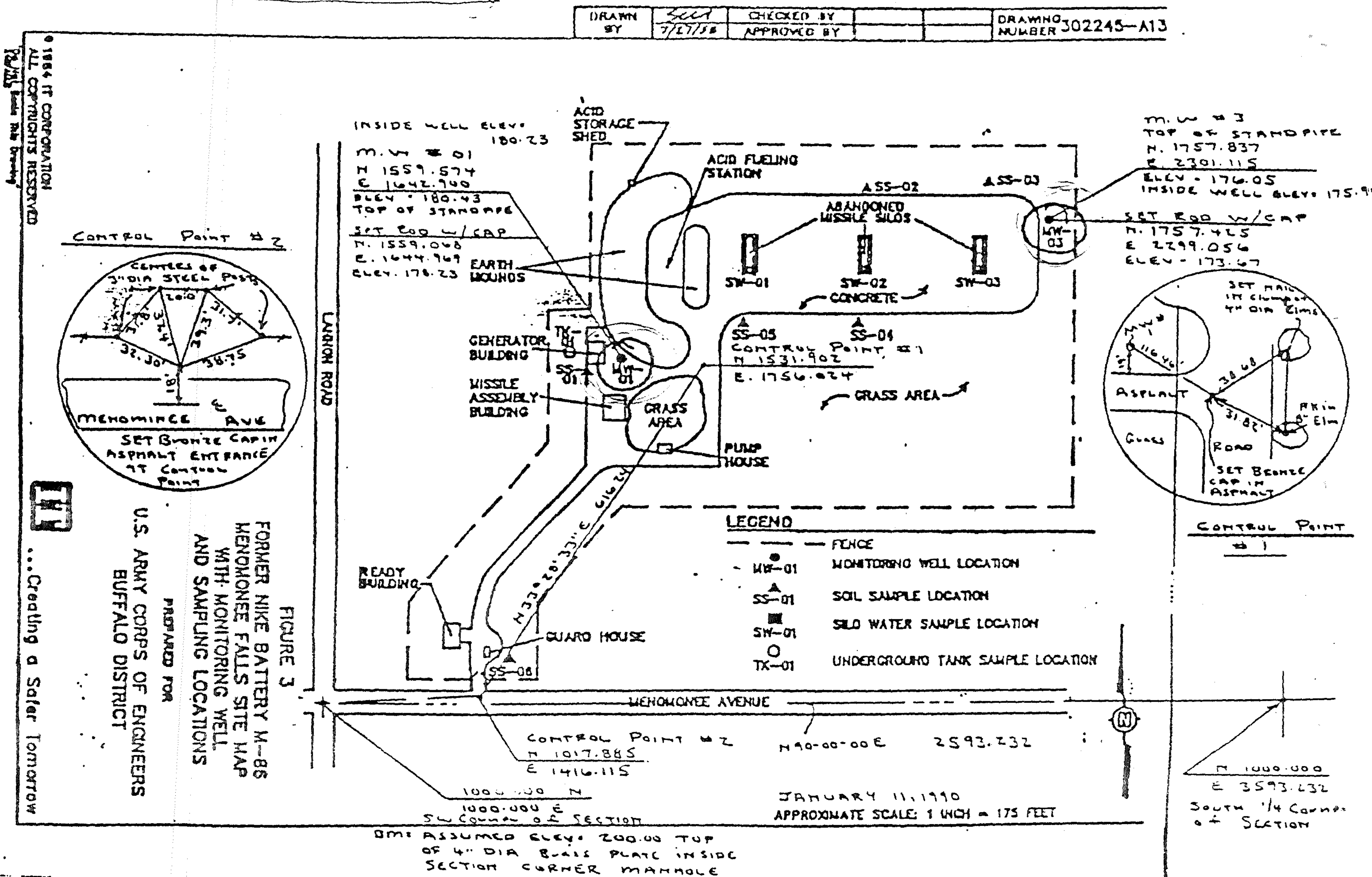
   d. There is a significant amount of hazardous material at the site.

   e. There is a protected natural resource or environment nearby.

Based on the above, is there a reason to believe the environment and/or public health is at risk of contamination at this site? — Yes [X] No [] Unknown []

If Yes, then site shall be classified High Potential under ss.144.442 or ss.144.76. Unanticipated environmental consequences at a landfill fall under ss.144.442. Most other significant releases of hazardous materials fall under 144.76. — ss.144.442 [] ss.144.76 [X]

Underground water flow



DRAFT

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91

Date Collected: 09/25/91

Parameter		ARDL No: 6008-5 Customer No: SW-03	Method	Notation
Arsenic	(Total)	<0.0030	7060	
	(Dissolved)	<0.0030	7060	
Barium 1 mg/l .2 mg/l	(Total)	0.15	6010	
	(Dissolved)	0.26	6010	
Cadmium 10 1	(Total)	<0.0050	6010	
	(Dissolved)	<0.0050	6010	ok
Chromium 50 5	(Total)	<0.010 2X P.L	6010	ok
	(Dissolved)	<0.010	6010	
Copper 1 mg/l .3 mg/l	(Total)	<0.025	6010	
	(Dissolved)	<0.025	6010	
Iron .3 mg/l .15 mg/l	(Total)	0.38	6010	
	(Dissolved)	0.080	6010	
Lead 50 5	(Total)	<0.060	6010	
	(Dissolved)	<0.060	6010	
Manganese .05 mg/l .025 mg/l	(Total)	0.083	6010	
	(Dissolved)	0.034	6010	
Mercury 2 2	(Total)	<0.00020	7470	
	(Dissolved)	<0.00020	7470	
Nickel	(Total)	<0.040	6010	
	(Dissolved)	<0.040	6010	
Selenium 10 1	(Total)	<0.0030 3X P.L	7740	
	(Dissolved)	<0.0030	7740	
Silver 50	(Total)	<0.010	6010	
	(Dissolved)	<0.010	6010	
Sodium	(Total)	8.1	6010	
	(Dissolved)	9.2	6010	
Zinc 5 mg/l 2.5 mg/l	(Total)	0.049	6010	
	(Dissolved)	0.023	6010	
TRPH		<0.20	418.1	

DRAFT

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 — Date Collected: 09/25/91

Parameter	MCL	ARDL No: / Customer No:	6008-1 MW-01 (well #1)	6008-2 MW-03 (well #3)	Method	Notation
Arsenic	0.05	(Total)	0.015	0.037	7060	
		(Dissolved)	<0.0030	0.014	7060	
Barium	1.0	(Total)	0.33	0.29	6010	
		(Dissolved)	0.28	0.35	6010	
Cadmium	0.01	(Total)	<0.0050	0.0090	6010	
		(Dissolved)	<0.0050	<0.0050	6010	OK
Chromium	0.05	(Total)	0.036	0.062	6010	
		(Dissolved)	<0.010	<0.010	6010	OK
Copper	—	(Total)	0.063	0.14	6010	
		(Dissolved)	<0.025	<0.025	6010	
Iron	0.30	(Total)	37	60	6010	
		(Dissolved)	<0.050	5.4	6010	
Lead	0.05	(Total)	0.078	<0.060	~~6010~~ 7421	will retest
		(Dissolved)	<0.060	<0.060	~~6010~~ 7421	
Manganese	0.05	(Total)	4.0	2.7	6010	
		(Dissolved)	0.61	<0.015	6010	
Mercury	.002	(Total)	0.00034	0.00027	7470	
		(Dissolved)	<0.00020	<0.00020	7470	
Nickel	—	(Total)	0.060	0.076	6010	
		(Dissolved)	<0.040	<0.040	6010	
Selenium	.010	(Total)	<0.0030	<0.0030	7740	
		(Dissolved)	<0.0030	<0.0030	7740	
Silver	0.05	(Total)	<0.010	<0.010	6010	
		(Dissolved)	<0.010	<0.010	6010	
Sodium	—	(Total)	13	3.6	6010	
		(Dissolved)	12	4.6	6010	
Zinc	—	(Total)	0.21	0.24	6010	
		(Dissolved)	0.087	0.063	6010	

naturally occurring

DRAFT

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L

Project Name: MEN FALLS, WI

Date Samples Received: 09/28/91 Date Collected: 09/25/91

Parameter	ES	PAL	ARDL No: / Customer No:	6008-3 SW-01	6008-4 SW-02	Method	Notation
Arsenic	5	5	(Total)	<0.0030	<0.0030	7060	.00005
			(Dissolved)	<0.0030	<0.0030	7060	
Barium	1mg/L	.2mg/L	(Total)	0.064	0.19	6010	
			(Dissolved)	0.18	0.31	6010	
Cadmium	10	1	(Total)	<0.0050	<0.0050	6010	.00001
			(Dissolved)	<0.0050	<0.0050	6010	OK
Chromium	50	5	(Total)	<0.010	<0.010	6010	.000005
			(Dissolved)	<0.010	<0.010	6010	OK.
Copper	1mg/L	.5mg/L	(Total)	<0.025	<0.025	6010	
			(Dissolved)	<0.025	<0.025	6010	
Iron	.3mg/L	.15mg/L	(Total)	0.31	0.57	6010	
			(Dissolved)	<0.050	0.050	6010	
Lead	50	5	(Total)	<0.060	<0.060	6010	.000005
			(Dissolved)	<0.060	<0.060	6010	
Manganese	.05mg/L	.025mg/L	(Total)	0.058	0.075	6010	
			(Dissolved)	0.030	0.031	6010	
Mercury	2	2	(Total)	<0.00020	<0.00020	7470	.000002
			(Dissolved)	<0.00020	<0.00020	7470	
Nickel			(Total)	<0.040	<0.040	6010	
			(Dissolved)	<0.040	<0.040	6010	
Selenium	10	1	(Total)	<0.0030	<0.0030	7740	.00001
			(Dissolved)	<0.0030	<0.0030	7740	
Silver	50	10	(Total)	<0.010	<0.010	6010	
			(Dissolved)	<0.010	<0.010	6010	
Sodium			(Total)	5.1	6.6	6010	
			(Dissolved)	5.3	6.4	6010	

~~Zinc~~ 5mg/L 2.5 mg/L

Tax Key # MNFU 030.995

U.S. Army Corps Of Engineers
Essayons
Buffalo District 1857

FROM: (NAME) Sophie Baj
(OFFICE SYMBOL) NCBCO-HQ
(TELEPHONE NO.) 716-879-4271
RELEASER'S SIGNATURE S. Yudrich

TO: (NAME) Tom Kells
(OFFICE SYMBOL) ——
(TELEPHONE NO.) ~~414~~ 414-782-3144

NUMBER OF PAGES 2
PRECEDENCE
DATE: 12/19/91

SUBJECT:

NCB 897-R, FEB 91

MENOMONEE FALLS, WI

Date: 12/18/91

ANALYSIS RESULTS
CONTRACT NO: DACW49-D-0003
US ARMY ENGINEER DISTRICT, BUFFALO, NEW YORK

ARDL REPORT: 6008
UNITS: mg/L (ppm).

Sample ID No.	Lab ID No.	Total Lead	Dissolved Lead
MW-01	6008-1	0.017	<0.0020
	6008-1 Duplicate	0.016	<0.0020
	(%RPD)	6.1%	Not calculable
	6008-1 Spike	0.023	0.0061
	% Recovery	30%	30%
MW-03	6008-2	0.026	<0.0020
SW-01	6008-3	0.0032	<0.0020
SW-02	6008-1	0.0044	<0.0020
SW-03	6008-5	0.0051	<0.0020
	Laboratory Control Sample	0.0096	Not applicable - no digestion
	% Recovery	96%	