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FINAL
PHASE II DATA ADDENDUM
SITE 3-4
NEMAGON SPILL AREA
VERSION 3.1

DTIC G

October 1988
Contract No. DAAK11-84-D-0017
TASK NO. 20 - Lower Lakes

EBASCO SERVICES INCORPORATED

R. L. Stollar and Associates
California Analytical Laboratories, Inc.
DataChem, Inc. Geraghty & Miller, Inc.

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ROCKY MOUNTAIN ARSENAL

FINAL
PHASE II DATA ADDENDUM
SITE 3-4
NEMAGON SPILL AREA
VERSION 3.1

DTIC QUALITY INSPECTED 5

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Prepared for:

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR
ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP

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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 <u>PHASE II PROGRAM</u>	1
2.0 <u>PHASE II FIELD OBSERVATIONS</u>	2
3.0 <u>PHASE II GEOPHYSICAL EXPLORATION</u>	2
4.0 <u>PHASE II ANALYTE LEVELS AND DISTRIBUTION</u>	2
5.0 <u>REFERENCES CITED</u>	12

Appendix 3-4-II-A Chemical Names and Abbreviations

Appendix 3-4-II-B Phase II Chemical Data

LIST OF TABLES

<u>Table</u>		<u>Page</u>
3-4-II-1	Summary of Analytical results for Site 3-4, Phase II. . . .	3
3-4-II-2	Results of Phase II Field Study	4
3-4-II-3	Tentative Identification of Nontarget Compounds, Phase II .	7

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
3-4-II-1	Phase I and Phase II Analytes Detected Within or Above Indicator Levels	9
3-4-II-1b	Phase I and Phase II Analytes Detected Within or Above Indicator Levels - Rail Line Area	10

1.0 PHASE II PROGRAM

Due to the detection of benzene, carbon tetrachloride, tetrachloroethylene, and a number of tentatively identified nontarget compounds at Site 3-4 during the Phase I contamination assessment, and the discovery of detectable levels of dibromochloropropane during the PETREX soil gas program (Ebasco, 1988/RIC 88076R04), a Phase II program was initiated at Site 3-4 in the spring of 1988. The Phase II program was generally conducted as presented in the Phase I Contamination Assessment Report (CAR). Boring locations, depths, and number of samples were as planned in the Phase I program, except at Borings 31, 33, 34, and 37 where poor recovery after the 0 to 1 feet (ft) sample was collected necessitated that the borings be relocated in order to enable the collection of samples at deeper intervals. Boring 31 was moved 0.3 ft south and Borings 33 and 34 each were moved 0.5 ft south so that the 4 to 5 ft intervals could be sampled. The 2 to 3 ft sample for Boring 37 was collected at a location 0.5 north of the original borehole. A total of ten borings, three to 3 ft, four to 5 ft, and three to 8 ft, were drilled and sampled, yielding 23 samples.

Prior to any Phase II drilling, the Program Manager's Office, Ebasco, Morrison-Knudsen Engineers (MKE), and R.L. Stollar and Associates formulated procedures for MKE to obtain subsamples from selected soil cores during Phase II drilling. MKE did not subsample any borings for Site 4-3.

Analytes and analytical methods were generally as planned in the Phase I program. Selected samples (see Table 3-4-II-2, Section 4.0 of this report) were analyzed by gas chromatography/electron capture detector (GCECD) for dibromochloropropane (8 samples), by gas chromatography/mass spectrometry (GC/MS) for semivolatile target organics (6 samples), by gas chromatography/photoionization detector (GCPID) for volatile aromatic organic compounds (9 samples), and gas chromatography/conductivity detector (GCCON) for volatile halogenated organic compounds (9 samples). One sample was analyzed for volatile target organics by the GC/MS method. This method can also detect nontarget analytes. Gas chromatography/mass spectroscopy confirmation analysis was also requested for one of the samples (rather than

two, as originally planned). Appendix 3-4-II-A presents a complete list of all analytical methods and target analytes used in the Phase I and Phase II programs; methods and analytes were chosen from the list for use at this site.

2.0 PHASE II FIELD OBSERVATIONS

There were no appreciable changes at the site since the Phase I program was conducted in the fall of 1987. No new field observations were noted at the time of Phase II drilling.

In situ air monitoring was conducted during drilling operations for safety purposes using a photoionization detector (HNU) and an organic vapor analyzer (OVA). No OVA reading above background was detected, nor were any HNU readings recorded above background level. The results of the volatile organic readings down the borings at the sampled depths are presented in Table 3-4-II-2, Section 4.0 of this report.

The history of this site did not indicate a need for use of an M8 alarm or M18A2 test kit. No unexploded ordnance, buried metal, or other objects were detected during drilling. Drilling difficulties were encountered at all ten borings due to trains occupying and moving along the tracks, between which borings were to be drilled. No unusual coloring or staining of the core samples was noted.

3.0 GEOPHYSICAL EXPLORATION

No geophysical survey was conducted at Site 3-4 during Phase II drilling because historical data indicated that the presence of unexploded ordnance, buried metal, or any other object was highly unlikely.

4.0 PHASE II ANALYTE LEVELS AND DISTRIBUTION

The number of samples containing each analyte, the concentration range, median, mean, standard deviation, detection limit, and indicator level are listed in Table 3-4-II-1. The results of geologic field observations, air monitoring during drilling, and the chemical analysis of each soil sample are summarized in Table 3-4-II-2. Table 3-4-II-3 lists the boring number, sample interval depth, relative retention time (shown as "unknown number" on the

Table 3-4-II-1. Summary of Analytical Results for Site 3-4, Phase II. Page 1 of 1.

Constituent Detected	Number of Samples*	Range	Median**	Mean**	Concentration (ug/g)		DataChem Detection Limit	CAL Detection Limit	Indicator Level
					Standard Deviation**	Standard Deviation**			
<u>Volatile Organic Compounds (N=1)</u>									
None detected									
<u>Volatile Aromatic Organics (N=9)</u>									
None detected									
<u>Volatile Halogenated Organics (N=9)</u>									
None detected									
<u>Semivolatile Organic Compounds (N=6)</u>									
Aldrin	1	2	-	-	-	0.3	0.3	0.3	DL
Dieldrin	2	0.5-7	-	-	-	0.3	0.3	0.3	DL
Dibromochloropropane (N=8)	2	0.38-1.3	-	-	-	0.0050	0.014	0.014	DL

DL - The indicator level is the detection limit for DataChem and CAL Laboratories, as appropriate
 N - Number of samples analyzed
 * - Number of samples in which constituent was detected; only these sample results were used in statistical analyses
 ** - Median, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples
 *** - Laboratory not certified for analytical method

Table 3-4-II-2. Results of Phase II Field Study. Page 1 of 3.

Depth (feet)	Boring 28			Boring 29			Boring 30		
	2-3	4-5	7-8	2-3	4-5	7-8	2-3	4-5	7-8
Geologic Material	Sand w/Clay trace Gravel	Clayey Sand	Gravelly Sand	Clayey Sand trace Gravel	Clayey Sand	Sand w/Clay trace Gravel	Clayey Sand w/Gravel	Sand w/Gravel	Clayey Sand
Percent FinesVO	10	15	0	10	20	10	30	0	35

AIR MONITORING

Volatile Organic Readings (ppm)

HNu*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
OVA*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD

SOIL CHEMISTRY

Volatile Organic Compounds (ug/g)

	NA	NA	NA	NA	NA	NA	NA	BDL	NA
--	----	----	----	----	----	----	----	-----	----

Volatile Aromatic Organics (ug/g)

	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
--	-----	-----	-----	-----	-----	-----	-----	-----	-----

Volatile Halogenated Organics (ug/g)

	BDL	BDL	BDL	BDL	**BDL	BDL	BDL	BDL	BDL
--	-----	-----	-----	-----	-------	-----	-----	-----	-----

Semivolatile Organics (ug/g)

Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA

Dibromochloropropane (ug/g)

	NA	NA	NA	NA	NA	NA	NA	NA	NA
--	----	----	----	----	----	----	----	----	----

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

** - Phase II method confirmed by gas chromatography/mass spectrometry (GC/MS)

Table 3-4-II-2. Results of Phase II Field Study. Page 2 of 3.

Depth (feet)	Boring 31		Boring 32		Boring 33		Boring 34	
	0-1	4-5	0-1	4-5	0-1	4-5	0-1	4-5
Geologic Material	Sand	Clayey Sand	Sand	Sand	Sand w/Gravel	Sand	Sand w/Gravel/Clayey Sand	Sand
Percent Fines/VO	0/15	10	0	0	0	0	0/25	0

AIR MONITORING

Volatile Organic Readings (ppm)

HNu*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
OVA*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD

SOIL CHEMISTRY

<u>Volatile Organic Compounds (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA
<u>Volatile Aromatic Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA
<u>Volatile Halogenated Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA
<u>Semivolatile Organics (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA
<u>Dibromochloropropane (ug/g)</u>	1.3	BDL	BDL	BDL	BDL	BDL	0.38	BDL

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

11/3/88

Table 3-4-II-2. Results of Phase II Field Study. Page 3 of 3.

Depth (feet)	Boring 35		Boring 36		Boring 37	
	0-1	2-3	0-1	2-3	0-1	2-3
Geologic Material	Sand	Clayey Sand	Sand trace Gravel	Clayey Sand	Sand trace Grav	Clayey Sand w/Silt
Percent Fines VO	0	20	0	30	0	25
AIR MONITORING						
<u>Volatle Organic Readings (ppm)</u>						
HNu*	BKD	BKD	BKD	BKD	BKD	BKI
OVA*	BKD	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY						
<u>Volatle Organic Compounds (ug/g)</u>						
	NA	NA	NA	NA	NA	NA
<u>Volatle Aromatic Organics (ug/g)</u>						
	NA	NA	NA	NA	NA	NA
<u>Volatle Halogenated Organics (ug/g)</u>						
	NA	NA	NA	NA	NA	NA
<u>Semivolatle Organics (ug/g)</u>						
Aldrin	BDL	BDL	BDL	BDL	2	BDL
Dieldrin	BDL	BDL	BDL	BDL	7	0.5
<u>Dibromochloropropane (ug/g)</u>						
	NA	NA	NA	NA	NA	NA

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

11/3/88

Table 3-4-11-3. Summary of Analytical Results for Site 3-4, Phase II, Page 1 of 1.

Constituent Detected	Number of Samples	Range	Concentration (ug/g)				DataChem Detection Limit	CAL Detection Limit	Indicator Level
			Median**	Mean**	Standard Deviation**				
<u>Volatile Organic Compounds (N=1)</u>									
None detected									
<u>Volatile Aromatic Organics (N=9)</u>									
None detected									
<u>Volatile Halogenated Organics (N=9)</u>									
None detected									
<u>Semivolatile Organics (N=6)</u>									
Aldrin	1	2	-	-	-	0.30	0.30	DL	
Dieldrin	2	0.5-7	-	-	-	0.30	0.30	DL	
Dibromochloropropane (N=8)	2	1.3-0.38	-	-	-	0.0050	0.0140	DL	

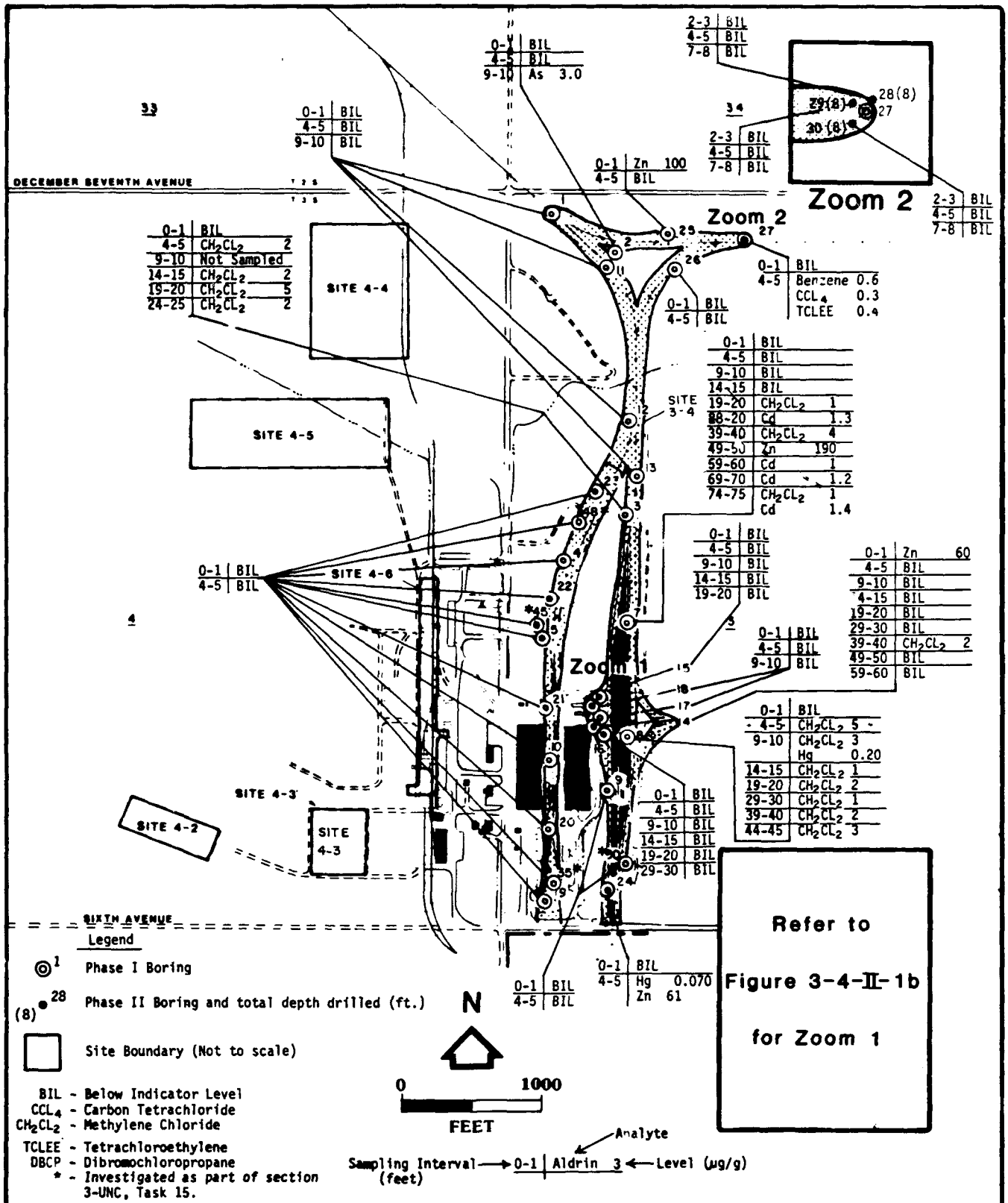
DL - The indicator level is the detection limit for DataChem and CAL Laboratories, as appropriate
 N - Number of samples analyzed
 * - Number of samples in which constituent was detected; only these sample results were used in statistical analyses
 ** - Medium, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples

table), concentration, sample number, lot, best-fit identification, and comments for those nontarget compounds detected by GC/MS analysis of samples from Site 3-4. A tabulation of all analytical data associated with the Phase II program is presented in Appendix 3-4-II-B.

To assess the significance of the metal and organic analytical values, indicator ranges were established during the Phase I program. For organic compounds, the indicator level is the method detection limit. For metals, a range of values was chosen to reflect the upper end of the expected natural range for each metal as normally found in RMA alluvial soil. The procedure for establishing indicator ranges is presented in the Introduction to the Contamination Assessment Reports (ESE, 1987/RIC 88204R02).

Samples from the Phase II borings were analyzed for semivolatile and volatile target organics, volatile aromatic organics, volatile halogenated organics, and dibromochloropropane. Figures 3-4-II-1 and 1b, which show the locations of the borings as drilled, illustrates the analytes detected within or above their indicator levels. Aldrin, dieldrin, and dibromochloropropane were detected in the samples from Site 3-4 (Figures 3-4-II-1 and 1b). For purposes of comparison, the analytes detected within or above their indicator levels during the Phase I program are also presented in Figures 3-4-II-1 and 1b. At Site 3-4, both Phase I and Phase II programs used the same methods of analysis and detection limits for dibromochloropropane and volatile and semivolatile organics, so the resulting data are directly comparable; however, volatile aromatic and volatile halogenated organics were analyzed by more sensitive method in the Phase II program, enabling detection of these compounds at lower concentrations than by the GC/MS method. Low concentrations of the nontarget compounds, hexadecanoic acid and octadecene were tentatively identified in Borings 30, 35, 36, and 37 (Table 3-4-II-3). It should be noted that methylene chloride was also detected in the blanks at a concentration above its indicator level (2.0 ug/g for DataChem).

The data reporting procedures as described in the Laboratory Quality Assurance Plan, RMA (Ebasco, 1985/RIC 86241R02) required that all analyses on a sample be completed within the sample's respective holding time, and that analytical results be corrected for percent recovery and moisture content.



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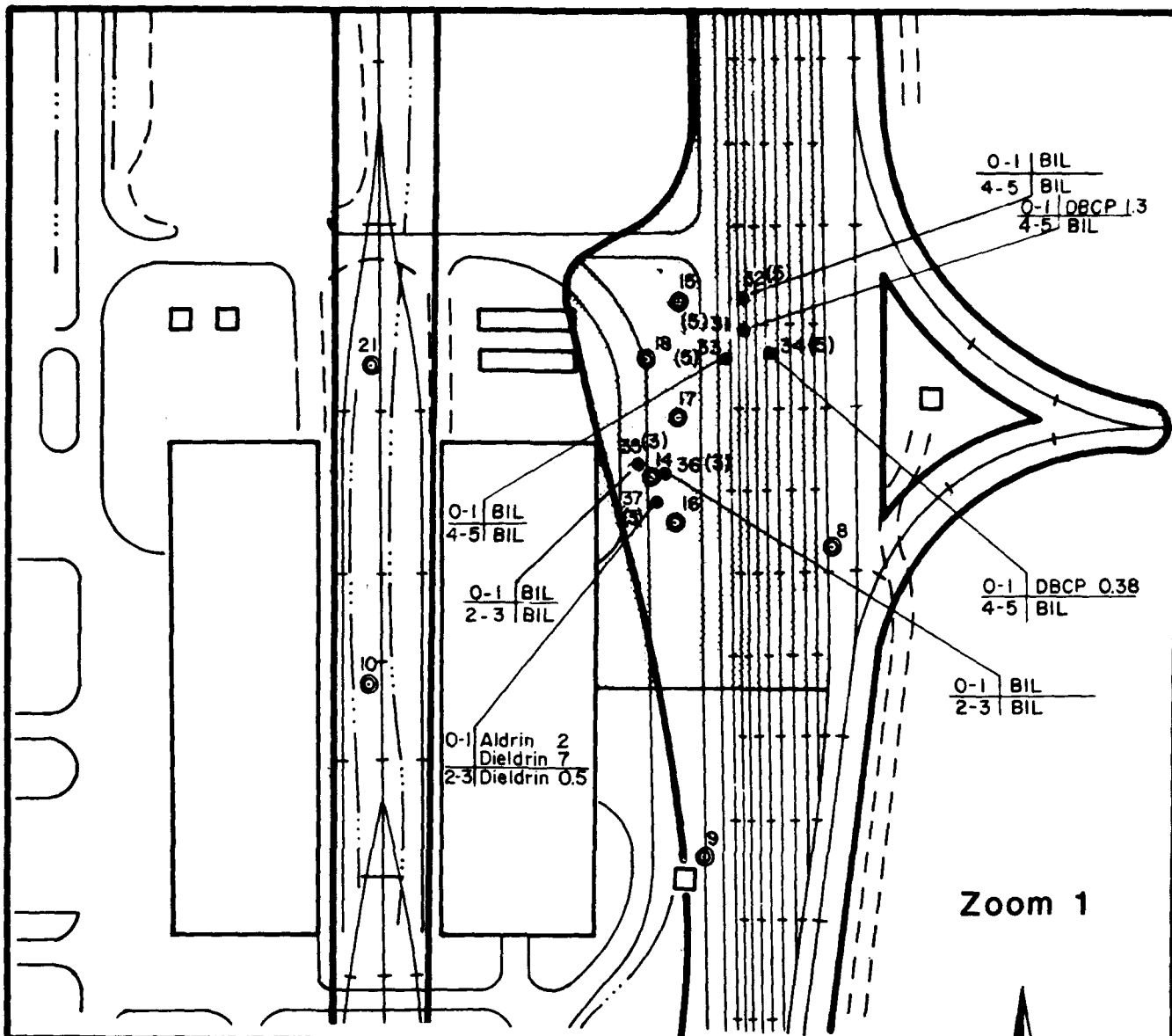
Program Manager's Office for
 Rocky Mountain Arsenal Cleanup
 Aberdeen Proving Ground, Maryland

Drafted: 9/29/88

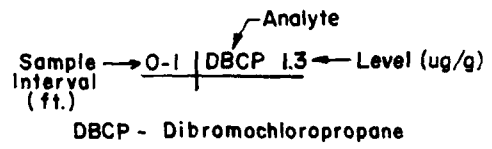
Figure 3-4-II-1
Phase I and Phase II
Analytes Detected Within or Above
Indicator Levels

Rocky Mountain Arsenal, Task 20

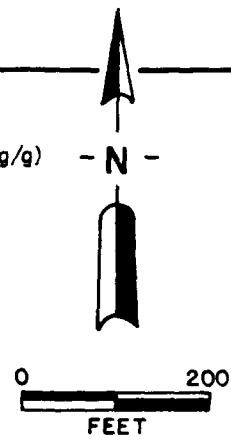
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- ⁸ Phase I Borings
- ³⁶ Phase II Boring and total depth drilled (ft)
- BIL Below Indicator Level



▣ Phase II Site Boundary
(Limits of DBCP Soil Gas Study Area)



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 Program Manager's Office for
 Rocky Mountain Arsenal Cleanup
 Aberdeen Proving Ground, Maryland

Revised: 11/3/88

FIGURE 3-4-II-1b
Phase I and Phase II
Analytes Detected Within or Above
Indicator Levels - Rail Line Area
 Rocky Mountain Arsenal, Task 20
 Prepared by: Ebasco Services Incorporated

During routine sample analysis, analytical results must have either fallen within or have been diluted within the certified range, provided that holding times had not expired.

During laboratory certification, an analytical method was tested over a certain concentration range to determine the certified range. A typical tested concentration range would have been 0, 0.5x, 1.0x, 2.0x, 5.0x, and 10.0x, where x was the Target Reporting Limit (TRL). The Certified Reporting Limit (CRL) was determined by comparing the target and actual concentrations of the tested range. The upper certified range was the highest target concentration achieved.

If a sample analysis indicated that the sample was not diluted adequately to be within the certified range, the result was reported as greater than the upper certified range times any dilution factors. If a sample had exceeded its holding time and the result was greater than the certified range, the result was reported as greater than the upper certified range. If holding times were exceeded in attempting to dilute the sample until all results were within the certified range, results that were not identified above the certified range, but that may have been present at concentrations above the certified detection limit times the dilution factor.

The results of the Phase II sampling program at Site 3-4 are analyzed as part of the overall data analysis for the Western Study Area Report.

5.0 REFERENCES CITED

RIC 86241R02

Ebasco (Ebasco Services Incorporated). 1985, August. Rocky Mountain Arsenal Procedures Manual to Technical Plan. Contract No. DAAK11-84-D-0017.

RIC 88076R04

Ebasco. 1988, March. Final Phase I Contamination Assessment Report; Site 3-4, Nemagon Spill Area, Version 3.2; Task 7. Contract No. DAAK11-84-D-0017.

RIC 88204R02

ESE (Environmental Science and Engineering). 1987. Introduction to the Contamination Assessment Reports. RMA. Prepared for PMO for Rocky Mountain Arsenal Contamination Cleanup.

Appendix 3-4 - II-A

**Chemical Names
and
Abbreviations**

APPENDIX 3-4-II-A
Chemical Names and Abbreviations

Analytic Methods

Abbreviations

Atomic Absorption Spectroscopy	AA
Gas Chromatography/Conductivity Detector	GCCON
Gas Chromatography/Electron Capture Detector	GCECD
Gas Chromatography/Flame Ionization Detector	GCFID
Gas Chromatography/Flame Photometric Detector	GCFPD
Gas Chromatography/Mass Spectrometry	GCMS
Gas Chromatography/Nitrogen Phosphorous Detector	GCNPD
Gas Chromatography/Photoionization Detector	GCPID
High Performance Liquid Chromatography	HPLC
Inductive Coupled Argon Plasma Screen	ICP
Ion Chromatography	IONCHROM
Spectrophotometry	SPECT

PHASE I ANALYTES AND CERTIFIED METHODS
SOIL SAMPLES

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u>		
Chloroacetic acid	Chloroacetic acid	TDG
Thiodiglycol	Thiodiglycol (TDG)	CLC2A TDGCL
<u>AGENT PRODUCTS/IONCHROM</u>		
Isopropylmethylphosphonic acid	Isopropylmethylphosphonate	GBDF IMPA
<u>ANIONS/IONCHROM</u>		
Chloride	Chloride	<u>ANIONS</u> CL
Fluoride	Fluoride	FL
Sulfate	Sulfate	SO4
<u>ARSENIC/AA</u>	Arsenic	AS
<u>DIBROMOCHLOROPROPANE/GCECD</u>	Dibromochloropropane	DBCP
<u>HYDRAZINES/SPECT</u>		
Hydrazine	Hydrazine	HYD
Methylhydrazine	Methylhydrazine	HYDRZ MHYDRZ
Unsymmetrical dimethyl hydrazine	Unsymmetrical dimethyl hydrazine	UDMH
<u>MERCURY/AA</u>	Mercury	HG

APPENDIX 3-4-II-A (Continued)
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>METALS/ICP</u>		
Cadmium	Cadmium	ICP CD
Chromium	Chromium	CR
Copper	Copper	CU
Lead	Lead	PB
Zinc	Zinc	ZN
<u>ORGANONITROGEN COMPOUNDS/GCNPD</u>		
n-Nitrosodimethylamine	n-Nitrosodimethylamine	ONC NNDMEA
n-Nitrosodi-n-propylamine	n-Nitrosodi-n-propylamine	NNDNPA
<u>ORGANOPHOSPHOROUS COMPOUNDS/GCFPD</u>		
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	OPC DIMP
Dimethylmethyl phosphonate	Dimethylmethyl phosphate	DMMP
<u>SEMIVOLATILE ORGANIC COMPOUNDS/ GCMS</u>		
1,4-Oxathiane	1,4-Oxathiane	SVO OXAT
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	PPDDE
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	PPDDT
Aldrin	Aldrin	ALDRN
Atrazine	Atrazine	ATZ
Chlordane	Chlordane	CLDAN
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CPMS
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMSO2
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dieldrin	Dieldrin	DLDRN
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DMMP*
Dithiane	Dithiane	DITH
Endrin	Endrin	ENDRN
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	CL6CP
Isodrin	Isodrin	ISODR
Malathion	Malathion	MLTHN
Parathion	Parathion	PRTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl-diethyl phosphates	SUPONA
Vapona	Vapona	DDVP

* DMMP is certified as part of the semivolatile organic compound method only for Hittman-Ebasco Laboratory.

APPENDIX 3-4-II-A (Continued)
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
VOLATILE ORGANIC COMPOUNDS/ GCMS		
1,1-Dichloroethane	1,1-Dichloroethane	VO 11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Benzene	Benzene	C6H6
Bicycloheptadiene	Bicycloheptadiene	BCHPD
Carbon tetrachloride	Carbon tetrachloride	CCL4
Chlorobenzene	Chlorobenzene	CLC6H5
Chloroform	Chloroform	CHCL3
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dimethyldisulfide	Dimethyldisulfide	DMDS
Ethylbenzene	Ethylbenzene	ETC6H5
m-Xylene	m-Xylene	13DMB
Methylene chloride	Methylene chloride	CH2CL2
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
o- and p-Xylene	Ortho- & Para-xylene	XYLEN
Tetrachloroethylene	Tetrachloroethene	TCLEE
Toluene	Toluene	MEC6H5
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethene	12DCE
Trichloroethylene	Trichloroethene	TRCLE

APPENDIX 3-4-II-A
Phase II

PHASE II ANALYTES AND CERTIFIED METHODS
SOIL SAMPLES

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u> (Same as Phase I)		<u>TDG</u>
<u>AGENT PRODUCTS/IONCHROM</u> (Same as Phase I)		<u>GBDP</u>
<u>ANIONS/IONCHROM</u> (Same as Phase I)		<u>ANIONS</u>
<u>ARSENIC/AA</u>	Arsenic	<u>AS</u>
<u>DIBROMOCHLOROPROPANE/GC</u>	Dibromochloropropane	<u>DBCP</u>
<u>HYDRAZINES/SPECT</u> (Same as Phase I)		<u>HYD</u>
<u>MERCURY/AA</u>	Mercury	<u>HG</u>
<u>METALS/ICP</u> (Same as Phase I)		<u>ICP</u>
<u>ORGANOCHLORINE PESTICIDES/GCECD</u>		<u>OCP</u>
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	<u>PPDDE</u>
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	<u>PPDDT</u>
Aldrin	Aldrin	<u>ALDRN</u>
Chlordane	Chlordane	<u>CLDAN</u>
Dieldrin	Dieldrin	<u>DLDRN</u>
Endrin	Endrin	<u>ENDRN</u>
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	<u>CL6CP</u>
Isodrin	Isodrin	<u>ISODR</u>
<u>ORGANONITROGEN COMPOUNDS/GCNPD</u> (Same as Phase I)		<u>ONC</u>
<u>ORGANOPHOSPHOROUS COMPOUNDS/GCFPD</u> (Same as Phase I)		<u>OPC</u>

APPENDIX 3-4-II-A (Continued)
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>ORGANOPHOSPHORUS PESTICIDES/ GCNPD</u>		
Atrazine	Atrazine	OPP
Malathion	Malathion	ATZ
Parathion	Parathion	MLTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl diethyl phosphates	PRTHN
Vapona	Vapona	SUPONA
		DDVP
<u>ORGANOSULPHUR COMPOUNDS/GCFPD</u>		
1,4-Oxathiane	1,4-Oxathiane	OSC
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	OXAT
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO2
Dimethyldisulfide	Dimethyldisulfide	CPMSO
Dithiane	Dithiane	DMDS
		DITH
<u>SEMIVOLATILE ORGANIC COMPOUNDS/ GCMS</u>		
(Same as Phase I)		SVQ
<u>VOLATILE AROMATIC ORGANIC COMPOUNDS/GCPID</u>		
Benzene	Benzene	VAO
Ethylbenzene	Ethylbenzene	C6H6
m-Xylene	m-Xylene	ETC6H5
o- and p-Xylene	Ortho- & Para-xylene	13DMB
Toluene	Toluene	XYLEN
		MEC6H5
<u>VOLATILE HALOGENATED ORGANIC COMPOUNDS/GCCON</u>		
1,1-Dichloroethane	1,1-Dichloroethane	VHO
1,2-Dichloroethane	1,2-Dichloroethane	11DCLE
1,1-Dichloroethene	1,1-Dichloroethene	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	11DCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	111TCE
Carbon tetrachloride	Carbon tetrachloride	112TCE
Chlorobenzene	Chlorobenzene	CCL4
Chloroform	Chloroform	CLC6H5
Methylene chloride	Methylene chloride	CHCL3
Tetrachloroethylene	Tetrachloroethene	CH2CL2
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethene	TCLEE
Trichloroethylene	Trichloroethene	T12DCE
		TRCLE

APPENDIX 3-4-II-A (Continued)
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>VOLATILE HYDROCARBON COMPOUNDS/ GCFID</u>		
Bicycloheptadiene	Bicycloheptadiene	HYDCBN
Dicyclopentadiene	Dicyclopentadiene	BCHPD
Methylisobutyl ketone	Methylisobutyl ketone	DCPD
		MIBK
<u>VOLATILE ORGANIC COMPOUNDS/GCMS</u> (Same as Phase I)		VO

Appendix 3- 4- II-B
Phase II Chemical Data

APPENDIX 3-4-II-B
Phase II Chemical Data

The analytical results of the laboratory analysis of soil samples collected as part of the program comprise the first part of Appendix 3-2/3-3-II-A. Data are listed sequentially by boring number and successive depths below the surface. Within each depth, all analytes for which the samples were tested are listed alphabetically. Results are given as less than (LT) the detection limit for the test laboratory, or as detected concentrations above this limit. Based on the accuracy of laboratory test methods, values for GC/MS volatile and GC/MS semivolatile compounds are considered accurate to one significant figure; values for analytes detected by all other methods used in this program are considered accurate to two significant figures.

The second part of Appendix 3-2/3-3-II-A contains data from the blanks associated with the analytical work. Blanks for the soil samples were based on a homogenized subsample of composited samples from a known uncontaminated soil that is stratigraphically similar to the RMA soils. Blanks for the water samples were based on distilled water. Control samples, or blanks, are introduced into the train of environmental samples to function as monitors on the performance of the analytical method. These samples function as quality control (QC) samples, and are an integral part of the quality assurance (QA) program for the project. The method blanks listed in this Appendix were utilized to verify that the laboratory was not a source of sample contamination. If contamination were detected in a method blank, corrective actions would have been taken to assure that reported concentrations of target analytes reflected sample analytes, and not analytes introduced by the laboratory process.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

03/20/88

Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0028	2-3	Soil	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND005
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND005
			1,1-Dichloroethane	LT 2.40 -1	ug/g	DND005
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND005
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND005
			m-Xylene	LT 2.60 -1	ug/g	DNC005
			Benzene	LT 8.50 -2	ug/g	DNC005
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND005
			Methylene Chloride	LT 3.70 0	ug/g	DND005
			Chloroform	LT 6.80 -2	ug/g	DND005
			Chlorobenzene	LT 2.00 -1	ug/g	DND005
			Ethylbenzene	LT 1.60 -1	ug/g	DNC005
			Toluene	LT 1.90 -1	ug/g	DNC005
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND005
Tetrachloroethene	LT 2.70 -1	ug/g	DND005			
0028	4-5	Soil	Trichloroethene	LT 1.40 -1	ug/g	DND005
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC005
			1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND006
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND006
			1,1-Dichloroethane	LT 2.40 -1	ug/g	DND006
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND006
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND006
			m-Xylene	LT 2.60 -1	ug/g	DNC006
			Benzene	LT 8.50 -2	ug/g	DNC006
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND006
			Methylene Chloride	LT 3.70 0	ug/g	DND006
			Chloroform	LT 6.80 -2	ug/g	DND006
			Chlorobenzene	LT 2.00 -1	ug/g	DND006
			Ethylbenzene	LT 1.60 -1	ug/g	DNC006
Toluene	LT 1.90 -1	ug/g	DNC006			
Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND006			
Tetrachloroethene	LT 2.70 -1	ug/g	DND006			
Trichloroethene	LT 1.40 -1	ug/g	DND006			

Notes: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated Rocky Mountain Arsenal Program

Summary of Analytical Results Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0028	4-5	Soil	Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC006
0028	7-8	Soil	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND007
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND007
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND007
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND007
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND007
			m-Xylene	LT 2.60 -1	ug/g	DNC007
			Benzene	LT 8.50 -2	ug/g	DNC007
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND007
			Methylene Chloride	LT 3.70 0	ug/g	DND007
			Chloroform	LT 6.80 -2	ug/g	DND007
0029	2-3	Soil	Chlorobenzene	LT 2.00 -1	ug/g	DND007
			Ethylbenzene	LT 1.60 -1	ug/g	DNC007
			Toluene	LT 1.90 -1	ug/g	DNC007
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND007
			Tetrachloroethene	LT 2.70 -1	ug/g	DND007
			Trichloroethene	LT 1.40 -1	ug/g	DND007
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC007
			1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND008
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND008
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND008
0029	2-3	Soil	1,1-Dichloroethane	LT 7.40 -2	ug/g	DND008
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND008
			m-Xylene	LT 2.60 -1	ug/g	DNC008
			Benzene	LT 8.50 -2	ug/g	DNC008
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND008
			Methylene Chloride	LT 3.70 0	ug/g	DND008
			Chloroform	LT 6.80 -2	ug/g	DND008
			Chlorobenzene	LT 2.00 -1	ug/g	DND008
			Ethylbenzene	LT 1.60 -1	ug/g	DNC008
			Toluene	LT 1.90 -1	ug/g	DNC008
0029	2-3	Soil	Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND008
			Tetrachloroethene	LT 2.70 -1	ug/g	DND008

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Task 20, Site 3-4, Phase Two, Nemagon Spill Area

09/20/08

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0029	2-3	Soil	Trichloroethene Ortho- & Para-Xylene	LT 1.40	-1	DND008
				LT 3.90	-1	DNC008
0029	4-5	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80	-2	DND009
				LT 2.60	-1	DND009
				LT 2.40	-1	DND009
				LT 7.40	-2	DND009
				LT 8.50	-2	DND009
				LT 2.60	-1	DNC009
0029	7-8	Soil	m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethene Tetrachloroethene Trichloroethene Ortho- & Para-Xylene 1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethane m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethene	LT 8.50	-2	DNC009
				LT 1.20	-1	DND009
				LT 3.70	0	DND009
				LT 6.80	-2	DND009
				LT 2.00	-1	DND009
				LT 1.60	-1	DNC009
				LT 1.90	-1	DNC009
				LT 2.60	-1	DND009
				LT 2.70	-1	DND009
				LT 1.40	-1	DND009
LT 3.90	-1	DNC009				
0029	7-8	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethane m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethene	LT 8.80	-2	DND010
				LT 2.60	-1	DND010
				LT 2.40	-1	DND010
				LT 7.40	-2	DND010
				LT 8.50	-2	DND010
				LT 2.60	-1	DNC010
				LT 8.50	-2	DNC010
				LT 1.20	-1	DND010
				LT 3.70	0	DND010
				LT 6.80	-2	DND010
LT 2.00	-1	DND010				
LT 1.60	-1	DNC010				
LT 1.90	-1	DNC010				
LT 2.60	-1	DND010				

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0029	7-8	Soil	Tetrachloroethene	LT 2.70 -1	ug/g	DND010
			Trichloroethene	LT 1.40 -1	ug/g	DND010
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC010
0030	2-3	Soil	1,1,1-Trichloroethane	LT 6.80 -2	ug/g	DND011
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND011
			1,1-Dichloroethane	LT 2.40 -1	ug/g	DND011
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND011
			1,2-Dichloroethane	LT 6.50 -2	ug/g	DND011
			m-Xylene	LT 2.60 -1	ug/g	DNC011
			Benzene	LT 6.50 -2	ug/g	DNC011
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND011
			Methylene Chloride	LT 3.70 0	ug/g	DND011
			Chloroform	LT 6.80 -2	ug/g	DND011
0030	4-5	Soil	Chlorobenzene	LT 2.00 -1	ug/g	DND011
			Ethylbenzene	LT 1.60 -1	ug/g	DNC011
			Toluene	LT 1.90 -1	ug/g	DNC011
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND011
			Tetrachloroethene	LT 2.70 -1	ug/g	DND011
			Trichloroethene	LT 1.40 -1	ug/g	DND011
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC011
			1,1,1-Trichloroethane	LT 4.30 -1	ug/g	DNB002
			1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND012
			1,1,2-Trichloroethane	LT 3.90 -1	ug/g	DNB002
0030	4-5	Soil	1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND012
			1,1-Dichloroethane	LT 2.40 -1	ug/g	DND012
0030	4-5	Soil	1,1-Dichloroethane	LT 1.70 0	ug/g	DNB002
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND012
			1,2-Dichloroethane	LT 5.60 -1	ug/g	DNB002
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND012
			m-Xylene	LT 7.40 -1	ug/g	DNB002
0030	4-5	Soil	m-Xylene	LT 2.60 -1	ug/g	DNC012
			Bicycloheptadiene	LT 3.60 -1	ug/g	DNB002
			Benzene	LT 2.50 -1	ug/g	DNB002

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Newagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number	
0030	4-5	Soil	Benzene	LT 8.50 -2	ug/g	DNC012	
			Carbon Tetrachloride	LT 2.50 -1	ug/g	DNB002	
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND012	
			Methylene Chloride	LT 1.50 0	ug/g	DNB002	
	Methylene Chloride	LT 3.70 0	ug/g	DND012			
				Chloroform	LT 2.90 -1	ug/g	DNB002
				Chloroform	LT 6.80 -2	ug/g	DND012
				Chlorobenzene	LT 1.50 0	ug/g	DNB002
				Chlorobenzene	LT 2.00 -1	ug/g	DND012
				Dibromochloropropane	LT 2.40 0	ug/g	DNB002
				Dicyclopentadiene	LT 6.40 -1	ug/g	DNB002
				Dimethyldisulfide	LT 2.00 1	ug/g	DNB002
				Ethylbenzene	LT 3.80 -1	ug/g	DNB002
				Ethylbenzene	LT 1.60 -1	ug/g	DNC012
				Toluene	LT 2.50 -1	ug/g	DNB002
				Toluene	LT 1.90 -1	ug/g	DNC012
				Methylisobutyl Ketone	LT 7.30 -1	ug/g	DNB002
				Trans-1,2-Dichloroethene	LT 1.70 0	ug/g	DNB002
				Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND012
Tetrachloroethene				LT 2.50 -1	ug/g	DNB002	
			Tetrachloroethene	LT 2.70 -1	ug/g	DND012	
			Trichloroethene	LT 5.40 -1	ug/g	DNB002	
			Trichloroethene	LT 1.40 -1	ug/g	DND012	
			Ortho- & Para-Xylene	LT 4.90 0	ug/g	DNB002	
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC012	
			1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND013	
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND013	
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND013	
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND013	
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND013	
			m-Xylene	LT 2.60 -1	ug/g	DNC013	
			Benzene	LT 8.50 -2	ug/g	DNC013	
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND013	

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number	
0030	7-8	Soil	Methylene Chloride	LT 3.70	0	ug/g	DND013
			Chloroform	LT 6.80	-2	ug/g	DND013
			Chlorobenzene	LT 2.00	-1	ug/g	DND013
			Ethylbenzene	LT 1.60	-1	ug/g	DNC013
			Toluene	LT 1.90	-1	ug/g	DNC013
0031	0-1	Soil	Trans-1,2-Dichloroethene	LT 2.60	-1	ug/g	DND013
			Tetrachloroethene	LT 2.70	-1	ug/g	DND013
			Trichloroethene	LT 1.40	-1	ug/g	DND013
			Ortho- & Para-Xylene	LT 3.90	-1	ug/g	DNC013
			Dibromochloropropane	1.30	0	ug/g	DM0005
0031	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g	DM0006
0032	0-1	Soil	Dibromochloropropane	LT 5.00	-3	ug/g	DM0007
0032	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g	DM0008
0033	0-1	Soil	Dibromochloropropane	LT 5.00	-3	ug/g	DM0011
0033	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g	DM0012
0034	0-1	Soil	Dibromochloropropane	3.80	-1	ug/g	DM0009
0034	4-5	Soil	Dibromochloropropane	LT 5.00	-3	ug/g	DM0010
0035	0-1	Soil	Aldrin	LT 3.00	-1	ug/g	DMP002
			Atrazine	LT 3.00	-1	ug/g	DMP002
			Hexachlorocyclopentadiene	LT 6.00	-1	ug/g	DMP002
			Chlordane	LT 2.00	0	ug/g	DMP002
			p-Chlorophenylmethyl Sulfide	LT 9.00	-1	ug/g	DMP002
			p-Chlorophenylmethyl Sulfoxide	LT 3.00	-1	ug/g	DMP002
			p-Chlorophenylmethyl Sulfone	LT 3.00	-1	ug/g	DMP002
			Dibromochloropropane	LT 3.00	-1	ug/g	DMP002
			Dicyclopentadiene	LT 1.00	0	ug/g	DMP002
			Vapona	LT 3.00	0	ug/g	DMP002
			Diisopropylmethyl Phosphonate	LT 1.00	0	ug/g	DMP002

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number			
0035	0-1	Soil	Dithiane	LT 4.00 -1	ug/g	DMP002			
			Dieldrin	LT 3.00 -1	ug/g	DMP002			
			Endrin	LT 5.00 -1	ug/g	DMP002			
			Isodrin	LT 3.00 -1	ug/g	DMP002			
			Malathion	LT 7.00 -1	ug/g	DMP002			
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP002			
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP002			
			Dichlorodiphenyltrichloro-ethane	LT 5.00 -1	ug/g	DMP002			
			Parathion	LT 9.00 -1	ug/g	DMP002			
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6.00 -1	ug/g	DMP002			
			0035	2-3	Soil	Aldrin	LT 3.00 -1	ug/g	DMP003
						Atrazine	LT 3.00 -1	ug/g	DMP003
						Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP003
						Chlordane	LT 2.00 0	ug/g	DMP003
p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g				DMP003			
p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g				DMP003			
p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g				DMP003			
Dibromochloropropane	LT 1.00 0	ug/g				DMP003			
Dicyclopentadiene	LT 3.00 0	ug/g				DMP003			
Vapona	LT 1.00 0	ug/g				DMP003			
Diisopropylmethyl Phosphonate	LT 4.00 -1	ug/g				DMP003			
Dithiane	LT 3.00 -1	ug/g				DMP003			
Dieldrin	LT 3.00 -1	ug/g				DMP003			
Endrin	LT 5.00 -1	ug/g				DMP003			
Isodrin	LT 3.00 -1	ug/g	DMP003						
0035	2-3	Soil	Malathion	LT 7.00 -1	ug/g	DMP003			
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP003			
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP003			
			Dichlorodiphenyltrichloro-ethane	LT 5.00 -1	ug/g	DMP003			
			Parathion	LT 9.00 -1	ug/g	DMP003			

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Task 20, Site 3-4, Phase Two, Nemagon Spill Area

09/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0035	2-3	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6.00 -1	ug/g	DMP003
0036	0-1	Soil	Aldrin	LT 3.00 -1	ug/g	DMP004
			Atrazine	LT 3.00 -1	ug/g	DMP004
			Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP004
			Chlordane	LT 2.00 0	ug/g	DMP004
			p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP004
			p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP004
			p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP004
			Dibromochloropropane	LT 3.00 -1	ug/g	DMP004
			Dicyclopentadiene	LT 1.00 0	ug/g	DMP004
			Vapona	LT 3.00 0	ug/g	DMP004
			Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP004
			Dithiane	LT 4.00 -1	ug/g	DMP004
			Diieldrin	LT 3.00 -1	ug/g	DMP004
			Endrin	LT 5.00 -1	ug/g	DMP004
Isodrin	LT 3.00 -1	ug/g	DMP004			
0036	2-3	Soil	Malathion	LT 7.00 -1	ug/g	DMP004
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP004
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP004
			Dichlorodiphenyltrichloro-ethane	LT 5.00 -1	ug/g	DMP004
			Parathion	LT 9.00 -1	ug/g	DMP004
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6.00 -1	ug/g	DMP004
			Aldrin	LT 3.00 -1	ug/g	DMP005
			Atrazine	LT 3.00 -1	ug/g	DMP005
			Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP005
			Chlordane	LT 2.00 0	ug/g	DMP005
p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP005			
0036	2-3	Soil	p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP005
			p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP005
			Dibromochloropropane	LT 3.00 -1	ug/g	DMP005

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Ebasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Task 20, Site 3-4, Phase Two, Nemagon Spill Area

03/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number	
0036	2-3	Soil	Dicyclopentadiene	LT 1.00	0	ug/g	DMP005
			Vapona	LT 3.00	0	ug/g	DMP005
			Diisopropylmethyl Phosphonate	LT 1.00	0	ug/g	DMP005
			Dithiane	LT 4.00	-1	ug/g	DMP005
			Dieldrin	LT 3.00	-1	ug/g	DMP005
			Endrin	LT 5.00	-1	ug/g	DMP005
			Isodrin	LT 3.00	-1	ug/g	DMP005
			Malathion	LT 7.00	-1	ug/g	DMP005
			1,4-Oxathiane	LT 3.00	-1	ug/g	DMP005
			Dichlorodiphenylethane	LT 6.00	-1	ug/g	DMP005
			Dichlorodiphenyltrichloro-ethane	LT 5.00	-1	ug/g	DMP005
			Parathion	LT 9.00	-1	ug/g	DMP005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00	-1	ug/g	DMP005
			0037	0-1	Soil	Aldrin	1.92
Atrazine	LT 3.00	-1				ug/g	DMP006
Hexachlorocyclopentadiene	LT 6.00	-1				ug/g	DMP006
Chlordane	LT 2.00	0				ug/g	DMP006
p-Chlorophenylmethyl Sulfide	LT 9.00	-1				ug/g	DMP006
p-Chlorophenylmethyl Sulfoxide	LT 3.00	-1				ug/g	DMP006
p-Chlorophenylmethyl Sulfone	LT 3.00	-1				ug/g	DMP006
Dibromochloropropane	LT 3.00	-1				ug/g	DMP006
Dicyclopentadiene	LT 1.00	0				ug/g	DMP006
Vapona	LT 3.00	0				ug/g	DMP006
Diisopropylmethyl Phosphonate	LT 1.00	0				ug/g	DMP006
Dithiane	LT 4.00	-1				ug/g	DMP006
Dieldrin	7.43	0				ug/g	DMP006
Endrin	LT 5.00	-1				ug/g	DMP006
Isodrin	LT 3.00	-1	ug/g	DMP006			
0038	0-1	Soil	Malathion	LT 7.00	-1	ug/g	DMP006
			1,4-Oxathiane	LT 3.00	-1	ug/g	DMP006
			Dichlorodiphenylethane	LT 6.00	-1	ug/g	DMP006
			Dichlorodiphenyltrichloro-ethane	LT 5.00	-1	ug/g	DMP006

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Task 20, Site 3-4, Phase Two, Nemagon Spill Area

09/20/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0037	0-1	Soil	Parathion	LT 9.00 -1	ug/g	DMP006
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6.00 -1	ug/g	DMP006
0037	2-3	Soil	Aldrin	LT 3.00 -1	ug/g	DMP007
			Atrazine	LT 3.00 -1	ug/g	DMP007
			Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP007
			Chlordane	LT 2.00 0	ug/g	DMP007
			p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP007
			p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP007
			p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP007
			Dibromochloropropane	LT 3.00 -1	ug/g	DMP007
			Dicyclopentadiene	LT 1.00 0	ug/g	DMP007
			Vapona	LT 3.00 0	ug/g	DMP007
			Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP007
			Dithiane	LT 4.00 -1	ug/g	DMP007
			Diendrin	4.59 -1	ug/g	DMP007
			Endrin	LT 5.00 -1	ug/g	DMP007
Isodrin	LT 3.00 -1	ug/g	DMP007			
0037		Soil	Malathion	LT 7.00 -1	ug/g	DMP007
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP007
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP007
			Dichlorodiphenyltrichloro-ethane	LT 5.00 -1	ug/g	DMP007
			Parathion	LT 9.00 -1	ug/g	DMP007
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6.00 -1	ug/g	DMP007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Blanks Associated with Task 20
 Phase II, Site 3-4, Nemagon Spill Area

09/20/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dibromochloropropane	LT 5.00 -3	ug/g	DMP001
Blank	Aldrin	LT 3.00 -1	ug/g	DMP001
Blank	Atrazine	LT 3.00 -1	ug/g	DMP001
Blank	Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP001
Blank	Chlordane	LT 2.00 0	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP001
Blank	Dibromochloropropane	LT 3.00 -1	ug/g	DMP001
Blank	Dicyclopentadiene	LT 1.00 0	ug/g	DMP001
Blank	Vapona	LT 3.00 0	ug/g	DMP001
Blank	Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP001
Blank	Dithiane	LT 4.00 -1	ug/g	DMP001
Blank	Dieldrin	LT 3.00 -1	ug/g	DMP001
Blank	Endrin	LT 5.00 -1	ug/g	DMP001
Blank	Isodrin	LT 3.00 -1	ug/g	DMP001
Blank	Malathion	LT 7.00 -1	ug/g	DMP001
Blank	1,4-Oxathiane	LT 3.00 -1	ug/g	DMP001
Blank	Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP001
Blank	Dichlorodiphenyltrichloro-ethane	LT 5.00 -1	ug/g	DMP001
Blank	Parathion	LT 9.00 -1	ug/g	DMP001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00 -1	ug/g	DMP001
Blank	1,1,1-Trichloroethane	LT 4.30 -1	ug/g	DNB001
Blank	1,1,2-Trichloroethane	LT 3.90 -1	ug/g	DNB001
Blank	1,1-Dichloroethane	LT 1.70 0	ug/g	DNB001
Blank	Trans-1,2-Dichloroethane	LT 1.70 0	ug/g	DNB001
Blank	1,2-Dichloroethane	LT 5.60 -1	ug/g	DNB001
Blank	m-Xylene	LT 7.40 -1	ug/g	DNB001
Blank	Bicycloheptadiene	LT 3.60 -1	ug/g	DNB001
Blank	Benzene	LT 2.50 -1	ug/g	DNB001
Blank	Carbon Tetrachloride	LT 2.50 -1	ug/g	DNB001
Blank	Methylene Chloride	LT 4.58 0	ug/g	DNB001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Blanks Associated with Task 20
 Phase II, Site 3-4, Nemagon Spill Area

03/20/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Chloroform	LT 2.90 -1	ug/g	DNR001
Blank	Chlorobenzene	LT 1.50 0	ug/g	DNR001
Blank	Dibromochloropropane	LT 2.40 0	ug/g	DNR001
Blank	Dicyclopentadiene	LT 6.40 -1	ug/g	DNB001
Blank	Dimethyldisulfide	LT 2.00 1	ug/g	DNB001
Blank	Ethylbenzene	LT 3.80 -1	ug/g	DNR001
Blank	Toluene	LT 2.50 -1	ug/g	DNB001
Blank	Methylisobutyl Ketone	LT 7.30 -1	ug/g	DNB001
Blank	Tetrachloroethere	LT 2.50 -1	ug/g	DNR001
Blank	Trichloroethene	LT 5.40 -1	ug/g	DNB001
Blank	Ortho- & Para-Xylene	LT 4.90 0	ug/g	DNB001
Blank	m-Xylene	LT 2.60 -1	ug/g	DNC001
Blank	Benzene	LT 8.50 -2	ug/g	DNC001
Blank	Ethylbenzene	LT 1.60 -1	ug/g	DNC001
Blank	Toluene	LT 1.90 -1	ug/g	DNC001
Blank	Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC001
Blank	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND001
Blank	1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND001
Blank	1,1-Dichloroethene	LT 2.40 -1	ug/g	DND001
Blank	1,1-Dichloroethane	LT 7.40 -2	ug/g	DND001
Blank	Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND001
Blank	1,2-Dichloroethane	LT 8.50 -2	ug/g	DND001
Blank	Carbon Tetrachloride	LT 1.20 -1	ug/g	DND001
Blank	Methylene Chloride	LT 3.70 0	ug/g	DND001
Blank	Chloroform	LT 6.80 -2	ug/g	DND001
Blank	Chlorobenzene	LT 2.00 -1	ug/g	DND001
Blank	Tetrachloroethene	LT 2.70 -1	ug/g	DND001
Blank	Trichloroethene	LT 1.40 -1	ug/g	DND001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.