MONTHLY PROGRESS REPORT #6
FOR SEPTEMBER 1997

EPA REGION I ADMINISTRATIVE ORDER SDWA I-97-1019
MASSACHUSETTS MILITARY RESERVATION
TRAINING RANGE AND IMPACT AREA

The following summary of progress is for the period from September 1 to September 30, 1997. Scheduled actions are for the six-week period ending November 12, 1997.

1. SUMMARY OF ACTIONS TAKEN

UXO Survey

Ogden and CMS Environmental (the UXO contractor) continued work on site during the first week of September, demobilizing from the site on September 5. The drilling pad at MW-13, and several sediment sampling locations at ponds were cleared during the week.

Surface clearance activities have also been completed at all of the 21 Barber Rig drilling locations in the Impact Area and Demo Areas. Downhole UXO clearance has been completed at 16 of the 21 locations including MW-1, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-11, MW-12, MW-14, MW-15, MW-16, MW- 25, MW-27, MW-28, and MW-29, by advancing 10-foot deep boreholes at each drilling location. Downhole clearance will not be needed at MW-2 because this area was excavated to 12 feet in the course of performing UXO clearance. Downhole clearance remains to be performed at MW-3 (awaiting road building), MW-13 (awaiting road building), MW-19, and MW-26.

UXO recovered during clearance activities are summarized in Table 1. UXO present at Spruce Swamp Road, Pocasset-Sandwich Road, and drilling locations MW-1, MW- 6, and MW-27 were destroyed on July 25. Remaining UXO in Table 1 were destroyed on September 12.

Plans and Reports

NGB submitted a Final Field Sampling Plan (FSP) for Areas 6, 7, and 8, and for Areas 9, 10, 11, and 14, on September 26. NGB submitted Draft FSPs for Area 15 and for Areas 12 and 13 on September 5, for Background locations on September 12, for Groundwater Sampling on September 18, and for Gun & Mortar positions on September 18. These areas and the status of plans are summarized in Table 2.

Drilling

Ogden, D.L. Maher (the drilling contractor), and Valeri Construction (Maher's road building

subcontractor) continued work on the site in September. TRC (EPA's oversight contractor) and the U.S. Geological Survey were present for oversight of drilling activities during the month. Table 3 presents a summary of monitoring wells completed to date. Draft boring logs for these wells have been distributed to EPA, MADEP, USGS, and TRC during the weekly project review meetings.

Sampling and Analysis

Soil and groundwater samples have been analyzed or submitted for borings that have been drilled to date. Also, hand auger samples have been collected from 0-6 inches at future drilling locations in the Impact Area, and at the areas of potential concern identified in the Field Sampling Plans. The types of samples being analyzed, dates of submittal, and preliminary results are summarized in Table 4. All results in Table 4 are unvalidated. Concentrations of specific compounds will be presented in tabular form after the results for all samples in a sample data group are available and have been validated.

Explosive Compounds --

Explosive compounds have been detected in soil samples collected from 0-6 inches at MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW- 7, MW-8, MW-9, MW-12, MW-15, MW-19, MW-25, MW-26, MW-27, MW-28, and MW-29, using the screening methods. Explosives were also detected in the 10-12 foot interval from MW-1 using the screening method. No explosives have been detected from the confirmatory Method 8330 analysis of 0-6 inch samples from MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-9, MW-12, MW-15, MW-26, MW-27, MW-28, and MW-29, and of the 10-12 foot interval from MW-1. The results from the 8330 analysis of 0-6 inch samples from MW-8, MW-19, and MW-25 confirm that explosive compounds are present in surface soil at these locations. No explosive compounds have been detected in deeper soil samples analyzed to date by screening or confirmatory 8330 methods.

Explosive compounds have been detected in composite surface soil samples from 0-6 inches in 8 grids from Area 1, 12 grids from Area 2, 11 grids from Area 3, 4 grids from Area 9, 5 grids from Area 10, and 5 grids from Area 14 using the screening method. Method 8330 analysis performed on the 11 screening hits in Area 3 were non-detect. Method 8330 analysis performed on 5 of the 12 screening hits in Area 2 were non-detect, with results for the remaining 7 screening hits not yet available. Method 8330 results from the remaining grids that had screening results are not yet available.

RDX was reported at an estimated concentration below the detection limit by the screening method in a groundwater sample collected from 160 feet bgs in MW-17. When this sample was analyzed using Method 8330 no explosive compounds were detected. Explosive compounds were detected using Method 8330 in a groundwater sample collected from 44 feet bgs in MW-18.

RDX was reported at an estimated concentration below the detection limit by the screening method in a groundwater sample collected from 176 feet bgs in MW-18. When this sample was analyzed using Method 8330 no explosive compounds were detected. RDX was detected in groundwater from 120, 130, 162, 202, 222, 232, and 252 feet bgs in MW-1 by screening methods. Explosive compounds were detected using Method 8330 in groundwater samples collected at 120, 130, 140, 150, 162, 182, 202, 212, 222, 232, 252, 262, 272, and 282 feet bgs in MW-1. In MW-15, explosive compounds were detected in groundwater samples from 110, 120, 130, 140, 150, 160, 280, and 300 feet bgs using Method 8330. In MW-21, explosive compounds were detected in groundwater samples from 176 and 186 feet bgs using Method 8330.

Inorganic Compounds --

Inorganic compounds have been detected in all soil samples analyzed to date. There are a large number of detected compounds and many of these are expected to be naturally occurring. The identification of compounds exceeding background concentrations will be reported after determination of background levels.

Other Analytes --

A number of "other" analytes have been detected in soil and groundwater samples as indicated in Table 1, including VOC, SVOC, pesticides, and herbicides. Some of these compounds may have background concentrations; i.e., they may result from anthropogenic or natural sources which are not related to activities at the Impact Area and Training Ranges. Some of these compounds have been detected in laboratory blanks, which suggests that they may not be present in all of the samples indicated. Many of these compounds have been reported at estimated concentrations due to quality control issues. The quantity of data for these analytes does not allow a detailed description of the occurrence of each analyte for this progress update report. Ogden is currently importing these data into a database to allow some summary information on the concentrations of each compound to be developed, to be presented in a future progress report.

Water Level Measurements

Water level recording devices that were installed in LRWS-2, CS-19 (MW-7E), and CS-10 (AEHA- 11) continue to record water levels. The next synoptic round of water level measurements is scheduled for October 3.

Meetings

A September 29 meeting of the Impact Area Groundwater Study Review Team was convened by EPA to discuss progress on the project. Weekly project review meetings continued during the month with EPA, MADEP, USGS, and TRC.

2. SUMMARY OF DATA RECEIVED

Daily reports of UXO survey results were received by Ogden during the survey operations and are summarized in section 1 above. Table 1 provides a summary of potential UXO discovered to date.

Laboratory results for soil and groundwater samples were received during the week and are summarized in Section 1 above. Concentrations for specific compounds will be presented in tabular form after the results for all samples in a sample data group are available and have been validated. The types of samples being analyzed, dates of submittal, and preliminary results are summarized in Table 4. All results in Table 4 are unvalidated.

3. DELIVERABLES SUBMITTED

Deliverables submitted during the reporting period included the following:

Draft Field Sampling Plan Areas 12 & 13	September 4, 1997
Draft Field Sampling Plan Area 15	September 4, 1997
Weekly Progress Update (August 29 - September 4)	September 5, 1997
Weekly Progress Update (September 5 - September 11)	September 12, 1997
Draft Background Field Sampling Plan	September 12, 1997
Draft Groundwater Field Sampling Plan	September 18, 1997
Weekly Progress Update (September 12 - September 18)	September 19, 1997
Draft Field Sampling Plan for Gun and Mortar Positions	September 19, 1997
Weekly Progress Update (September 19 - September 25)	September 26, 1997
Final Field Sampling Plan Areas 6, 7, and 8	September 26, 1997
Final Field Sampling Plan Areas 9, 10, 11, and 14	September 26, 1997

4. SCHEDULED ACTIONS

Actions for the next six weeks are indicated in Figure 2. This figure provides a Gantt chart based on the Final Action Plan, updated to reflect progress and proposed work.

Field Sampling Plans will continue to be completed and submitted to EPA during October. Drilling, sampling, and analysis will continue during October.

A meeting of the Impact Area Groundwater Study Review Team will be convened on October 22, 1997.

Table 1
Potential Explosive Ordnance Discovery
As of September 30, 1997

Location	Object Found	Depth (inches)	Disposition
Succonsette Pond, Area 8	2.36" rocket HEAT	surface	destroyed
	81mm mortar HE	4	destroyed
	60mm mortar HE	6	destroyed
	60mm mortar HE	5	destroyed
Turpentine Road	81mm mortar HE	18	destroyed
	105mm projectile HE	12	destroyed
MW-1 (Area 3)	105mm projectile HE	14	destroyed
Spruce Swamp Road	2" HE mortar	0.5	destroyed
	2" HE mortar	1.5	destroyed
	2“ HE mortar	2	destroyed
	2" HE mortar	8	destroyed
Sandwich Road	105mm projectile WP	6	destroyed
	105mm projectile HE		destroyed
MW-26 (Area 2, east side)	155mm projectile HE		destroyed
	105mm projectile HE	surface	destroyed
	105mm projectile HE	surface	destroyed
	30mm projectile HE	surface	destroyed
	30mm projectile HE	surface	destroyed
Demo Area 1	30mm projectile HE	surface	destroyed
	3.5" rocket HEAT	surface	destroyed
	105mm projectile HEAT	20	destroyed
MW-27	105mm projectile HEAT	3	destroyed
	105mm projectile HEAT	surface	destroyed

Table 1
Potential Explosive Ordnance Discovery
As of September 30, 1997

Location	Object Found	Depth (inches)	Disposition
MW-6	105mm projectile HEAT	6	destroyed
	105mm projectile HEAT	3	destroyed
	105mm projectile HE	4	destroyed
	81mm mortar HE	8	destroyed
	105mm projectile HEAT	3	destroyed
	105mm projectile HEAT	surface	destroyed
	60mm mortar HE	24	destroyed
	60mm mortar HE	24	destroyed
MW-29	60mm mortar HE		destroyed
MW-3	155mm ejection	surface	destroyed
MW-2	155mm ejection	surface	destroyed
	155mm ejection	8	destroyed
	155mm projectile HE	surface	destroyed
	81mm mortar HE	8	destroyed
	81mm mortar Illum.	18	destroyed
Indian Trail Road	81mm mortar HE	6	destroyed
	81mm mortar HE	8	destroyed
	4.5" Hedge Hog rkt HE	16	destroyed
	4.5" Hedge Hog rkt HE	8	destroyed
Mortar Position 8	40mm M918 Training	surface	destroyed

Table 2
Summary of Sampling Areas and Field Sampling Plan Status
As of September 30, 1997

Area[a]	Well No. (depth)	Location name/Description in Action Plan	Sample methods/media	FSP status
1	3 (S/I/D)	Area of Depression w/ Ground Scar	barber rig (soil) hand auger (soil) groundwater	final 7/18 draft 8/11 draft 9/18
2	2 (S/I/D), 26 (S)	Site 3/Target Area/Burn Area	barber rig (soil) hand auger (soil) groundwater	final 7/18 final 8/1 draft 9/18
3	1(S/I/D)	Site 1 Target Area	barber rig (soil) hand auger (soil) groundwater	final 7/18 final 8/1 draft 9/18
4	27 (S)	Site 4 Mounds	barber rig (soil) hand auger (soil) groundwater	final 7/18 draft 8/15 draft 9/18
5		Site 5	hand auger (soil)	
6	7 (S/I/D)	Burn Area (southeast of Turpentine)	barber rig (soil) hand auger (soil) groundwater	final 7/18 final 9/26 draft 9/18
7	8(S)	Burn Areas (southwest of Turpentine)	barber rig (soil) hand auger (soil) groundwater	final 7/18 final 9/26 draft 9/18
8		Succonsette Pond	sediment/surface water hand auger (soil)	 final 9/26
9	4 (S)	(well on Pocasset Road north of Five Corners)	barber rig (soil) hand auger (soil: control area) groundwater	final 7/18 final 9/26 draft 9/18
10	5 (S/I/D)	(well north of Wood Road)	barber rig (soil) hand auger (soil: control area) groundwater	final 7/18 final 9/26 draft 9/18
11	25 (S)	(well southeast of CS-19)	barber rig (soil) hand auger (soil: control area) groundwater	final 7/18 final 9/26 draft 9/18
	6 (S)	(well north of Area 5)	barber rig (soil) groundwater	final 7/18 draft 9/18

Table 2
Summary of Sampling Areas and Field Sampling Plan Status
As of September 30, 1997

Area[a]	Well No. (depth)	Location name/Description in Action Plan	Sample methods/media	FSP status
12	19 (S/D)	Demo Area 1	barber rig (soil) hand auger (soil) groundwater	final 7/18 draft 9/4 draft 9/18
13	16 (S/D)	Demo Area 2	barber rig (soil) hand auger (soil) groundwater	final 7/18 draft 9/4 draft 9/18
14		(access road to MW-7)	hand auger (soil: control area)	final 9/26
	9 (S)	none (well southwest of CS-19)	barber rig (soil) groundwater	final 7/18 draft 9/18
	10 (S/I/D)	none (well on west Jefferson Road)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18
	11 (S)	none (well midway along Jefferson)	barber rig (soil) groundwater	final 7/18 draft 9/18
	12 (S)	none (well on Barlow south of Wood)	barber rig (soil) groundwater	final 7/18 draft 9/18
	13 (S/D)	none (well near J-3 range south of Chadwick)	barber rig (soil) groundwater	final 7/18 draft 9/18
	14 (S)	none (well at the corner of Wheelock and Turpentine)	barber rig (soil) groundwater	final 7/18 draft 9/18
	15 (S/D)	none (well at the corner of Spruce Swamp and Sandwich)	barber rig (soil) groundwater	final 7/18 draft 9/18
15		Site 6	hand auger (soil)	draft 9/4
	28 (S)	none (well at corner of Wheelock and Chadwick)	barber rig (soil) groundwater	final 7/18 draft 9/18
	29 (S)	none (well at the corner of Barlow and Chadwick)	barber rig (soil) groundwater	final 7/18 draft 9/18
	17 (S/D)	none (well southeast of Demo-2)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18
	18 (S/I/D)	none (well on east end of Gibbs)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18

Table 2
Summary of Sampling Areas and Field Sampling Plan Status
As of September 30, 1997

Area[a]	Well No. (depth)	Location name/Description in Action Plan	Sample methods/media	FSP status
	20 (S)	none (well on west end of Pocasset Forestdale)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18
	21 (S/D)	none (well on south end of Burgoyne)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18
	22 (S)	none (well midway on Burgoyne)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18
	23 (S/I/D)	none (well north end of Burgoyne)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18
	24 (S)	none (well near Rod & Gun Club)	rotosonic rig (soil) groundwater	final 7/18 draft 9/18
16		GP-9 (High-use gun position)	hand auger (soil)	draft 9/19
17		Mixed-use gun position	hand auger (soil)	draft 9/19
18		Low-use gun position	hand auger (soil)	draft 9/19
19		High-use mortar position	hand auger (soil)	draft 9/19
20		Mixed-use mortar position	hand auger (soil)	draft 9/19
21		Low-use mortar position	hand auger (soil)	draft 9/19
22		Control area near mortar positions	hand auger (soil: control)	draft 9/19
23		Drainage swale (N of Snake Pd.)	hand auger (soil)	
24		Drainage swale (NW of Snake Pd.)	hand auger (soil)	
25		Rod & Gun Club pond	sediment/surface water	
26		Deep Bottom Pond	sediment/surface water	
27		Round Swamp	sediment/surface water	
28		Grassy Pond	sediment/surface water	
29		Ox Pond	sediment/surface water	
30		Donnely Pond	sediment/surface water	
31		Little Halfway Pond	sediment/surface water	

Table 2
Summary of Sampling Areas and Field Sampling Plan Status
As of September 30, 1997

Area[a]	Well No. (depth)	Location name/Description in Action Plan	Sample methods/media	FSP status
32		Raccoon Swamp/Pond	sediment/surface water (control)	
33		Snake Pond	sediment/surface water	
34		Bailey's Pond	sediment/surface water	
35		Gibbs Pond	sediment/surface water	
36		Opening Pond	sediment/surface water	
37		Bypass Bog	sediment/surface water	
38		Control area near gun positions	hand auger (soil: control)	draft 9/19

Notes: (a) Boring sampling locations do not have unique area numbers

Table 3
Summary of Monitoring Wells Completed
As of September 30, 1997

Monitoring Well	Screen Interval (feet bgs)	Location	Date Completed
MW-14S	96.0-106.0	Water Table	7/28
MW-23S	122.5-132.5	Water Table	7/29
MW-23D	272.0-282.0	Bottom of Aquifer[1]	7/29
MW-28S	95.2-105.2	Water Table	7/30
MW-29S	98.5-108.5	Water Table	8/1
MW-12S	96.7-106.7	Water Table	8/7
MW-10S	145.0-155.0	Water Table	8/11
MW-10D	351.5-361.5	Bottom of Aquifer[2]	8/11
MW-11S	122.0-132.0	Water Table	8/12

Table 3
Summary of Monitoring Wells Completed
As of September 30, 1997

Monitoring Well	Screen Interval (feet bgs)	Location	Date Completed
MW-4S	137.0-147.0	Water Table	8/18
MW-7S	103.0-104.0	Water Table	8/27
MW-7D	332.0-342.0	Bottom of Aquifer[1]	8/27
MW-17S	120.0-130.0	Water Table	8/27
MW-17D	320.0-330.0	Bottom of Aquifer[1]	8/27
MW-18S	35.0-45.0	Water Table	9/9
MW-18D	265.0-275.0	Bottom of Aquifer[1]	9/9
MW-1D	290.0-300.0	Bottom of Aquifer[1]	9/15
MW-1I	160.0-165.0	45 feet Below Water Table	9/18
MW-1S	114.0-124.0	Water Table	9/18
MW-15S	105.0-115.0	Water Table	9/18
MW-15D	324.0-334.0	Bottom of Aquifer[1]	9/18
MW-21S	164.0-174.0	Water Table	9/22
MW-21D	302.0-312.0	Bottom of Aquifer[1]	9/22
MW-25S	108.0-118.0	Water Table	9/23
MW-22S	170.5-180.5	Water Table	9/24
MW-6S	106.0-116.0	Water Table	9/25
MW-9S	113.0-123.0	Water Table	9/25

1 =Well constructed on top of till layer overlying bedrock.
2 =Well constructed on top of bedrock.

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
MW-14	Soil: 0.5 feet	ND[S]	Inorganics	ND
	Soil: 2 feet			
	Soil: 10 feet	ND[S]	Inorganics	Ace TCB BEHP DIHP
	Soil: 20 feet	ND[S]	Inorganics	
	Soil: 30, 40, 50, 60, 70, 80, 90 feet	ND[S]	Inorganics	
MW-23	Soil: 40 feet			Ace TCB BEHP
	Soil: 70 feet			Ace TCB
	Groundwater: 140, 150, 160, 170, 180, 190, 200, 210, 220	ND[S]		ND (V)
	Groundwater: 230	ND[S]		Tol (V*)
	Groundwater: 240, 250, 260	ND[S]		THM (V*)
	Groundwater: 270, 290	ND[S]		ND (V)
MW-28	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	ND
	Soil: 2 feet	ND[S] **ND**		
	Soil: 10 feet	ND[S]	Inorganics	ND
	Soil: 20 feet	ND[S]	Inorganics	
	Soil: 30, 40, 50, 60, 70, 80, 90 feet		Inorganics	
	Soil: 100 feet		Inorganics	ND
MW-7	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	ND

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Soil: 2 feet			
	Soil: 10 feet	ND[S]	Inorganics	ND
	Soil: 20 feet	ND[S]	Inorganics	
	Soil: 30, 40, 50, 60, 70, 80, 90, 100 feet		Inorganics	
	Groundwater: 130 feet	ND[S]		THM (V) MP Hex Ace But
	Groundwater: 140 feet	ND[S]		ND (V)
	Groundwater: 150, 160 feet	ND[S]		THM (V) Ace
	Groundwater: 165, 175 feet	ND[S]		Ace (V)
	Groundwater: 185 feet	ND[S]		ND (V)
	Groundwater: 195, 205, 215 feet	ND[S]		THM (V) Ace
	Groundwater: 225 feet	ND[S]		Ace (V)
	Groundwater: 235, 245 feet	ND[S]		Ace (V) CD
	Groundwater: 255, 265, 275 feet	ND[S]		ND (V)
	Groundwater: 285, 295 feet	ND[S]		THM (V)
	Groundwater: 310, 320, 330 feet	ND[S]		ND (V)
	Groundwater: 340 feet	ND[S]		Ace (V) CD But
	Groundwater: 347 feet	ND[S]		ND (V)
MW-29	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Soil: 2 feet			
	Soil: 10 feet	ND[S] **ND**	Inorganics	Ace
	Soil: 20 feet	ND[S]	Inorganics	
	Soil: 30 feet		Inorganics	
	Soil: 40 feet		Inorganics	Ace
	Soil: 50, 60, 70, 80, 90, 100 feet		Inorganics	
MW-10	Soil: 140 feet			Ace (V*)
	Groundwater: 185, 195, 205 feet	ND[S]		THM (V)
	Groundwater: 285, 295 feet	ND[S]		ND (V)
	Groundwater: 305, 315, 330 feet	ND[S]		THM (V)
	Groundwater: 355 feet	ND[S]		ND (V)
MW-12	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace Phe bBHC dBHC
	Soil: 2 feet			
	Soil: 10 feet	ND[S]	Inorganics	Ace Phe bBHC dBHC gBHC DIEP
	Soil: 20 feet	ND[S]	Inorganics	
	Soil: 30, 40, 50, 60, 70, 80, 90, 100 feet		Inorganics	
MW-11	Soil: 0.5 feet	ND[S]	Inorganics	Ace
	Soil: 2 feet			

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Soil: 10 feet	ND[S]	Inorganics	Ace
	Soil: 20 feet	ND[S]	Inorganics	ND
	Soil: 30 feet		Inorganics	Ace BEHP But
	Soil: 40 feet		Inorganics	ND
	Soil: 50 feet		Inorganics	Ace BEHP
	Soil: 60, 70 feet		Inorganics	Ace
	Soil: 80 feet		Inorganics	ND
	Soil: 90, 100, 110 feet		Inorganics	Ace
	Soil: 120 feet		Inorganics	Ace THM
	Soil: 130 feet		Inorganics	Ace DCBA
MW-17	Soil: 3.5 feet			Ace
	Soil: 17.5 feet			Ace TCB DCB
	Soil: 53 feet			Ace BEHP bBHC
	Groundwater: 120, 130, 140, 150 feet	ND[S]		ND (V)
	Groundwater: 160 feet	RDX[S] **ND**		ND (V)
	Groundwater: 170, 180, 190 feet	ND[S]		ND (V)
	Groundwater: 200 feet	ND[S]		Ace (V) THM

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Groundwater: 210, 220, 230, 240, 250, 260, 270, 280, 290, 320 feet	ND[S]		THM (V)
	Groundwater: 330 feet	ND[S]		ND (V)
MW-4	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace MCPA BEHP DDE DDT
	Soil: 2 feet			
	Soil: 10 feet	ND[S]	Inorganics	ND
	Soil: 20 feet	ND[S]	Inorganics	
	Soil: 30, 40, 50 feet		Inorganics	ND
	Soil: 60 feet		Inorganics	bBHC dBHC
	Soil: 70, 80, 90, 100 feet		Inorganics	
	Soil: 110, 120, 130 feet		Inorganics	ND
	Soil: 140 feet		Inorganics	
MW-1	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace DIEP
	Soil: 2 feet			
	Soil: 10 feet	RDX/HMX[S] **ND**	Inorganics	Ace DIEP DIHP BEHP
	Soil: 20 feet	ND[S]	Inorganics	
	Soil: 30, 40 feet	**ND**	Inorganics	
	Soil: 50 feet			
	Soil: 60, 70, 80, 90, 100, 110, 120 feet	**ND**	Inorganics	

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Groundwater: 120 feet	RDX[S] **EXP**		Ace (V) But MP Hex
	Groundwater: 130 feet	RDX[S] **EXP**		Ace (V) But MP Hex MeCl
	Groundwater: 140 feet	ND[S] **EXP**		Ace (V) But Benz
	Groundwater: 150 feet	ND[S] **EXP**		Ace (V) But Hex
	Groundwater: 162 feet	RDX[S] **EXP**		Ace (V) But
	Groundwater: 182 feet	**EXP**		Ace (V) THM
	Groundwater: 192 feet	**ND**		Ace (V) But
	Groundwater: 202 feet	RDX[S] **EXP**		Ace (V) THM
	Groundwater: 212 feet	ND[S] **EXP**		Ace (V) THM
	Groundwater: 222, 232 feet	RDX[S] **EXP**		9/2 (V)
	Groundwater: 252 feet	RDX[S] TNT[S] **EXP**		9/10 (V)
	Groundwater: 262, 272, 282 feet	**EXP**		9/10 (V)
	Groundwater: 292 feet	**ND**		9/10 (V)

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
MW-3	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace PCP
MW-5	Soil: 0.5 feet	TNT/DNT[S] RDX/HMX[S] **ND**	Inorganics	Ace BEHP
MW-6	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace BEHP
	Soil: 2 feet			
	Soil: 10, 25	ND[S] **9/24**	9/24	
	Soil: 35, 48, 55, 67, 75, 87, 94, 107, 114 feet		9/24-9/25	
	Groundwater: 109 feet	9/25		9/25 (V)
MW-16	Soil: 0.5 feet	ND[S]	Inorganics	Ace
	Soil: 2 feet			dBHC
	Soil: 10 feet	9/30	9/30	9/30
	Soil: 20 feet	9/30	9/30	
	Soil: 30, 40, 50, 60, 70, 80 feet		10/1	
MW-26	Soil: 0.5 feet	TNT/DNT[S] RDX/HMX[S] **ND**	Inorganics	Ace DIEP DDT
MW-27	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace
MW-2	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace TCE MeCl DDT DDE
MW-8	Soil: 0.5 feet	TNT/DNT[S] **EXP**	Inorganics	Ace

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Soil: 2 feet			
	Soil: 10 feet	10/2	10/2	10/2
MW-9	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace MCPA MeCl TCE
	Soil: 2 feet			
	Soil: 10 feet	9/25	9/25	9/25
	Soil: 20 feet	9/25	9/25	
	Soil: 30, 40, 50, 60, 70, 80, 90, 100, 120 feet		9/26	
	Groundwater: 120 feet	**9/26**		9/26 (V)
MW-15	Soil: 0.5 feet	TNT/DNT[S] **ND**	Inorganics	Ace MCPA DCBA MeCl BEHP
	Soil: 2 feet			
	Soil: 10 feet	ND[S]	8/29	8/29
	Soil: 20 feet	ND[S]	8/29	
	Soil: 30 feet		8/29	8/29
	Soil: 50, 60, 70 feet	ND[S]	8/29	
	Soil: 80, 90, 100 feet	**9/5**	9/2	
	Groundwater: 110, 120 feet	ND[S] **EXP**		ND (V)

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Groundwater: 130 feet	ND[S] **EXP**		Ace (V) 1,1-DCE TCE Benz Tol CB
	Groundwater: 140 feet	ND[S] **EXP**		Ace (V) 1,1-DCE Benz Tol CB
	Groundwater: 150, 160 feet	ND[S] **EXP**		ND (V)
	Groundwater: 170, 180, 190, 200, 210 feet	ND[S] **ND**		ND (V)
	Groundwater: 220, 230, 240 feet	ND[S] **ND**		THM (V)
	Groundwater: 250, 260, 270 feet	ND[S] **ND**		ND (V)
	Groundwater: 280 feet	**EXP**		9/11-12 (V)
	Groundwater: 290 feet	**ND**		9/11-12 (V)
	Groundwater: 300 feet	**EXP**		9/11-12 (V)
	Groundwater: 310, 320, 330, 340 feet	**ND**		9/13 (V)

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
MW-19	Soil: 0.5 feet	RDX/HMX[S] **EXP**	Inorganics	Ace PCP TCE Hept Endo MCPP Die Bent Nn HCB gBHC
MW-25	Soil: 0.5 feet	TNT/DNT[S] RDX/HMX[S] **EXP**	Inorganics	MeCl Ace TCE MCPA Pic BEHP DDT
	Soil: 2 feet			
	Soil: 10 feet	9/20	9/20	9/20
	Soil: 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120 feet	9/20-23	9/20-23	
	Groundwater: 120 feet	**9/23**		9/23 (V)
MW-18	Groundwater: 44 feet	ND[S] **EXP**		Ace (V) THM CD
	Groundwater: 60 feet	ND[S]		ND (V)
	Groundwater: 76, 86, 96 feet	ND[S] **ND**		ND (V)
	Groundwater: 106, 116, 126, 136 feet	ND[S] **ND**		Ace (V)
	Groundwater: 146 feet	ND[S] **ND**		Ace (V) THM

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Groundwater: 156 feet	ND[S] **ND**		THM (V)
	Groundwater: 166 feet	ND[S] **ND**		ND (V)
	Groundwater: 176 feet	ND[S] **ND**		TCE (V)
	Groundwater: 186 feet	ND[S] **ND**		Ace (V) CD THM TCE
	Groundwater: 196 feet	ND[S] **ND**		THM (V) TCE
	Groundwater: 206 feet	ND[S] **ND**		THM (V)
	Groundwater: 216 feet	ND[S] **ND**		ND (V)
	Groundwater: 226 feet	ND[S] **ND**		THM (V)
	Groundwater: 236 feet	ND[S] **ND**		Ace (V) THM
	Groundwater: 246, 256, 268 feet	ND[S] **ND**		ND (V)
	Groundwater: 276 feet	**ND**		9/9 (V)
MW-21	Groundwater: 176, 186 feet	**EXP**		9/13-20 (V)
	Groundwater: 196, 206, 216, 225, 246, 255, 270, 277, 286, 296, 306, 335 feet	**9/13-20**		9/13-20 (V)
MW-20	Soil: 60 feet		9/26	9/26
Area 3 Grid A	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/10	9/10
	Soil: 18-24 inch			

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
Area 3 Grid B	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S] **ND**	9/10	9/10
	Soil: 18-24 inch			
Area 3 Grid C	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/10	9/10
	Soil: 18-24 inch			
Area 3 Grid D	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/15	9/15
	Soil: 18-24 inch			
Area 3 Grid E	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/10	9/10
	Soil: 18-24 inch			
Area 3 Grid F	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/10	9/10
	Soil: 18-24 inch			
Area 3 Grid G	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/10	9/10
	Soil: 18-24 inch			
Area 3 Grid J	Soil: 0-6 inch	ND[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 3 Grid K	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 3 Grid L	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
Area 3 Grid M	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 3 Grid N	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 2 Grid A	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 2 Grid B	Soil: 0-6 inch	ND[S] **ND**	9/10	9/10
	Soil: 18-24 inch			
Area 2 Grid C	Soil: 0-6 inch	ND[S] **ND**	9/10	9/10
	Soil: 18-24 inch			
Area 2 Grid D	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 2 Grid E	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 2 Grid F	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			
Area 2 Grid G	Soil: 0-6 inch	TNT/DNT[S] **ND**	9/11	9/11
	Soil: 18-24 inch			

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
Area 2 Grid H	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/15	9/15
	Soil: 18-24 inch			
Area 2 Grid I	Soil: 0-6 inch	TNT/DNT[S]	9/11	9/11
	Soil: 18-24 inch			
Area 2 Grid J	Soil: 0-6 inch	TNT/DNT[S]	9/11	9/11
	Soil: 18-24 inch			
Area 2 Grid K	Soil: 0-6 inch	TNT/DNT[S]	9/12	9/12
	Soil: 18-24 inch			
Area 2 Grid L	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/15	9/15
	Soil: 18-24 inch			
Area 2 Grid M	Soil: 0-6 inch	ND[S]	9/15	9/15
	Soil: 18-24 inch			
Area 2 Grid N	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/15	9/15
	Soil: 18-24 inch			
Area 2 Grid O	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/15	9/15
	Soil: 18-24 inch			
Area 9 Grid A	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/16	9/16
	Soil: 18-24 inch			
Area 9 Grid B	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/16	9/16
	Soil: 18-24 inch			

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes
Area 9 Grid C	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/16	9/16
	Soil: 18-24 inch			
Area 9 Grid D	Soil: 0-6 inch	TNT/DNT[S]	9/16	9/16
	Soil: 18-24 inch			
Area 9 Grid E	Soil: 0-6 inch	ND[S]	9/16	9/16
	Soil: 18-24 inch			
Area 10 Grid A	Soil: 18-24 inch	TNT/DNT[S] RDX/HMX[S]	9/17	9/17
	Soil: 0-6 inch			
Area 10 Grid B	Soil: 18-24 inch	TNT/DNT[S]	9/17	9/17
	Soil: 18-24 inch			
Area 10 Grid C	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/17	9/17
	Soil: 18-24 inch			
Area 10 Grid D	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/17	9/17
	Soil: 18-24 inch			
Area 10 Grid E	Soil: 0-6 inch	TNT/DNT[S]	9/17	9/17
	Soil: 18-24 inch			
Area 14 Grid A	Soil: 0-6 inch	TNT/DNT[S]	9/16	9/16
	Soil: 18-24 inch			
Area 14 Grid B	Soil: 0-6 inch	TNT/DNT[S]	9/16	9/16
	Soil: 18-24 inch			
Area 14 Grid C	Soil: 0-6 inch	TNT/DNT[S] RDX/HMX[S]	9/16	9/16

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

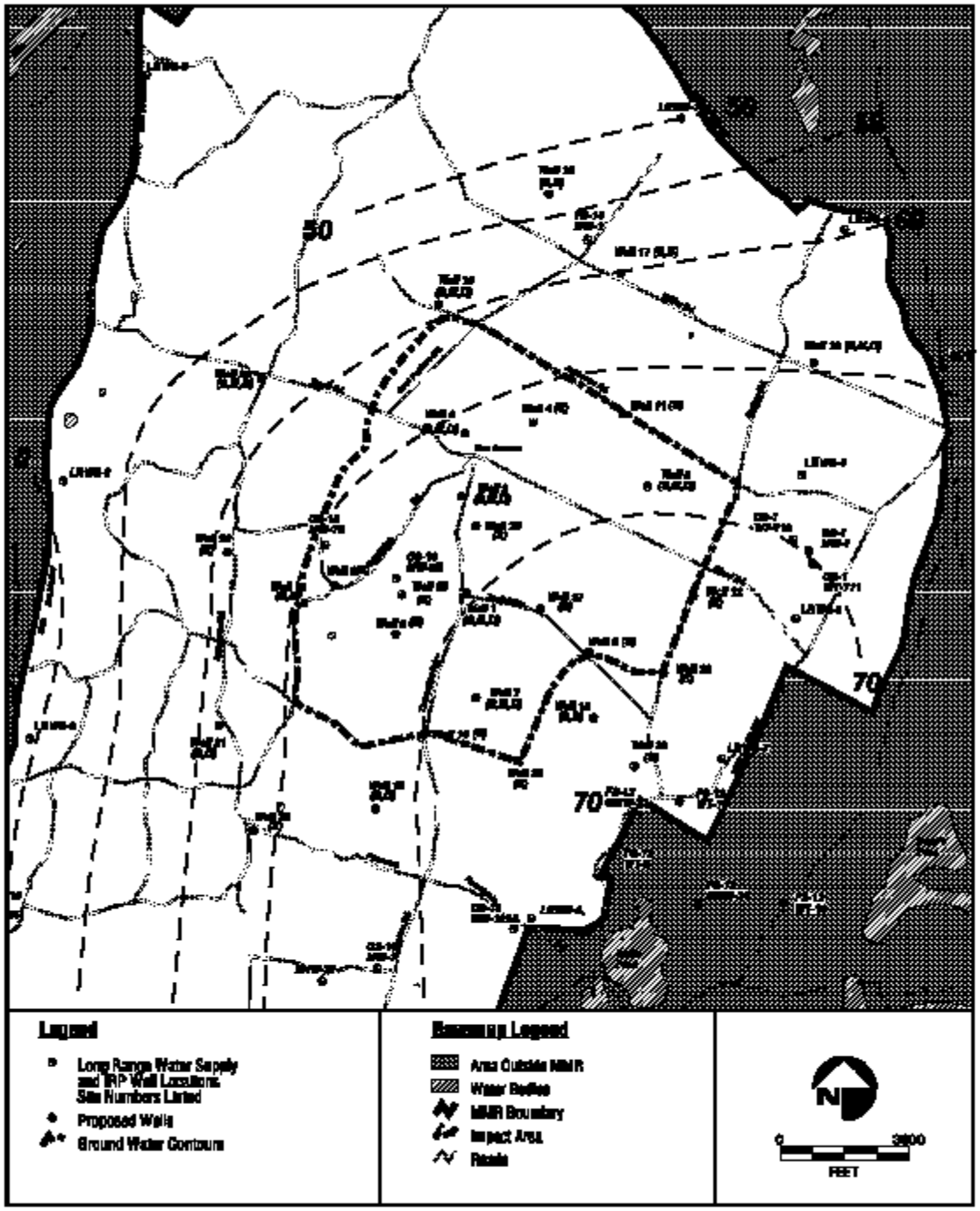
Boring	Sample Type	Explosives	Inorganics	Other Analytes
	Soil: 18-24 inch			
Area 14 Grid D	Soil: 0-6 inch	TNT/DNT[S]	9/16	9/16
	Soil: 18-24 inch			
Area 14 Grid E	Soil: 0-6 inch	TNT/DNT[S]	9/16	9/16
	Soil: 18-24 inch			
Area 1 Grid A	Soil: 0-6 inch	TNT/DNT[S]	9/19	9/19
	Soil: 18-24 inch			
Area 1 Grid B	Soil: 0-6 inch	TNT/DNT[S]	9/19	9/19
	Soil: 18-24 inch			
Area 1 Gri C	Soil: 0-6 inch	TNT/DNT[S]	9/19	9/19
	Soil: 18-24 inch			
Area 1 Grid D	Soil: 0-6 inch	TNT/DNT[S]	9/19	9/19
	Soil: 18-24 inch			
Area 1 Grid E	Soil: 0-6 inch	TNT/DNT[S]	9/19	9/19
	Soil: 18-24 inch			
Area 1 Grid F	Soil: 0-6 inch	TNT/DNT[S]	9/20	9/20
	Soil: 18-24 inch			
Area 1 Grid G	Soil: 0-6 inch	TNT/DNT[S]	9/20	9/20
	Soil: 18-24 inch			
Area 1 Grid H	Soil: 0-6 inch	TNT/DNT[S]	9/20	9/20
	Soil: 18-24 inch			

Table 4
Summary of Preliminary Analytical Results (not validated)
As of September 30, 1997

Boring	Sample Type	Explosives	Inorganics	Other Analytes

Notes:

7/22	= date sample received for analysis
ND	= not detected
s	= result from screening method (colorimetric for soil or high-level 8330 for groundwater)
BOLD	= result from 8330 method
(V)	= analyzed for volatile organic compounds only; * = expedited (5-day TAT)
EXP	= explosives
Tol	= toluene
Ace	= acetone
Benz	= benzene
CB	= chlorobenzene
DCB	= 2,4-dichlorobenzene
TCB	= 1,2,4 -Trichlorobenzene
HCB	= hexachlorobenzene
THM	= trihalomethanes
MeCl	= methylene chloride
1,1-DCE	= 1,1-dichloroethylene
TCE	= trichloroethylene
But	= 2-butanone
MP	= 4-methyl-2-pentanone
Hex	= 2-hexanone
CD	= carbon disulfide
DCBA	= 3,5-dichlorobenzoic acid
BEHP	= Bis (2-ethylhexyl) phthalate
DIHP	= di-n-butylphthalate
DIEP	= diethylphthalate
Phe	= phenol
PCP	= pentachlorophenol
Nn	= N-nitrosodiphenylamine-1
Hept	= heptachlor epoxide
Endo	= Endosulfan I
bBHC	= beta-BHC
dBHC	= delta-BHC
gBHC	= gamma-BHC
Pic	= Picloram
Die	= Dieldrin
Bent	= Bentazon
DDT	= 4,4-DDT
DDE	= 4,4-DDE
Inorganics	= inorganic compounds detected; compounds exceeding background will be reported after determination of background levels.



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MMR - Impact Area Study Locations