New York State Department of Environmental Conservation, Region 5

Division of Environmental Remediation, Michael J. O'Toole, Jr., Director

NYSDEC Region 5

Atlas Missile Silo Site S-4 Additional Groundwater Monitoring Well Installations, Sampling Results, And Recommendations Final Report

February 2000

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GEORGE PATAKI, Governor

JOHN CAHILL, Commissioner

STUART BUCHANAN, Regional Director

MALCOLM PIRNIE

FIELD DATA SUMMARY

NEW YORK STATE SUPERFUND STANDBY CONTRACT
ATLAS MISSILE SITES: S-4, S-6, S-8, AND S-12
PLATTSBURGH AREA, NEW YORK

WORK ASSIGNMENT D-002852-30

NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

SEPTEMBER 1999

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0266-337/FDS

Table Of Contents

Section 1 - Executive Summary

1.1 Summary of Results

The Atlas Missile Silo Site S-4 located in the Town of Essex, Essex County, New York State is the subject of this site investigation. The owner of record is Leader Sport Product Inc., 675 North Margaret St., Plattsburgh NY, 12901. This facility was investigated by a consultant working for the Department of Defense (DOD) in 1987. The 1987 report was based on the initial investigation and sampling associated with the site.

The 1987 report documented low levels of contamination found at this site (table 1). Contamination was mainly caused by a cleaning solvent trichloroethene (TCE). In the fall of 1995 the New York State Department of Health (NYSDOH) sampled nearby residences of the atlas missile silo sites. The results of this sampling indicate that nothing was detected in the residential wells sampled. To answer the question of whether this site should be listed on the registry, the site monitoring wells were again sampled and analyzed for Volatile Organic Analysis (VOA), EPA method 8260 - GC/MS. The results of this November 5, 1996 sampling indicated contamination evident in the five well samples. Methylene chloride was present in all of the sample results, however this is a suspected lab artifact, and may not indicate actual groundwater contamination but contamination from other sources (e.g. the lab). Acetone was present in wells 401, 402, and 405, and is also a suspected lab artifact. Trichloroethene was present in wells 401 to 404 at levels at and above the established groundwater and drinking water standards. 1,2-dichloroethene was present in the sample results for wells 402, 403, and 404 also at levels exceeding the established groundwater and drinking water standards (table 2).

In the summer of 1999 the NYSDEC had three additional monitoring wells installed in the down gradient direction, two on site, and one off site, along the site access road. These wells are 200' deep. The well off site is a flowing well, indicating that there is some groundwater in this area under pressure, and this pressure is causing an upward movement of this groundwater. While some of the water produced in well 43 may be site related, the water that is coming from the fracture(s) under pressure is not site related. This makes well 43 not truly representative of the site. These three additional wells were sampled on November 8, 1999. None of the well sample results indicate contamination from volatile organic chemicals, including the TCE and DCE found in the older wells on site.

1.2 Presence of Significant Threat

There is not a significant threat posed by the contamination at the site. The estimated quantity of TCE and DCE present in the groundwater on site is less than one pound. This estimated amount is based on some very conservative assumptions, and indicates that there is no source of TCE present on site contributing to the groundwater contamination. The site itself is served by public water and the two residential wells approximately a quarter of a mile away down gradient of the site have been sampled periodically in the past and have not shown any detections of site related contaminants. The additional down gradient monitoring wells installed were sampled and no contamination was found in these wells, indicating a localized influence of the TCE / DCE contamination, limited to the area

adjacent to the silo. The recommendations from the NYSDOH May 1996 residential well sampling summary report are that the off site residential wells should not be sampled further, but the on site monitoring wells should continue to be monitored based on the proximity of the down gradient residential drinking water wells. Since that report there have been additional monitoring wells installed and sampled, and have not detected any contamination. These additional wells are installed between the older wells on site that have had a history of TCE / DCE contamination, and the residential wells down gradient. Since this area of the site and immediately off site in the down gradient direction was investigated and no contamination was found, and since the site has not had missile base operations for over 30 years, a reasonable conclusion to draw at this point is that this site does not have a source of TCE contributing to the groundwater contamination, and what contamination there is locally in the groundwater (<1 pound) is not enough to reach off site receptors, has limited impact on the site itself, and is therefore not a significant threat.

1.3 Recommended Action

This site has been investigated sufficiently to make a determination of no significant threat. This site should therefore not be included in the Registry of Inactive Hazardous Waste Disposal Sites for New York State. The work remaining at this site is the proper abandonment of the three newly installed 200' monitoring wells. These wells are open hole bedrock wells, and should not remain in place as is. They are conduits to transfer any future contamination in the upper part of the bedrock to the lower part of the bedrock (similar to the silo itself). Well 43 in particular should be abandoned, as it is currently in a flowing condition, and is acting in a reverse way; a conduit from lower strata to higher strata.

Section 2 -Introduction

2.1 Current Site Description

The site is currently used as a residence and a workshop for various local artists and crafts people. The silo doors are closed and the entrance staircase has a locked gate on it. Water is visible in the drains beside the silo and the entrance stairs on the site. The site fence is in place and the site can be locked shut. The quonset huts are being used (1 as a residence, and 1 as a workshop) and a pole barn on site is used as storage.

2.2 Previous Investigations

2.2.1 1987 DOD Report

The Atlas Missile Silos are former Department of Defense (DOD) sites that have been initially investigated and reported by a contractor working for the DOD in 1987. The 1987 report included a recommendation to conduct a baseline public health assessment.

Table 1
Summary of 1987 DOD Report

Contaminant	Well Numbers	Level (ppb)	DW Std	GA Std
methylene chloride	403, trip blank**	8.1, 14	5	0.8
chloroform	404, trip blank, sample blank**	3.6, 7.1, 5.9	50	7
trichloroethene	401, 402, 403, 404, silo	6.8, 9.7, 20, 15, 5.7	5	5
trans-1,2-dichloroethene	402, 403, 404	<5 (below MDL)***, 8.7, 18	5	5
total chromium	402, 403	42, 32 (39 dup.)	100	50
total lead	401, 402, 403, silo	7, 32, 21 (21 dup.) , 5	15 *	25
total arsenic	403	6 (8 dup.)	50	25
total barium	401, 402, 403, 404, silo, 405	73, 262, 170 (170 dup.), 94, 37, 38	2,000	1,000

Notes:

* The lead action levels is exceeded if the concentration of lead in more than 10 % of one liter first draw tap samples collected during any monitoring period exceeds 0.015 milligrams per liter. (NYSDOH Subpart 5-1; section 5-1.41). Later sampling of wells 402 & 403 was <5 ppb for lead.
** These chemicals were detected in the trip blanks and sample blanks and are most likely lab artifacts, and not indicative of the groundwater quality from the monitoring well.
*** MDL = Method Detection Limit

2.2.2 November 5, 1996 Monitoring Well Sampling

The results of the sample analysis were sent to the Department from the laboratory in accordance with the NYSDEC Analytical Services Protocol (ASP). The deliverables included ASP form I's and copies of chromatograms and data tables used in analysis.

The sampling results for this site detected methylene chloride, acetone, 1,2,-dichloroethene (total), and trichloroethene as specified below. Of these detections the 1,2,-dichloroethane (total), and the trichloroethene are the two contaminants that are of concern. Cis-1,2,-dichloroethene is a breakdown product of trichloroethene which was used on the site as a solvent during the operation of the missile silo.

Table 2: Results of November 5, 1996 Monitoring Well Sampling
Atlas Missile Site S-4

Well No.	Chemical	Amount (ppb)	Qualifier
MW 401	methylene chloride	9	(B) probable lab artifact
	acetone	7	(B) probable lab artifact (J) Estimated quantity, below MDL
	trichloroethene	5	
MW 402	methylene chloride	8	(B) probable lab artifact
	acetone	8	(B) probable lab artifact (J) Estimated quantity, below MDL
	1,2-dichloroethene (total)	7	
	trichloroethene	14	
MW 403	methylene chloride	2	(B) probable lab artifact (J) Estimated quantity, below MDL
	1,2-dichloroethene (total)	7	
	trichloroethene	24	
MW 404	methylene chloride	6	(B) probable lab artifact
	1,2-dichloroethene (total)	9	
	trichloroethene	3	(J) Estimated quantity, below MDL
MW 405	methylene chloride	6	(B) probable lab artifact
	acetone	14	(B) probable lab artifact

Note: parts per billion is signified by ppb in this table. All results are given in ppb.

acetone's NYSDEC GA and DOH drinking water standards are 50 ppb.

2.2.3 NYSDOH Summary Report, May 1996

The section of this residential well sampling report that applies to S-4 is included in appendix B. In the fall of 1995 the DOH sampled residences nearby the atlas missile silo sites. The results of this sampling indicate that nothing was detected in the residential wells that were sampled.

2.3 Standards Criteria and Guidance

The site has various applicable SCGs. The applicability of these SCGs requires that they be considered in the investigation of the site. The SCGs are:

- Technical and Administrative Guidance Memorandum (TAGM) 4046.
- Technical Operations and Guidance Series (TOGS) 1.1.1.
- Part V of 10NYCRR - NYSDOH Drinking Water Standards
- 6NYCRR Parts 371 & 375, 376, 700-705.
- Fish And Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA)

Section 3 - Scope Of Work - 1999 Field Investigation

3.1 Investigation Objective

The objective of the investigation was to determine if there is a need for continued action at this site in terms of contamination resulting from operations of the missile silo. Specifically, the objective was to determine if the Atlas Missile Silo Sites should be added to the Registry of Inactive Hazardous Waste Sites for New York State. Currently only S-11 is listed on the registry (# 510009). This 1999 phase of the investigation included installation of three down gradient monitoring wells, 200' deep, sampling and analysis of these three wells, and the preparation of this report documenting the findings from the sampling and analysis and presenting a conclusion regarding the site status.

3.2 Sample Collection

Samples were collected from the three newly installed monitoring wells using dedicated tubing, and a pump for 41 and 42. Well 43 was in a flowing condition and was sampled directly form the top of the casing. Some of the water coming from well 43 is coming from a source other than the missile silo. This water is under pressure (thus the flowing condition of the well). The water sample taken from this well is therefore not truly representative of the site conditions at the missile silo. While some of the water in well 43 may be connected to the site, some of it is also being pushed into the well from a different location.

3.3 Sample Analysis

The samples, including trip blanks, were sent to Roy F. Weston Inc. Laboratory in Lionville Pennsylvania and analyzed in accordance with USEPA method 8260 - GC/MS. A trip blank was included in the sampling.

Section 4 - Investigation Results - 1999 200' Monitoring Wells; Installation and Sampling

The sample results for the three new monitoring wells are all non-detect. The sample summary sheets are attached in Appendix A. Monitoring well locations are shown on figure 2. The 1996 sampling of the existing monitoring wells indicated that there may be a plume of TCE contaminated groundwater migrating off site in the direction of two residential drinking water wells. This was the basis for drilling three additional wells, all at 200 feet deep to establish if there was a plume of TCE contamination migrating from the site. The results from the three monitoring wells were all non-detect for the volatile organic chemicals analyzed for, including TCE (see appendix A). The section of the Field Data Summary, New York State Superfund Standby Contract, Atlas Missile Sites: S-4, S-6, S-8, and S-12, Plattsburgh Area, New York describing the monitoring well installation, that applies to S-4, is included as Appendix C.

Section 5 - Presence of Significant Threat & Calculations of Quantity Estimate

5.1 Presence of Significant Threat

The on site TCE groundwater contamination does not represent a significant threat to human health and the environment. The non-detect sample results from the three additional monitoring wells in combination with the lower levels of TCE seen in the other monitoring wells on site are the basis for the conclusion that there is not a significant threat posed by the TCE contamination of the groundwater at this site. While it is true that TCE was present in wells 401 - 404, the levels seen were on the order of single digit part per billion levels, not indicative of a continuing source area. Calculations of the estimated quantity of TCE and DCE present in the water on site is less than 1 pound. This amount is not a significant threat to the potential receptors off site (i.e, the two down gradient drinking water wells). The site itself is served by public water from another source, so the groundwater on the site is not used as a drinking water source. There are three deep wells between the area of monitoring wells 401 - 404, and the nearest drinking water supply wells, that have been sampled and have come back non-detect for TCE.

The levels of contamination in wells 401 - 405 have not substantially changed over the past thirteen years, and the recently installed monitoring wells between the site and the residential wells show no contamination by TCE . The site therefore does not pose a significant threat to the residential wells down gradient of the site. Since this site is more than thirty years old, and the TCE has not migrated off the site yet, the reasonable conclusion would be that TCE contaminated groundwater would not migrate off the site to any significant degree.

5.2 Estimate of Quantity of TCE and Cis-1,2 - Dichloroethene

The calculations to determine the amount of TCE related products (i.e., TCE and cis- 1,2 - dichloroethene) are presented here. There were several assumptions made and are listed below. These are conservative assumptions and represent the worst possible case scenario.

1. An average concentration of the 1996 sampling data is sufficient to use for estimate calculations.
2. The depth of contamination will be the depth of the silo (200').
3. The total depth of water is the depth of the screen in well 401 - the average depth to the top

of the water. 200' - 10' = 190'

4. Areal extent is the exterior fence in the direction of flow to the quonset huts. 480' X 480' = 230,400 ft.^{2}
5. Volume of water in bedrock fissures is negligible when compared to the volume of water in the silo, and in the overburden soil.
6. Silo water volume is 190' deep by 60' diameter (V= PI *r^2 * h)
   V= (3.1417etc.)(30')^2(190') = 537,212 ft^3 * 7.48 = 4,018,348 gal. * 3.785 = 15,209,447 liters
7. Void space in soil is 20%, 10' of soil, approximately 4' is saturated
   V=20% X Area X Depth of saturated soil = (.20)(230,400 ft^2)(4ft)=184,320 ft^3
   V=184,320 ft^3 * 7.48 = 1,378,713 gal. * 3.785 = 5,218,428 liters
8. Average concentrations:
   TCE: (5+14+24+3)/4 = 11.5 ug/l
   cis-1,2 - dichloroethene: (7+7+9)/3 = 7.6 ug/l
9. Estimated amounts:
   TCE (silo): 15,209,447 l X 11.5 ug/l = 174,908,640 X 10^{-6} g = 175 g*2.205 X 10^{-3}=0.39 lb.
   TCE (soil water): 5,218,428 l X 11.5 ug/l X 2.205 X 10^{-9} = 0.13 lb. ***0.52 lbs. TCE***

   cis- 1,2 - dichloroethene (silo):15,209,447 l X 7.6 ug/l X 2.205 X 10^{-9} = 0.25 lb.
   cis- 1,2 - dichloroethene (soil water): 5,218,428 l X 7.6 ug/l X 2.205 X 10^{-9} = 0.09 lb.
   Total cis- 1,2 - dichloroethene: 0.34 lbs
   Total of both TCE & cis- 1,2 - dichloroethene: 0.86 lbs.

Section 6 - Recommendations

6.1 Recommended Site Classification

The recommendation for Atlas Missile Silo S-4 in Essex New York is that it not be pursued further as a "P" site. There is no significant threat posed by the TCE / DCE groundwater contamination at this site. There is TCE / DCE in the groundwater on the site, but it does not appear to be migrating towards the two drinking water wells down gradient of the site, and the groundwater on site is not used as a drinking water source.

6.2 Future Work

The work remaining at this site is the proper abandonment of the three newly installed 200' monitoring wells. These wells are open hole bedrock wells, and should not remain in place as is. They are conduits to transfer any future contamination in the upper part of the bedrock to the lower part of the bedrock (similar to the silo itself). Well 43 in particular should be abandoned, as it is currently in a flowing condition, and is acting as in a reverse way, a conduit from lower to higher strata.

Section 7 - References

Field Data Summary, New York State Superfund Standby Contract, Atlas Missile Sites: S-4, S-6, S-8, and S-12, Plattsburgh Area, New York, September 1999, prepared by Malcolm Pirnie Inc., Buffalo New York.

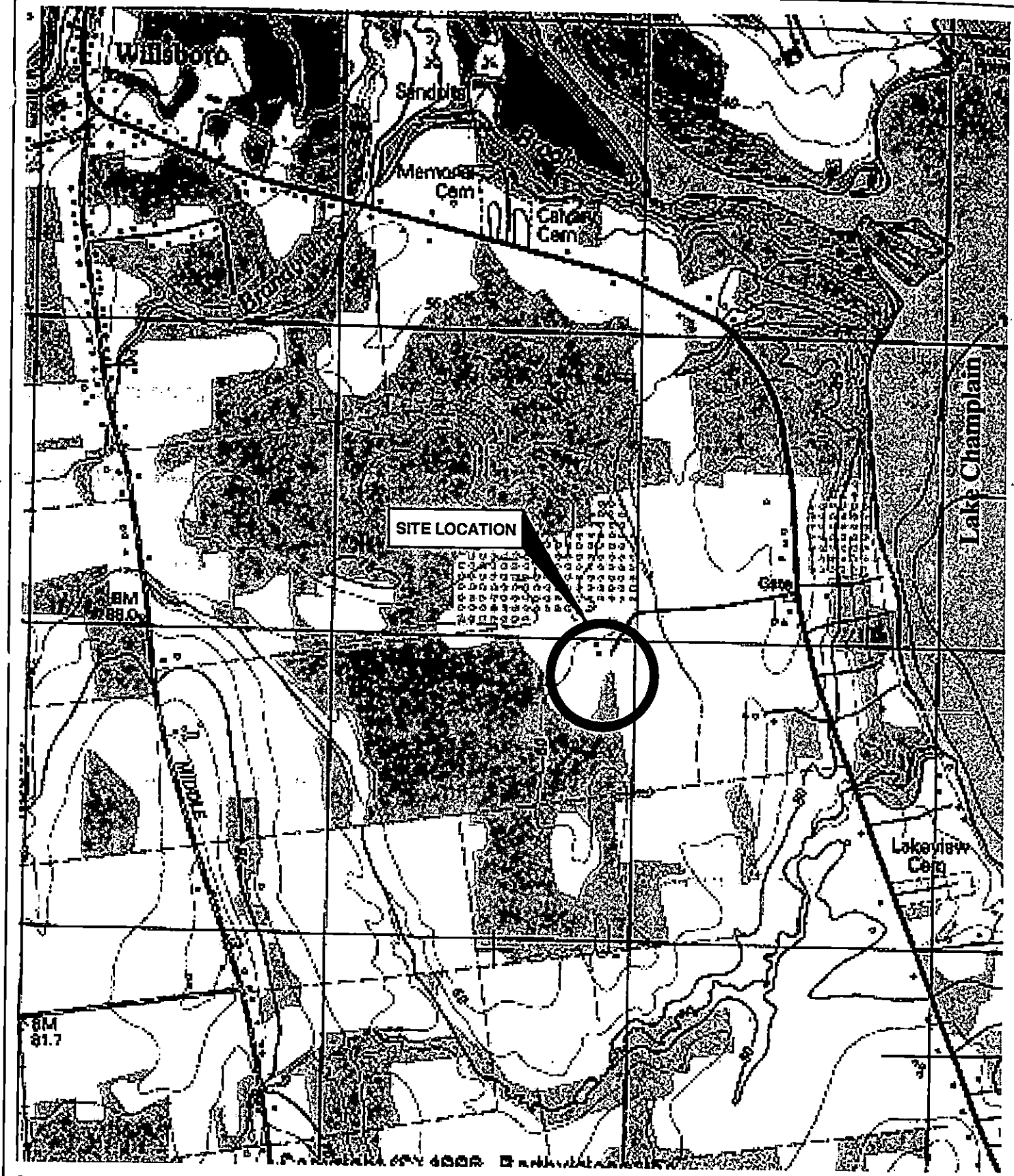
Sample Data Package: RFW Batch 9911L663, NYSDEC ID: SH599-11899-B08141, B08142, B08143, B08TB, December 1999, Recra Environmental Inc., Lionville Pennsylvania,

Final Report Confirmation Study of Former Atlas Missile Sites For Potential Toxic and Hazardous Waste Contamination Former Atlas Site S-4, Essex, New York, May 1987, for the U.S. Army Corps of Engineers, Kansas City Missouri; prepared by Law Environmental, Atlanta Georgia

Summary Report 1995 NYSDOH Residential Well Sampling of Atlas Missile Silo Sites, May 1996, NYSDOH.

Figure 1 Atlas Missile Site S-4 Site Location Map

FIGURE 1



Source: U.S.G.S. Quadrangle Map - Willsboro

ATLAS SITE S-4
ESSEX, NEW YORK
SITE LOCATION MAP

MALCOLM PIRNIE

APRIL 1999

Figure 2 Atlas Missile Site S-4 Site Map

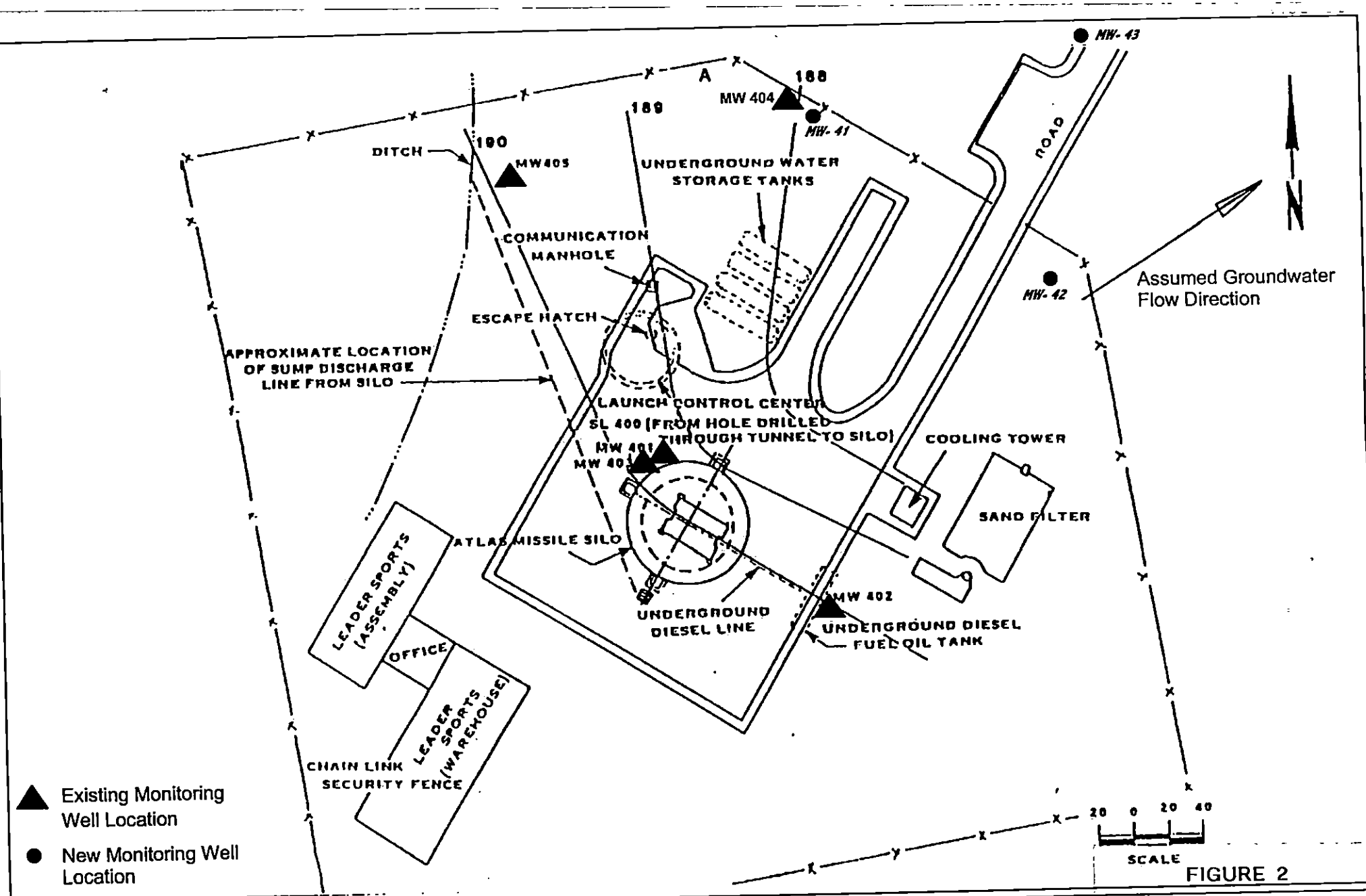


FIGURE 2

ATLAS SITE S-4
ESSEX, NEW YORK

NEW MONITORING WELL LOCATIONS

OCTOBER 1999

MALCOLM PIRNIE

Appendix A: Sample Results Summary Sheet for S-4, 1999 and 1996

Recra LabNet - Lionville Laboratory
Volatiles by GC/MS, HSL List
Report Date: 12/17/99 12:45

RFW Batch Number: 9911L663 Client: NYSDEC Work Order: 01667600001 Page: 1a

Sample Information	Cust ID:	SH599-11899-B08141	SH599-11899-B08141	SH599-11899-B08141	SH599-11899-B08142	SH599-11899-B08143	SH599-11899-B08TB1
	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Surrogate Recovery	Toluene-d8	99 %	94 %	96 %	105 %	100 %	102 %
	Bromofluorobenzene	93 %	88 %	95 %	92 %	93 %	96 %
	1,2-Dichloroethane-d4	107 %	85 %	95 %	103 %	102 %	100 %
Chloromethane		10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane		10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride		10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane		10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride		8 B	5 U	1 JB	9 B	6 B	7 B
Acetone		1 JB	10 U	10 U	1 JB	2 JB	2 JB
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene		5 U	89 %	80 %	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)		5 U	5 U	5 U	5 U	5 U	5 U
Chloroform		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone		10 U	10 U	10 U	1 JB	2 JB	1 JB
1,1,1-Trichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride		5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane		5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene		5 U	87 %	90 %	5 U	5 U	5 U
Dibromochloromethane		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
Benzene		5 U	97 %	98 %	5 U	5 U	5 U
Trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U
Bromoform		5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone		10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone		10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U	5 U
Toluene		5 U	94 %	92 %	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 9911L663 Client: NYSDEC Work Order: 0166760001 Page: 10

Cust ID:	SH599-11899-B08141	SH599-11899-B08141	SH599-11899-B08141	SH599-11899-B08142	SH599-11899-B08143	SH599-11899-B08TB1
RFW#:	001	001 MS	001 MSD	002	003	004
Chlorobenzene	5 U	94 %	95 %	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5 U	5 U	5 U	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

	Cust ID:	VBLKYO		VBLKBJ		VBLKBJ BS		VBLKZJ	
Sample Information	RFW#:	99LVN407-MB1		99LVH547-MB1		99LVH547-MB1		99LVN410-MB1	
	Matrix:	WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00	
	Units:	UG/L		UG/L		UG/L		UG/L	
Surrogate Recovery	Toluene-d8	103	%	96	%	97	%	101	%
	Bromofluorobenzene	88	%	92	%	92	%	94	%
	1,2-Dichloroethane-d4	94	%	85	%	87	%	105	%
Chloromethane		10	U	10	U	10	U	10	U
Bromomethane		10	U	10	U	10	U	10	U
Vinyl Chloride		10	U	10	U	10	U	10	U
Chloroethane		10	U	10	U	10	U	10	U
Methylene Chloride		10		9		17	B	5	J
Acetone		5	J	5	J	8	JB	3	J
Carbon Disulfide		5	U	5	U	5	U	5	U
1,1-Dichloroethene		5	U	5	U	90	%	5	U
1,1-Dichloroethane		5	U	5	U	5	U	5	U
1,2-Dichloroethene (total)		5	U	5	U	5	U	5	U
Chloroform		5	U	5	U	5	U	5	U
1,2-Dichloroethane		5	U	5	U	5	U	5	U
2-Butanone		1	J	10	U	10	U	1	J
1,1,1-Trichloroethane		5	U	5	U	5	U	5	U
Carbon Tetrachloride		5	U	5	U	5	U	5	U
Bromodichloromethane		5	U	5	U	5	U	5	U
1,2-Dichloropropane		5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene		5	U	5	U	5	U	5	U
Trichloroethene		5	U	5	U	90	%	5	U
Dibromochloromethane		5	U	5	U	5	U	5	U
1,1,2-Trichloroethane		5	U	5	U	5	U	5	U
Benzene		5	U	5	U	96	%	5	U
Trans-1,3-Dichloropropene		5	U	5	U	5	U	5	U
Bromoform		5	U	5	U	5	U	5	U
4-Methyl-2-pentanone		10	U	10	U	10	U	10	U
2-Hexanone		10	U	10	U	10	U	10	U
Tetrachloroethene		5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane		5	U	5	U	5	U	5	U
Toluene		5	U	5	U	94	%	5	U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 9911L663 Client: NYSDEC Work Order: 0168700001 Page: 33

Cust ID:	VBLKYO	VBLKBJ	VBLKBJ BS	VBLKZJ
RFW#:	99LVN407-MB1	99LVH547-MB1	99LVH547-MB1	99LVN410-MB1
Chlorobenzene	5 U	5 U	93 %	5 U
Ethylbenzene	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U
Xylene (total)	5 U	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

	Cust ID:	SH5961105B08 1TB		SH5961105B08 143		SH5961105B08 141		SH5961105B08 142		SH5961105B08 144		SH5961105B08 145	
Sample Information	RFW#:	001		002		003		004		005		006	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	UG/L		UG/L		UG/L		UG/L		UG/L		UG/L	
Surrogate Recovery	Toluene-d8	97	%	99	%	100	%	99	%	101	%	100	%
	Bromofluorobenzene	90	%	92	%	93	%	98	%	98	%	95	%
	1,2-Dichloroethane-d4	92	%	97	%	94	%	106	%	104	%	104	%
Chloromethane		10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane		10	U	10	U	10	U	10	U	10	U	10	U
Vinyl Chloride		10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane		10	U	10	U	10	U	10	U	10	U	10	U
Methylene Chloride		4	BJ	2	BJ	9	B	8	B	6	B	6	B
Acetone		3	BJ	10	U	7	BJ	8	BJ	10	U	14	B
Carbon Disulfide		5	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethene		5	U	5	U	5	U	5	U	5	U	5	U
1,1-Dichloroethane		5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloroethene (total)		5	U	7		4	J	7		9		5	U
Chloroform		5	U	2	J	5	U	5	U	5	U	5	U
1,2-Dichloroethane		5	U	5	U	5	U	5	U	5	U	5	U
2-Butanone		10	U	10	U	10	U	10	U	10	U	10	U
1,1,1-Trichloroethane		5	U	5	U	5	U	5	U	5	U	5	U
Carbon Tetrachloride		5	U	5	U	5	U	5	U	5	U	5	U
Vinyl Acetate		10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane		5	U	5	U	5	U	5	U	5	U	5	U
1,2-Dichloropropane		5	U	5	U	5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene		5	U	5	U	5	U	5	U	5	U	5	U
Trichloroethene		5	U	24		5		14		3	J	5	U
Dibromochloromethane		5	U	5	U	5	U	5	U	5	U	5	U
1,1,2-Trichloroethane		5	U	5	U	5	U	5	U	5	U	5	U
Benzene		5	U	5	U	5	U	5	U	5	U	5	U
Trans-1,3-Dichloropropene		5	U	5	U	5	U	5	U	5	U	5	U
Bromoform		5	U	5	U	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone		10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone		10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene		5	U	5	U	5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane		5	U	5	U	5	U	5	U	5	U	5	U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 9611L081 Client: NYSDEC Work Order: 01667010001 Page: 1b

Cust ID:	SH5961105B08 1TB	SH5961105B08 143	SH5961105B08 141	SH5961105B08 142	SH5961105B08 144	SH5961105B08 145
RFW#:	001	002	003	004	005	006
Toluene	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5 U	5 U	5 U	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

Appendix B:. Sections of the 1996 NYSDOH Residential Well Sampling of Atlas Missile Silo Sites, May 1996 that apply to S-4

SUMMARY REPORT

1995 NYSDOH Residential Well Sampling of Atlas Missile Silo Sites

May 1996

Introduction

The Atlas Missile Silo sites associated with the Plattsburgh Air Force Base were operated by the United States Department of Defense as part of the Intercontinental Ballistic Missile (ICBM) program. Ten(10) of these sites operated in northern New York State from the early 1960's until 1965 (refer to Figure 1, Attachment 1). Each missile silo site consisted of an underground silo (174 feet deep and 69 feet in diameter), a missile, a launch control center, and above ground maintenance buildings, security systems, and waste treatment facilities (septic leachfield). Activities at these sites which produced potential contaminants included: propellant storage (kerosene & liquid oxygen), underground fuel storage (diesel), operation of hydraulic systems and equipment maintenance (petroleum oil, lubricants and solvents).

The Department of Defense initiated preliminary investigations in the late 1980's, entitled "confirmation studies", to "assess the potential existence of toxic or hazardous contamination" at former Atlas Missile sites located in northern New York State.

Based on a review of these preliminary investigation, the New York State Department of Health (NYSDOH) sampled residential wells near these Missile Silo sites in 1995. This report summarizes the results of the NYSDOH sampling activities and includes recommendations about the need for additional investigation or groundwater monitoring at each site.

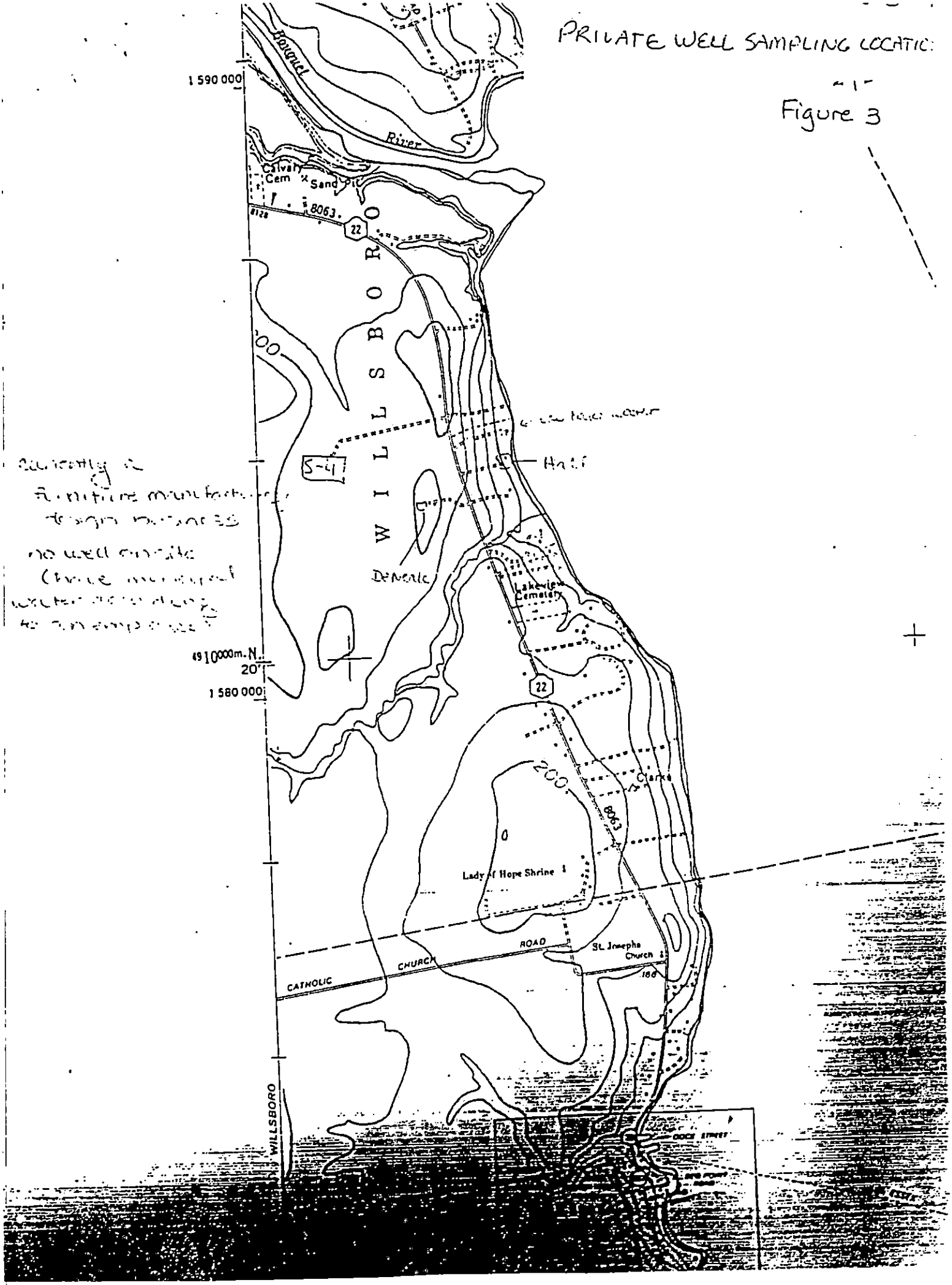
Two topographically downgradient wells were sampled by NYSDOH staff on July 13, 1995 (refer to Figure 3, Attachment 1). The samples were analyzed for VOCs and metals. No VOCs were detected and all metals were below NYSDOH drinking water standards for public water supplies. A summary of the sampling data is included in Attachment 2, Table 1.

The Missile Silo site is currently occupied by a furniture manufacturing/design business. According to the site operator, there is no on-site well; the site is served by municipal water.

The May 1987 confirmation study prepared for this site for the US Army Corps of Engineers indicated that trichloroethene was present in on-site groundwater monitoring wells at levels ranging from 6.5 to 20 mcg/l and trans-1,2-dichloroethene was detected at levels ranging from <0.50 - 18 mcg/l. The underground silo water sample contained trichloroethene at 5.7 mcg/l. Based on the data reviewed, further investigation of possible off-site groundwater contamination is not warranted at this time. However, monitoring of on-site groundwater monitoring wells should be continued due to the proximity of downgradient residential drinking water wells.

PRIVATE WELL SAMPLING LOCATIC

Figure 3



Site	Name	Address	City,State Zip	County	Phone #	Well	Notes	Date	Letter	VOCs	Ketones	Metals
S-1	Bonneau, Norman	41 Missile Base Rd.	Champlain, NY 12919	Clinton	298-8457	drilled, sulfur odor		7/11/95	8/23/95	ND	NA	NA
S-1	Gooley, Bertha	PO Box 572	Champlain, NY 12919	Clinton	298-2713	dug, 12 ft.		7/11/95	9/14/95	ND	NA	Fe:1.1mg/L Mn:.24mg/L
S-1	Parsons, Sharon	63 Missile Base Rd.	Champlain, NY 12919	Clinton	298-2076	15-25 ft.		7/11/95	8/23/95	ND	ND	ND
S-4	DeNeale, Richard	PO Box 398, Lakeshore Rd.	Willsboro, NY 12996	Essex	963-8922	300 ft. drilled		7/13/95	8/23/95	ND	NA	ND
S-4	Hall, Dorothy G.	204 Lakeshore Rd	Willsboro, NY 12996	Essex	963-8601 or 804-355-0200	2 yr. old, drilled well		7/13/95	8/23/95	ND	NA	NA
S-5	Bombard, Debra/ Allen Rogers Ltd.	Hale Hill Rd., PO box 68	Lewis, NY 12950	Essex	873-6705	dug, spring fed		7/13/95	8/23/95	ND	NA	NA
S-5	Burke, David	425 Deerhead Corners	Lewis, NY 12950	Essex	873-9950	dug, 8 ft?		7/13/95	8/23/95	ND	NA	NA
S-5	Mitchell, Steve & Allen	HCR 1, Box 412	Lewis, NY 12950	Essex	863-2607	120 ft., drilled		7/13/95	8/23/95	ND	NA	NA
S-6	Chamberlin, Catherine	PO Box 395	Ausable Forks, NY 12912	Clinton	647-2178	drilled		7/12/95	8/23/95	ND	ND	ND
S-6	Smith, Bruce	1998 Route 9N	Ausable Forks, NY 12912	Clinton	647-8498	dug, 7 ft.		7/12/95	8/23/95	ND	NA	NA
S-6	Wilkins, Ron & Judy	1974 Route 9N	Ausable Forks, NY 12912	Clinton	647-5987	dug		7/12/95	8/23/95	ND	NA	NA
S-7	Hadley, Melinda	HC1 Box 61	Vermontville, NY 12989	Franklin	891-4302	drilled		7/12/95	8/23/95	ND	ND	ND
S-7	Muir, James	Box 58, Rte. 3	Onchiota, NY 12989	Franklin	891-1297	280 ft.		7/12/95	8/23/95	ND	ND	ND
S-7	Nichols, Clay	PO Box 68	Onchiota, NY 12989	Franklin	891-4769	35 ft.		7/12/95	8/23/95	hexachloro butadiene: 0.8	acetone: 10	lead: 10 mcg/L

Appendix C: Sections of the Field Data Summary, New York State Superfund Standby Contract, Atlas Missile Sites: S-4, S-6, S-8, and S-12, Plattsburgh Area, New York, September 1999, that apply to S-4

MALCOLM PIRNIE

FIELD DATA SUMMARY
NEW YORK STATE SUPERFUND STANDBY CONTRACT
ATLAS MISSILE SITES

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

MALCOLM PIRNIE

TABLE OF CONTENTS (continued)

LIST OF APPENDICES

MALCOLM PIRNIE

1.0 INTRODUCTION

Malcolm Pirnie Inc. has completed the field activities described in the June 1999 New York State Superfund Standby Contract Site Investigation Work Plan for the Atlas Missile Sites: S-4, S-6, S-8, and S-12. This document presents a compilation of field data collected during the investigation conducted from July-September 1999 and includes:

- Site Maps
- Stratigraphic Borehole Logs
- Well Construction Diagrams
- Well Completion
- Well Development Data
- Laboratory Analytical Results

Brief descriptions of the work scope and data collected are presented in the following sections. Interpretations of the data will be presented in a summary report prepared by the New York State Department of Environmental Conservation (NYSDEC).

2.0 SITE MAP PREPARATION

The deep bedrock groundwater monitoring systems at each Atlas Missile site identified above consists of three to four newly installed monitoring wells designated as follows:

Site No.	S-4	S-6	S-8	S-12
Well Nos.	MW-41	MW-61	MW-81	MW-121
	MW-42	MW-62	MW-82	MW-122
	MW-43	MW-63	MW-83	MW-123
		MW-64		MW-124

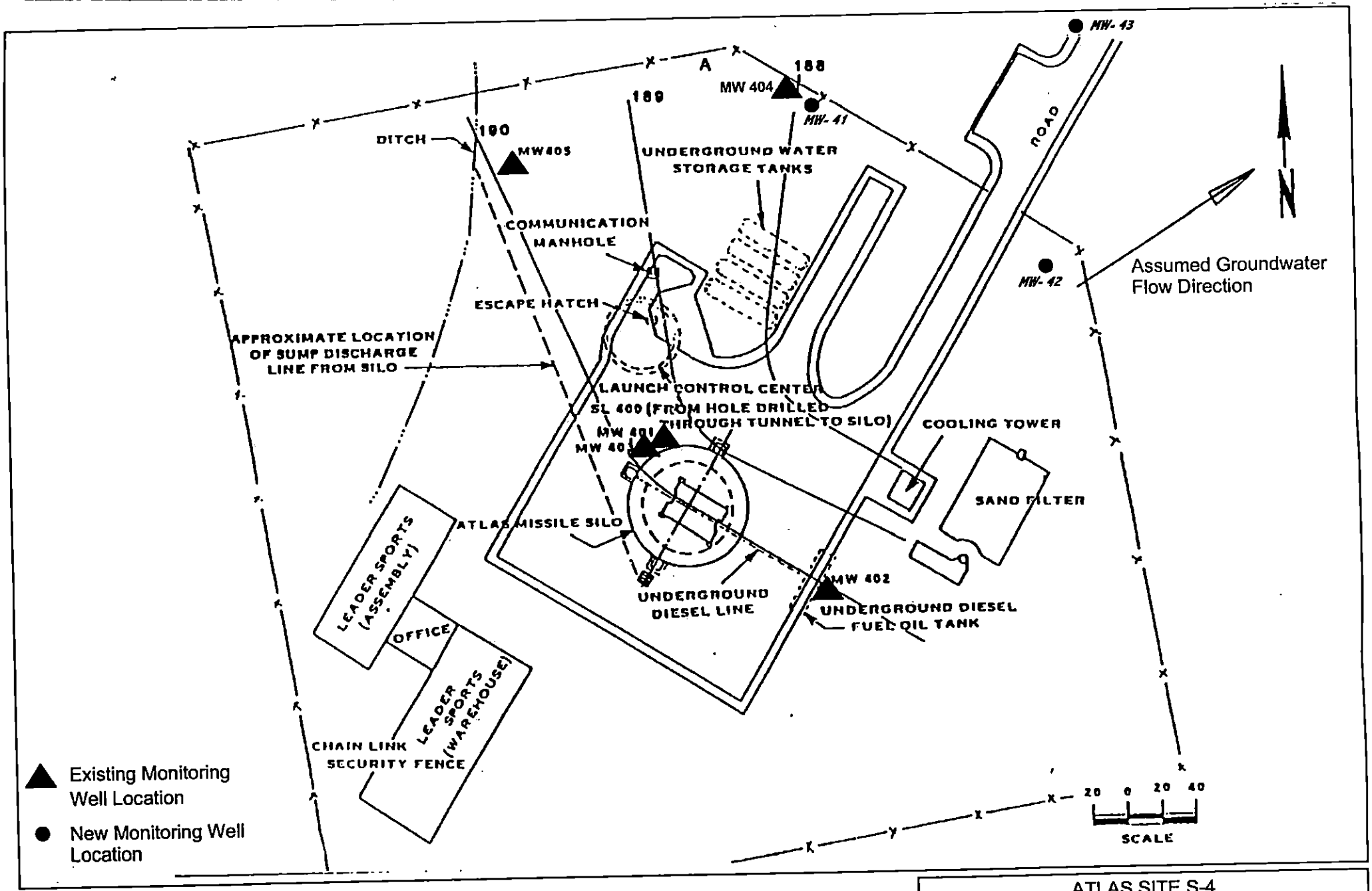
The site maps, originally presented as Figures 2-1 through 2-4 in the Atlas Missile Work Plan have been modified to include the approximate location of the newly installed monitoring wells. The well locations were selected during the NYSDEC-coordinated site walkover conducted on June 29, 1999. The locations of the new monitoring wells, as shown on the site maps, have not been surveyed to ascertain either vertical or horizontal measurements. Site maps are presented on Figures 2-1 through 2-4.

3.0 STRATIGRAPHIC AND WELL CONSTRUCTION LOGS

The drilling program included the drilling and installation of 14 new bedrock groundwater monitoring wells as identified in Section 2.0 above. Mud rotary and air hammer drilling methods were employed to facilitate borehole advancement and monitoring well installation. Representative samples of drill cuttings were collected at five-foot increments during borehole advancement to characterize bedrock stratigraphy. The samples were described on stratigraphic borehole logs by Malcolm Pirnie personnel and are presented in Appendix A. Well construction data is also provided in Appendix A and is summarized in Table 1.

4.0 WELL COMPLETION

Subsequent to advancement of the borehole to total well depth, each well was completed with a locking, permanent well cover affixed to the 6-inch diameter steel casing. All wells were secured with keyed-alike padlocks (masterlock key no. 3252). Appendix C contains one well key.



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ATLAS SITE S-4
ESSEX, NEW YORK

NEW MONITORING WELL LOCATIONS

OCTOBER 1999

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Table 1
Monitoring Well Construction Summary
Atlas Missile Sites (S-4, S-6, S-8 and, S-12)
Plattsburgh Area, New York

Well #	Date Completed	Depth to Bedrock (ft)	Depth of 6" Diameter Casing (ft)	Open Hole Interval	Total Well Depth (ft)
Site S-4					
MW-41	7/26/99	8.0	18.0	18.0 - 200.0	200.0
MW-42	7/23/99	34.5	41.0	41.0 - 200.0	200.0
MW-43	7/27/99	60.0	65.0	65.0 - 200.0[(1)]	200.0
Site S-6					
MW-61	8/9/99	64.0	69.0	69.0 - 200.0	200.0
MW-62	8/13/99	61.0	66.0	66.0 - 200.0	200.0
MW-63	8/16/99	115.0	120.0	120.0 - 200.0	200.0
MW-64	8/17/99	77.0	82.0	82.0 - 200.0	200.0
Site S-8					
MW-81	8/2/99	57.0	61.0	61.0 - 200.0	200.0
MW-82	8/3/99	75.0	80.0	80.0 - 200.0	200.0
MW-83	8/4/99	48.0	53.2	53.2 - 200.0	200.0
Site S-12					
MW-121	8/27/99	54.0	61.0	61.0 - 200.0	200.0
MW-122	8/26/99	65.0	68.0	68.0 - 200.0	200.0
MW-123	8/23/99	68.0	71.0	71.0 - 200.0	188.3
MW-124	9/22/99	89.2	100.0	100.0 - 200.0	200.0

Notes:
All depths are depth below ground surface.
[(1)] Forty (40) feet of 2-inch sch 40 PVC well materials partially obstruct 160 -200' interval.

5.0 WELL DEVELOPMENT

Prior to development, static water level elevations were measured in all newly installed monitoring wells. Table 2 presents a compilation of water level data measured during the development process. The monitoring wells were then purged and developed in accordance with the procedures specified in the Work Plan. All deep bedrock wells exhibited some well recharge and recovery ranging from a low estimated at less than .5 gallons per minute (gpm) at well location MW-63, to more than 500 gpm at monitoring well MW-124. Well development at all locations was completed using a nominal 4-inch diameter submersible pump capable of purging 8-25 gpm. A summary of field analytical parameters measured during the well development process is presented as Table 2 with the Well Development and Purging Logs in Appendix B.

6.0 GROUNDWATER ANALYTICAL RESULTS

Groundwater was sampled for chlorinated volatile organic compounds (VOCs) that included trichloroethene and its breakdown products (cis-1,2-dichloroethene, trans-1,2 dichloroethene, and vinyl chloride). Three to five groundwater samples were collected from the bedrock at each well location during borehole advancement. Each sample was collected from either an openhole interval, or from a discrete stratigraphic interval that was isolated using a single 4-inch diameter packer assembly. Interval-specific groundwater samples were collected using a precleaned 1¼ -inch PVC or plastic disposable bailer.

Groundwater samples were sent to Friend Laboratory Inc. in Waverly, New York for analyses. Samples were analyzed using Method 8021 within 24 hours of receipt at the laboratory and analytical results were considered during the drilling program for well location and depth decisions. Analytical results for the newly installed groundwater monitoring wells are presented in Appendix D and are summarized in Table 3.

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Table 2
Well Development Summary [1]
Atlas Missile Sites (S-4, S-6, S-8 and, S-12)
Plattsburgh Area, New York

Well #	Date Developed	Well Volume	Purged Volume	pH	Conductivity (µmhos/cm)	Temperature (°F)	Turbidity (NTU)	Appearance	Comments
Site S-4									
MW-41	9/23/99	290.9	300	7.05	629	55.0	35	Clear	-Pumped well to "dry" condition
MW-42	9/23/99	291.8	600	5.21	496	55.5	15	Clear	-Pump installed to 200' bgs, repositioned to 150'bgs
MW-43	9/23/99	300.0	1,500	5.35	515	53.5	14	Clear	-Pump installed to 60' bgs, repositioned to 20' bgs
Site S-6									
MW-61	9/22/99	239.2	230	8.38	260	50.3	36	Green tint	-Well purged "dry", no recharge
MW-62	9/22/99	211.9	210	9.11	298	50.2	>100	Brown, Cloud	-Well purged "dry", no recharge
MW-63	9/22/99	172.7	165	11.40	1040	50.3	>100	Brown, Turbid	-Well purged "dry", no recharge
MW-64	9/22/99	201.2	600	8.39	225	50.1	2	Clear	-Well pumped down to ~110' bgs
Site S-8									
MW-81	9/22/99	274.2	250	9.10	338	47.9	41	Slightly turbid	-Well pumped to "dry" condition, slow recharge
MW-82	9/22/99	292.1	570	7.35	498	46.8	3	Clear	-Well capable of purging to "dryness"
MW-83	9/22/99	276.4	280	11.30	362	47.7	65	Cloudy	-Installed pump @ top and bottom of water column.
Site S-12									
MW-121	9/21/99	286.6	1,200	7.54	4570	49.8	4	Clear	-Purged water from top & bottom of water column
MW-122	9/21/99	285.7	1,000	7.90	2570	50.5	3	Clear	
MW-123	9/21/99	280.5	800	7.51	12860	50.3	7	Clear	-Well capable of purging to "dryness"
MW-124	9/21/99	282.3	360	8.06	3420	50.1	46	Cloudy	-Completed drilling to total depth of 200' bgs, -Interval specific packer testing was not conducted due to extremely fractured character of bedrock, -Purged >2000g of water with air prior to installation of submersible pump

Notes:
(µmhos/cm) - micro mhos per centimeter
°F - degree Farenheit
NTU - Nephelometric turbidity units
[1] Values presented represent final development measurements.

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Table 3
Groundwater Screening Analytical Results
Atlas Missile Sites (S-4, S-6, S-8, S-12)
Plattsburgh Area, New York

Site #	Well #	Sample Depth (ft)	Date Sampled	Analytical Results
S-4	B-41	50 – 80	7/27/99	ND
	"	80 – 120	7/26/99	ND
	"	120 – 160	7/26/99	ND
	"	160 – 200	7/26/99	ND
	B-42	80 – 120	7/23/99	ND
	"	120 – 160	7/23/99	ND
	"	160 – 200	7/23/99	ND
	B-43	65 – 80	7/27/99	ND
	"	80 – 120	7/27/99	ND
	"	120 – 160	7/27/99	ND
	"	160 – 200	7/27/99	ND
S-6	B-61	69 – 200	8/11/99	ND
	B-62	66 – 120	8/13/99	ND
	"	66 – 200	8/17/99	4 ug/l of TCE
	B-63	120 - 200	8/17/99	ND
	B-64	82 – 130	8/17/99	ND
	"	130 – 160	8/17/99	ND
	"	160 – 200	8/17/99	ND
S-8	B-81	61 – 80	7/30/99	ND
	"	80 – 120	8/2/99	ND
	"	120 – 160	8/2/99	ND
	"	160 – 200	8/3/99	ND
	B-82	80 – 110	8/3/99	ND
	"	110 – 140	8/3/99	ND
	"	140 – 170	8/3/99	ND
	"	170 – 200	8/4/99	ND
	B-83	53 – 80	8/4/99	ND
	"	120 – 160	8/4/99	ND
	"	160 – 200	8/4/99	ND
S-12	B-121	61 – 80	8/24/99	ND
	"	80 – 110	8/24/99	ND
	"	110 – 137	8/24/99	ND
	"	135 – 165	8/25/99	ND
	"	170 – 200	8/27/99	ND
	B-122	68 – 80	8/25/99	ND
	"	85 – 115	8/26/99	4 ug/l of cis12DCE
	"	120 – 160	8/26/99	ND
	"	160 – 200	8/26/99	3 ug/l of cis12DCE
	B-123	71 – 90	8/23/99	4 ug/l of cis12DCE
	"	90 – 110	8/23/99	4 ug/l of cis12DCE
	"	110 – 140	8/23/99	3 ug/l of cis12DCE
	"	140 – 170	8/24/99	ND
	"	168 – 188	8/24/99	5 ug/l of cis12DCE
	B-124	100 – 120	8/27/99	3 ug/l of cis12DCE and 1 ug/l of Benz.
	"	100 – 140	9-21-99	ND
	"	100 – 160	9-21-99	5 ug/l of cis12DCE
	"	100 – 180	9-21-99	4 ug/l of cis12DCE
	"	100 – 200	9-21-99	5 ug/l of cis12DCE

Notes: cis12DCE = cis-1,2 dichloroethene TCE = Trichloroethene
ug/l = Micrograms per liter Benz = Benzene

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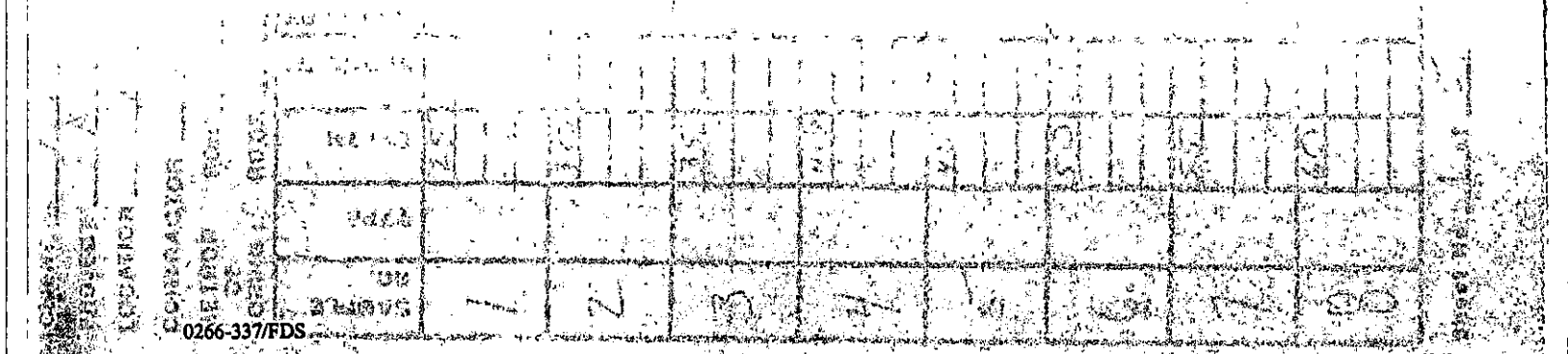
APPENDIX A

BOREHOLE AND WELL CONSTRUCTION LOGS



CLIENT [illegible]

PROJECT ATLAS Missile Inv

LOCATION Willsboro, S-4

CONTRACTOR American Auger

METHOD OF BORING: SOIL

ROCK

JOB NO. 0606-551

LOGGED BY JPH

CORE DIA.

FIELD BOREHOLE LOG

BOREHOLE NO. MW-41-99

STARTED 09:30 AM 7/26 19 99

FINISHED 19:30 PM 7/26 19 99

ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Oder, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
1		25				Limestone, dark gray-black, hard, brittle, massive	
2		30				Limestone	
3		35				Limestone	
4		40				ls, w/ calcite Machine Rifling	
5		45				Limestone w/ calcite, gypsum	
6		50				Limestone w/ calcite, gypsum	Conducted Sampling, C, 1B=50', open hole interval - borehole dry/ After waiting 1 hr 10:30-11:30
7		55				Limestone	
8		60				Limestone	

Sheet No. 1 of 5

MALCOLM PIRNIE

CLIENT NUSMC

PROJECT ATLAS Missile Inv

LOCATION Willsboro, S-4

CONTRACTOR American Auger

METHOD OF BORING: SOIL

ROCK

JOB NO. 0606-551

LOGGED BY JPH

CORE DIA.

FIELD BOREHOLE LOG

BOREHOLE NO. MW-41

STARTED 09:30 AM 7/26 19 99

FINISHED 15:30 PM 7/26 19 99

ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Oder, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
9		65				Limestone, dark gray-black w/ calcite filled fractures	
10		70				Limestone	
11		75				Limestone w/ calcite	
12		80				Limestone w/ calcite	Conducted packer test from 50-80' bgs interval sample collected @ 12:45 slow recharge @ approx .8 gal/hr pH @ 7.61 Cond @ 45 Temp @ 66.7 Turbidity @ >100
13		85				Limestone	
14		90				Limestone	
15		95				Limestone	
16		100				limestone	

MALCOLM PIRNIE

CLIENT AMSDLC
PROJECT ATHAS Missile Inv
LOCATION Willsboro, S-4
CONTRACTOR American Auger
METHOD OF BORING: SOIL
ROCK

JOB NO. 0266-337
LOGGED BY JPH
CORE DIA.

FIELD BOREHOLE LOG

BOREHOLE NO. MW-41
STARTED 09:30 AM 7/26 19 99
FINISHED 19:30 PM 7/26 19 99
ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Odor, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
17		105				Limestone	
18		110				Limestone	
19		115				Limestone	
20		120				Limestone	Conducted packer test from 80-120' interval. Collected sample @ 14:45. pH @ 8.03. Cond @ 443. Temp @ 65.8. Turbidity @ >100. Headspace.
21		125				Limestone	
22		130				Limestone	Bailed 2 gal prior to sample collection.
23		135				Limestone	
24		140				Limestone w/ calcite	

MALCOLM PIRNIE

FIELD BOREHOLE LOG

PROJECT ATLAS Missile INV
LOCATION Willsboro, S-4
CONTRACTOR American Auger
METHOD OF BORING: SOIL
ROCK
JOB NO.
LOGGED BY JPH
CORE DIA.
BOREHOLE NO. MW-41
STARTED 09:30 A.M. 7/26 19 99
FINISHED 19:30 P.M. 7/26 19 99
ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Odor, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
25		145				Limestone dark gray w/ calcite filled fractures	
26		150				Limestone A/A w/ calcite	
27		155				Limestone	
28		160				Limestone w/ shale interbeds	Conducted Packer Test @ 160 – 180' bgs interval 16:45 pH @ 8.04 Cond @ 485 Temp @ 68.3 Turbidity @ <100 Headspace H2O level @ 156.8' bgs
29		165				Limestone	
30		170				Limestone	
31		175				Limestone	
32		180				Limestone w/ calcite in fracture filling	

MALCOLM PIRNIE

FIELD BOREHOLE LOG

CLIENT NYSDEC
PROJECT ATLAS Missile INV
LOCATION
CONTRACTOR American Auger
METHOD OF BORING : SOIL
ROCK
JOB NO. 0266-337
LOGGED BY JPH
CORE DIA.
BOREHOLE NO. MW-41
STARTED 09:30 A 7/26 19 99
FINISHED 19:30 P 7/26 19 99
ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Oder, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
		185				limestone	
		190				limestone	
		195				limestone	Total depth of borehole to 200' bgs
		200					Packer tested 160-200' interval from 18:30 - 19:15
							pH 6.8 Cond 387 mS/cm Temp 56.3°F Turbidity >100 Headspace 0.0

Sheet No. 5 of 5

MALCOLM PIRNIE

ALLUVIUM PIRNIE

BEDROCK

MONITORING WELL SHEET

NYSDEC STANDBY
PROJECT Atlas Missile Proj. START DATE 7/21/99 END DATE 7/26/99

PROJECT NO. 0266-337 FIELD GEOLOGIST J.P. Hilton

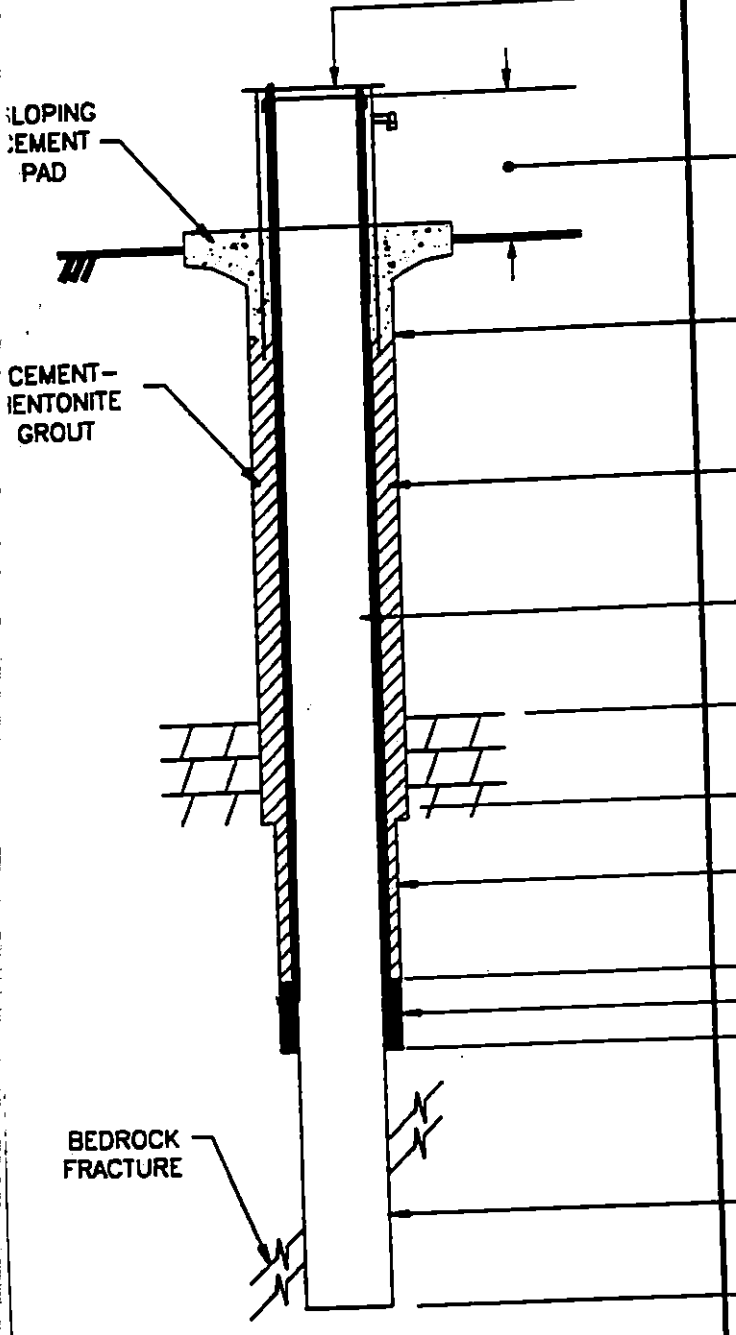
LOCATION S-4 Willsboro Site

DRILLING CO. American Auger

DRILLER (S) R. Baye

DRILLING METHOD (S) 8¼" HSA/9⅞" RB
6" Air Hammer

DEVELOPMENT METHOD (S) 4" submersible Pump



SIZE AND LENGTH OF LOCKABLE PROTECTIVE STEEL CASING 6" x 20'

LOCKED? X YES ___ NO

STICK-UP 2.0'

DEPTH TO TOP OF GROUT/ BOTTOM OF CEMENT @ grade

BOREHOLE DIAMETER 10"

CASING DIAMETER AND MATERIAL 6" Black Steel

WEATHERED ROCK DEPTH 8'

COMPETENT ROCK DEPTH NA

ROCK SOCKET DIAMETER 10"

DEPTH NA

PELLET SIZE NA

DEPTH 18'

HOLE DIAMETER 6" (CORE, ROLLER BIT, HAMMER)

DEPTH 200'

NOTE: DEPTHS ARE FEET BELOW GRADE

CLIENT NAVSEA

PROJECT ATHAS Missile Env

LOCATION Willsboro, S-4

CONTRACTOR American Augers

METHOD OF BORING: SOIL

ROCK 6" dia Air Hammer

JOB NO. 0266-351

LOGGED BY JPH

CORE DIA.

FIELD BOREHOLE LOG

BOREHOLE NO. MW-4/2-99

STARTED 09:00 AM 7/22 19 99

FINISHED 12:25 PM 7/23 19 99

ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Odor, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
1		40				Limestone, dark gray, hard, brittle	
2		45				Limestone dark gray, MASSIVE w/NO Apparent Fractures	Halt drilling @ 50' to collect sample from 41-50 open hole 12:00 - 13:00. Borehole dry after 1 hr unit
3		50				Limestone A/A	
4		55				Limestone A/A	
5		60				Limestone A/A	
6		65				Limestone A/A	
7		70				Limestone A/A with calcite filled fractures	
8		75				Limestone dark gray, brittle, w/ some calcite filled fractures	

MALCOLM PIRNIE

CLIENT: [illegible]

PROJECT: ATHAS Missile Inv

LOCATION: Willsboro, S-4

CONTRACTOR: American Auger

METHOD OF BORING: SOIL ____ ROCK ____

JOB NO. 0-666-551

LOGGED BY: JPH

CORE DIA. ____

FIELD BOREHOLE LOG

BOREHOLE NO. MW-42

STARTED 09:00 AM 7/22 19 99

FINISHED 12:25 PM 7/23 19 99

ELEVATIONS: DATUM ____

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Oder, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
9		80				Limestone dark grey, hard, brittle w/ occasional calcite as fracture fillings	Stopped drilling ops @ 80' bgs to collect VOA sample 13:45 - 14:45 borehole dry no sample collected
10		85				Limestone - A/A	
11		90				Limestone	
12		95				Limestone	
13		100				limestone	
14		105				Limestone	
15		110				Limestone w/ calcite filled fractures	fracture noted by drilling character @ approx 110-115
16		115				Limestone w/ calcite	

Sheet No. 2 of ____

MALCOLM PIRNIE

FIELD BOREHOLE LOG

PROJECT ATHAS Missile Inv
LOCATION Willsboro, S-4
CONTRACTOR American Auger
METHOD OF BORING: SOIL
ROCK
JOB NO. 0666-357
LOGGED BY JPH
CORE DIA.
BOREHOLE NO. MW-4/2-99
STARTED 09:00 AM 7/22 19 99
FINISHED 12:25 PM 7/23 19 99
ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Odor, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
17		120				Limestone	Collected sample from 80-120' interval @ 06:35 7/23 After allowing well to recharge overnight, 3.6' of water in borehole
18		125				Limestone w/ sporadic calcite, gypsum fracture filling	
19		130				Limestone	
20		135				Limestone	
21		140				Limestone	
22		145				Limestone	
23		150				Limestone	
24		155				Limestone	

MALCOLM PIRNIE

FIELD BOREHOLE LOG

PROJECT ATHAS Missile Inv
LOCATION Willsboro, S-4
CONTRACTOR American Auger
METHOD OF BORING: SOIL
ROCK
JOB NO.
LOGGED BY JPH
CORE DIA.

BOREHOLE NO. MW-4/2-99
STARTED 09:00 AM 7/22 19 99
FINISHED 12:25 PM 7/23 19 99
ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Oder, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
25		160				Limestone, dark gray, massive	Took VOA sample @ 09:45 120-160' interval Moderate recharge to borehole purged 2 gal to secure representative sample
26		165				Limestone	pH 7.72 62°F Cond 516 µS/cm Temp 62° F Turbidity >100
27		170				Limestone A/A w/ calcite as fracture filling cement, driller reports some fracturing as evidenced by drilling character	
28		175				Limestone A/A w/ shale interbeds	
29		180				Limestone	
30		185				Limestone	
31		190				Limestone	
32		195				Limestone	Took VOA sample from 160-200' interval pH 7.67 Turb <100 Cond 400 µS/cm Temp 68.4

Sheet No. 4 of 4

MALCOLM PIRNIE

MALCOLM PIRNIE

WELL NO. [illegible]

BEDROCK

MONITORING WELL SHEET

PROJECT NYSDEC STANDBY Atlas Missile Proj. START DATE 7/20/99 END DATE 7/23/99

PROJECT NO. 0266-337 FIELD GEOLOGIST J.P. Hilton

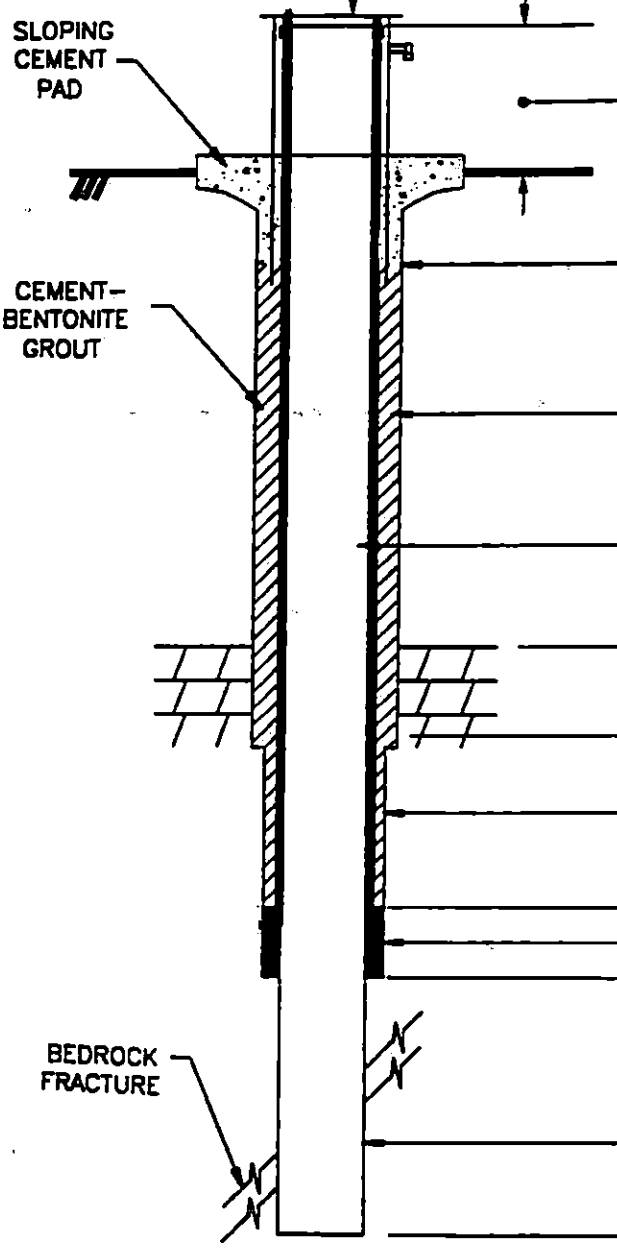
LOCATION S-4 Willsboro Site

DRILLING CO. American Auger

DRILLER (S) R. Baye

DRILLING METHOD (S) 8¼" HSA 6" Air Hammer

DEVELOPMENT METHOD (S) 4" submersible Pump



SIZE AND LENGTH OF LOCKABLE PROTECTIVE STEEL CASING 6" x 43'

LOCKED? X YES ___ NO

STICK-UP 2.5'

DEPTH TO TOP OF GROUT/ BOTTOM OF CEMENT @ grade

BOREHOLE DIAMETER 13½"

CASING DIAMETER AND MATERIAL 6" Black Steel

WEATHERED ROCK DEPTH 34.5

COMPETENT ROCK DEPTH NA

ROCK SOCKET DIAMETER 8"

DEPTH NA

PELLET SIZE NA

DEPTH 41'

HOLE DIAMETER (CORE, ROLLER BIT, HAMMER) 6"

DEPTH 200'

NOTE: DEPTHS ARE FEET BELOW GRADE

CLIENT: [illegible]

PROJECT: ATLAS MISSILE INV

LOCATION:

CONTRACTOR: AMERICAN AUGER

METHOD OF BORING: SOIL: ROCK:

JOB NO. V-606-501

LOGGED BY: JPH

CORE DIA.:

FIELD BOREHOLE LOG

BOREHOLE NO. MW-4/3-99

STARTED 08:30 AM 7/27 19 99

FINISHED ____ M ____ 19 99

ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Oder, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
1		70				Limestone dark gray-brown.	
2		75				Limestone gray-brown, fractured w/ calcite filling.	Driller reports fracturing and water recharge to borehole
3		80				Limestone A/A	Packer tested 65-80' interval good recharge to borehole
4		85				Limestone	Note water appears to carry tan-brown oxidized clay/silt/rock particulate
5		90				Limestone	pH @ 10.79 Cond @ 563 Temp @ 67.7 Turb @ >100 Headspace @ 0.3
6		95				Limestone	
7		100				Limestone	
8		105				Limestone	

Sheet No. 1 of ____

MALCOLM PIRNIE

CLIENT Nassco

PROJECT ATLAS Missile Env

LOCATION

CONTRACTOR American Auger

METHOD OF BORING: SOIL

ROCK

JOB NO. 0466-521

LOGGED BY JPH

CORE DIA.

FIELD BOREHOLE LOG

BOREHOLE NO. MW-43-99

STARTED 08:30 AM 7/27 19 99

FINISHED M 19 99

ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Odor, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
9		110				Limestone	
10		115				Limestone, gray-brown, w/ iron, calcite filled voids & fractures	Intercepted large fracture @ Appx 117-120'
11		120				Limestone	Conducted Packer Test @ 80-120' interval
12		125				Limestone	pH @ 8.08 Cond @ 369 Temp @ 64.3 Turbidity @ >100 Headspace 1.9
13		130				Limestone	
14		135				Limestone	
15		140				Limestone	
16		145				Limestone	

MALCOLM PIRNIE

FIELD BOREHOLE LOG

CLIENT AMSDEC
PROJECT ATLAS Missile Inv
LOCATION
CONTRACTOR American Auger
METHOD OF BORING: SOIL
ROCK

JOB NO. 0266-337
LOGGED BY JPH
CORE DIA.

BOREHOLE NO. MW-4/3-99
STARTED 08:30 AM 7/27 19 99
FINISHED M 19 99
ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Oder, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
17		150				Limestone	
18		155				Limestone	Conducted Packer Test Perm 170.-160' Borehole making in excess of 20 gpm pH @ 7.36 // Cond 418 us/cm Temp 63.2° F Turbidity >100 Headspace @ 0.1. Purged 95 gal prior to sampling
19		160				Limestone	
20		165				Limestone	
21		170				Limestone	
22		175				Limestone	
23		180				Limestone and Calcite, significant fracturing as indicated by amount of calcite infilling, some iron precipitation	
24		185				Limestone	

Sheet No. 3 of ____

MALCOLM DRAKE

CLIENT [illegible]

PROJECT ATLAS Missile INV

LOCATION

CONTRACTOR American Auger

METHOD OF BORING: SOIL

ROCK

JOB NO. 0466-551

LOGGED BY JPH

CORE DIA.

FIELD BOREHOLE LOG

BOREHOLE NO. MW-43-99

STARTED 08:30 AM 7/27 19 99

FINISHED PM 7/27 19 99

ELEVATIONS: DATUM

SAMPLE NO.	TYPE	DEPTH	BLOWS "N"	RECOVERY %	MOISTURE TIN NO.	SAMPLE DESCRIPTION: Color, Texture Classification, Compactness/Consistency, Moisture Condition, Weathering/Fracturing, Inclusions, Odor, Etc.	NOTES: Boring, Testing and Sampling Procedures, Water Loss and Gain Drilling and Testing Equipment, Etc.
25		190				Limestone	
26		195				Limestone	
27		200				Limestone	

Sheet No. 4 of 4

MALCOLM PIRNIE

MALCOLM PIRNIE

WELL NO. MW-10

BEDROCK

MONITORING WELL SHEET

PROJECT NYSDEC STANDBY Atlas Missile Proj. START DATE 7/21/99 END DATE 7/27/99

PROJECT NO. 0266-337 FIELD GEOLOGIST J.P. Hilton

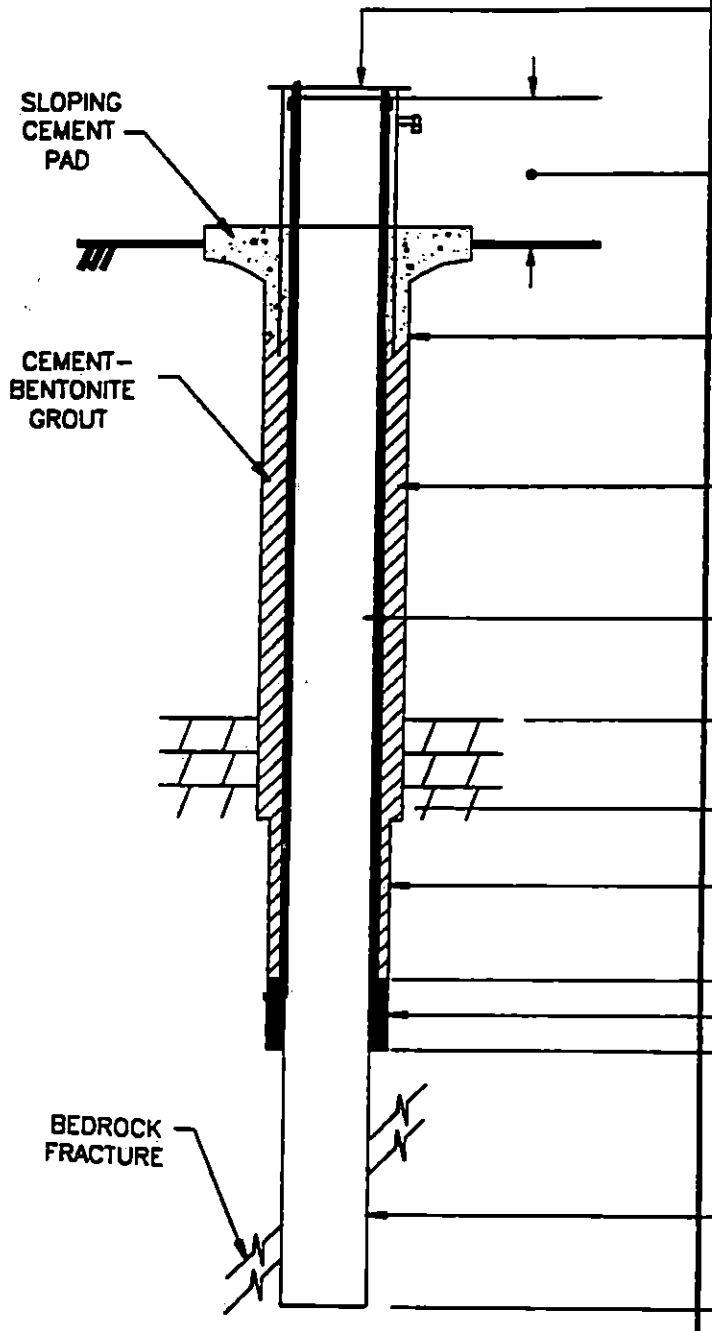
LOCATION S-4 Willsboro Site

DRILLING CO. American Auger

DRILLER (S) R. Baye

DRILLING METHOD (S) 9 7/8" RB
6" Air Hammer

DEVELOPMENT METHOD (S) 4" submersible Pump



SIZE AND LENGTH OF LOCKABLE PROTECTIVE STEEL CASING 6" x 67'

LOCKED? X YES ___ NO

STICK-UP 2.5'

DEPTH TO TOP OF GROUT/ BOTTOM OF CEMENT @ grade

BOREHOLE DIAMETER 10"

CASING DIAMETER AND MATERIAL 6" Black Steel

WEATHERED ROCK DEPTH 60'

COMPETENT ROCK DEPTH NA

ROCK SOCKET DIAMETER 10"

DEPTH NA

PELLET SIZE NA

DEPTH 65'

HOLE DIAMETER 6" (CORE, ROLLER BIT, HAMMER)

DEPTH 200'

NOTE: DEPTHS ARE FEET BELOW GRADE

MALCOLM PIRNIE

APPENDIX B

WELL DEVELOPMENT RECORDS

MALCOLM PIRNIE

WELL DEVELOPMENT / PURGING LOG

PROJECT TITLE: NYSDEC ATLAS MISSLE PROJECT

PROJECT NO. : 0266-337

STAFF: J.P. HILTON

DATE: 9/23/99

WELL NO.: MW- 41

(1) TOTAL CASING AND SCREEN LENGTH (ft.): 203.1

(2) CASING INTERNAL DIAMETER (in.): 6"

(3) WATER LEVEL BELOW TOP OF CASING (ft.): 9.16

(4) VOLUME OF WATER IN CASING (gal.): 290.9

WELL I.D.	VOL. GAL/Ft.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 [(2)^2 \times \{ (1) - (3) \}] =$ _____ GAL.

10:06 10:10 10:20

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	200	250	300								
pH	5.03	5.01	7.05								
CONDUCTIVITY	660	605	629								
TEMPERATURE	53.1	53.8	55.0								
TURBIDITY	18	25	35								
APPEARANCE	clear	clear	clear								

COMMENTS: Purged and developed using a 4-inch dia. submersible pump.

- Pumped well to "dry" condition, purged @ 25 gpm very slow recharge, well yeild estimated < 1 gpm

MALCOLM PIRNIE

WELL DEVELOPMENT / PURGING LOG

PROJECT TITLE: NYSDEC ATLAS MISSLE PROJECT

PROJECT NO. : 0266-337

STAFF: J.P. HILTON

DATE: 9/23/99

WELL NO.: MW- 42

(1) TOTAL CASING AND SCREEN LENGTH (ft.): 203.3

(2) CASING INTERNAL DIAMETER (in.): 6"

(3) WATER LEVEL BELOW TOP OF CASING (ft.): 8.76

(4) VOLUME OF WATER IN CASING (gal.): 291.8

WELL I.D.	VOL. GAL/Ft.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 [(2)^2 \times \{ (1) - (3) \}] =$ _____ GAL.

9:14 9:21 9:36 9:54 10:05

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	200	250	300	400	500	600					
pH	5.47	5.38	5.42	5.44	5.14	5.21					
CONDUCTIVITY	487	486	478	453	483	496					
TEMPERATURE	55.1	54.7	55.1	58.2	54.7	55.6					
TURBIDITY	22	15	18	26	8	15					
APPEARANCE	clear	clear	clear	green tint	clear	clear					

COMMENTS: **Purged and developed using a 4-inch dia. submersible pump.**

- pump installed to 200', pumped 400 gal @ 8gpm
- raised/repositioned pump @ 150' bgs w/ water level drawn down to 130' @ 8gpm
- continued well development @ 150' bgs, pumped total of 600 gal.

MALCOLM PIRNIE

WELL DEVELOPMENT / PURGING LOG

PROJECT TITLE: NYSDEC ATLAS MISSLE PROJECT

PROJECT NO. : 0266-337

STAFF: J.P. HILTON

DATE: 9/23/99

WELL NO.: MW- 43

(1) TOTAL CASING AND SCREEN LENGTH (ft.): 202.5

(2) CASING INTERNAL DIAMETER (in.): 6"

(3) WATER LEVEL BELOW TOP OF CASING (ft.): 2.3

(4) VOLUME OF WATER IN CASING (gal.): 300

WELL I.D.	VOL. GAL/Ft.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 [(2)^2 \times \{ (1) - (3) \}] =$ _____ GAL.

8:35 8:45 8:55 9:05 9:15

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	300	600	900	1200	1500						
pH	7.1	6.5	6.5	5.62	5.35						
CONDUCTIVITY	510	505	503	516	515						
TEMPERATURE	54.6	53.4	55.3	54.4	53.5						
TURBIDITY	4/4	31	12	13	14						
APPEARANCE	slightly turbid	clear	clear	clear	clear						

COMMENTS: **Purged and developed using a 4-inch dia. submersible pump.**

- Installed pump @ 65' bgs, 40' of 2" dia PVC in bottom of 6" borehole due to collapsed/cavernous bedrock character.
- Purged 900 gal prior to raising pump to 20' bgs, maximum drawdown @ 17.5' bgs, yeild estimated @ 50 gpm

MALCOLM PIRNIE

APPENDIX D

ANALYTICAL RESULTS

MALCOLM PIRNIE

SITE S-4

FLI
RIEND
ABORATORY
· N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 28-JUL-1999

LAB SAMPLE ID : L36516-1

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4 B-42-99
ORIGIN	B-42 (80-120')
DESCRIPTION	GRAB
SAMPLED ON	23-JUL-99 06:35 by CLIENT
DATE RECEIVED	26-JUL-99 08:51
P.O. NO.	N/A

nalysis Performed	Result		Units	Detection Limit	Date Analyzed	Method	Notebook Reference
PA 8021							
inyl chloride	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1677
rans-1,2-Dichloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1677
is-1,2-Dichloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1677
richloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1677
urrogate Recovery:							
FB-1	35	*	%				99-111-1677
FB-2	62		%				99-111-1677

nalysis Comment: * Hall surr rec low all results based on PID data.

NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____
Lab Director

EY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

e information in this report is accurate to the best of our knowledge and ability. In no event shall our liability exceed the cost of these services.
ur samples will be discarded after 14 days unless we are advised otherwise.

"Our family, caring about your analytical needs . . . Since 1963."

FLI
RIEND
BORATORY
· N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 28-JUL-1999

LAB SAMPLE ID : L36516-2

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4 B-42-99
ORIGIN	B-42 (120-160')
DESCRIPTION	GRAB
SAMPLED ON	23-JUL-99 09:45 by CLIENT
DATE RECEIVED	26-JUL-99 08:51
P.O. NO.	N/A

alysis Performed	Result		Units	Detection Limit	Date Analyzed	Method	Notebook Reference
A 8021							
nyl chloride	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1678
ans-1,2-Dichloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1678
s-1,2-Dichloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1678
ichloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1678
rrogate Recovery:							
B-1	43	*	%				99-111-1678
B-2	74		%				99-111-1678

alysis Comment: * Hall surr rec low, all results based upon PID data.

C NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____
Lab Director

EY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 28-JUL-1999

LAB SAMPLE ID : L36516-3

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4 B-42-99
ORIGIN	B-42 (160-200')
DESCRIPTION	GRAB
SAMPLED ON	23-JUL-99 11:45 by CLIENT
DATE RECEIVED	26-JUL-99 08:51
P.O. NO.	N/A

lysis Performed	Result		Units	Detection Limit	Date Analyzed	Method	Notebook Reference
8021							
yl chloride	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1679
ns-1,2-Dichloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1679
-1,2-Dichloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1679
chloroethene	U		ug/l	1	26-JUL-99	EPA 8021	99-111-1679
rogate Recovery:							
-1	44	*	%				99-111-1679
-2	78		%				99-111-1679

lysis Comment: * Hall surr rec. low, all results based upon PID data.

NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____
Lab Director

Y: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

FRIEND LABORATORY, INC.
ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 28-JUL-1999

LAB SAMPLE ID : L36516-4

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	FRIEND LABORATORY, INC.
ORIGIN	95-045-87-25
DESCRIPTION	TRIP BLANK
SAMPLED ON	23-JUL-99 00:00 by CLIENT
DATE RECEIVED	26-JUL-99 08:51
P.O. NO.	N/A

alysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
A 8021						
nyl chloride	U	ug/l	1	26-JUL-99	EPA 8021	99-111-1676
ans-1,2-Dichloroethene	U	ug/l	1	26-JUL-99	EPA 8021	99-111-1676
s-1,2-Dichloroethene	U	ug/l	1	26-JUL-99	EPA 8021	99-111-1676
ichloroethene	U	ug/l	1	26-JUL-99	EPA 8021	99-111-1676
rrogate Recovery:						99-111-1676
B-1	62	%				99-111-1676
B-2	81	%				

IC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

EY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO.: 0266-337

SITE NAME: S-4 / B-42-99

SAMPLERS (SIGNATURE): John P. Hilton

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 ML VOA METHOD 8021							REMARKS
1	7/23	06:35		X	B-42 (80-120')	2	2							L36516-1
2	7/23	09:45		X	B-42 (120-160')	2	2							-2
3	7/23	11:45		X	B-42 (160-200')	2	2							-3
					Trip Blanks	2	2	95-045-87-25						-4

*Note: 24 hr turn-around required

- Analysis to include specific analytes: TCE
  Cis 1,2-DCE
  Trans 1,2 DCE
  Vinyl Chloride

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
John P. Hilton	7/23/99 15:00				

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE/TIME	REMARKS
		Leona Jones	7/26/99 8:51	Analyses per Agreement w/ Kathy Wager

Distribution Original accompanies shipment, copy to coordinator field files

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 28-JUL-1999

LAB SAMPLE ID : L36535-1

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B41-99
ORIGIN	B-41 (50-80')
DESCRIPTION	GRAB
SAMPLED ON	26-JUL-99 13:00 by CLIENT
DATE RECEIVED	27-JUL-99 10:10
P.O. NO.	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1692
trans-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1692
cis-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1692
Trichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1692
Surrogate Recovery:						
CFB-1	62	%				99-111-1692
CFB-2	66	%				99-111-1692

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 28-JUL-1999

LAB SAMPLE ID : L36535-2

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B41-99
ORIGIN	B-41 (80-120')
DESCRIPTION	GRAB
SAMPLED ON	26-JUL-99 14:45 by CLIENT
DATE RECEIVED	27-JUL-99 10:10
P.O. NO.	N/A

alysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
A 8021						
nyl chloride	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1693
ans-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1693
s-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1693
ichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1693
rrogate Recovery:						
B-1	67	%				99-111-1693
B-2	71	%				99-111-1693

NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

EY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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FRIEND LABORATORY · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE : 28-JUL-1999

LAB SAMPLE ID : L36535-3

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE :	0266-337 S-4/B41-99
ORIGIN :	B-41 (120-160')
DESCRIPTION :	GRAB
SAMPLED ON :	26-JUL-99 16:45 by CLIENT
DATE RECEIVED :	27-JUL-99 10:10
P.O. NO. :	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1694
trans-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1694
cis-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1694
Trichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1694
Surrogate Recovery:						99-111-1694
CFB-1	66	%				99-111-1694
CFB-2	71	%				

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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FRIEND LABORATORY INC

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 28-JUL-1999

LAB SAMPLE ID : L36535-4

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	FRIEND LABORATORY, INC.
ORIGIN	95-045-87-28
DESCRIPTION	TRIP BLANK
SAMPLED ON	26-JUL-99 00:00 by LAB
DATE RECEIVED	27-JUL-99 10:10
P.O. NO.	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1691
trans-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1691
cis-1,2-Dichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1691
Trichloroethene	U	ug/l	1	27-JUL-99	EPA 8021	99-111-1691
Surrogate Recovery:						99-111-1691
CFB-1	66	%				99-111-1691
CFB-2	72	%				

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO.: 0266-337

SITE NAME: S-4 / Br 41-99

SAMPLERS (SIGNATURE): John P. Hilton

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 ML VOAs Meets BO21	REMARKS
1	7/26	13:00		X	B-41 (50-80')	2	2	L36535-1
2	7/26	14:45		X	B-41 (80-120')	2	2	-2
3	7/26	16:45		X	B-41 (120-160')	2	2	-3
4	7/26							
					Trip Blanks	2	2	-4
					95-045-87-28			

Total Bottle Count 8

Note: 24 hr turn-around required

Analyses to include:
TCE
cis 1,2-DCE
Trans 1,2 DCE
Vinyl Chloride

RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
John P. Hilton	7/26/99 18:45				
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE/TIME:	REMARKS: Analyses per Agreement w/ Kathy Wyger	
		Thomas Jones	7/27/99 10:10		

Distribution Original accompanies shipment, copy to coordinator field files

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 29-JUL-1999

LAB SAMPLE ID : L36577-1

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B-43-99
ORIGIN	B-41 (160-200)
DESCRIPTION	GRAB
SAMPLED ON	26-JUL-99 19:15 by CLIENT
DATE RECEIVED	28-JUL-99 13:22
P.O. NO.	N/A

nalysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
PA 8021						
inyl chloride	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1710
rans-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1710
is-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1710
richloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1710
urrogate Recovery:						
FB-1	90	%				99-111-1710
FB-2	96	%				99-111-1710

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 29-JUL-1999

LAB SAMPLE ID : L36577-2

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B-43-99
ORIGIN	B-43 (65-80)
DESCRIPTION	GRAB
SAMPLED ON	27-JUL-99 10:15 by CLIENT
DATE RECEIVED	28-JUL-99 13:22
P.O. NO.	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1709
trans-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1709
cis-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1709
Trichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1709
Surrogate Recovery:						
CFB-1	75	%				99-111-1709
CFB-2	82	%				99-111-1709

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 29-JUL-1999

LAB SAMPLE ID : L36577-3

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B-43-99
ORIGIN	S-4 DUP #1
DESCRIPTION	GRAB
SAMPLED ON	27-JUL-99 00:00 by CLIENT
DATE RECEIVED	28-JUL-99 13:22
P.O. NO.	N/A

nalysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
PA 8021						
inyl chloride	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1708
rans-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1708
is-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1708
richloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1708
urrogate Recovery:						
FB-1	75	%				99-111-1708
FB-2	81	%				99-111-1708

IC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: *Lab Director*

EY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

FLI
FRIEND LABORATORY · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 29-JUL-1999

LAB SAMPLE ID L36577-4

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B-43-99
ORIGIN	B-43 (80-120)
DESCRIPTION	GRAB
SAMPLED ON	27-JUL-99 12:00 by CLIENT
DATE RECEIVED	28-JUL-99 13:22
P.O. NO.	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1707
trans-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1707
cis-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1707
Trichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1707
Surrogate Recovery:						
CFB-1	82	%				99-111-1707
CFB-2	92	%				99-111-1707

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____
Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

FLI
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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 29-JUL-1999

LAB SAMPLE ID : L36577-5

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B-43-99
ORIGIN	B-43 (120-160)
DESCRIPTION	GRAB
SAMPLED ON	27-JUL-99 14:00 by CLIENT
DATE RECEIVED	28-JUL-99 13:22
P.O. NO.	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1706
trans-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1706
cis-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1706
Trichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1706
Surrogate Recovery:						99-111-1706
TFB-1	72	%				99-111-1706
TFB-2	81	%				

QC _____ NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

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ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 29-JUL-1999

LAB SAMPLE ID : L36577-6

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	0266-337 S-4/B-43-99
ORIGIN	B-43 (160-200)
DESCRIPTION	GRAB
SAMPLED ON	27-JUL-99 18:00 by CLIENT
DATE RECEIVED	28-JUL-99 13:22
P.O. NO.	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1712
trans-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1712
cis-1,2-Dichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1712
Trichloroethene	U	ug/l	1	29-JUL-99	EPA 8021	99-111-1712
Surrogate Recovery:						
CFB-1	89	%				99-111-1712
CFB-2	95	%				99-111-1712

QC NY 10252 NJ 73168 PA 68180 EPA NY 00033

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO.: 0266-337
SITE NAME: S-4 / B-43-99
SAMPLERS (SIGNATURE): John P. Hilton

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	40 ML VOAs 80Z
1	7/26	19:15		X	B-41 (160-200)	2	2
2	7/27	10:15		X	B-43 (65-80)	2	2
3	7/27				S-4 Dupl #1	2	2
4	7/27	12:00		X	B-43 (80-120)	2	2
5	7/27	14:20		X	B-43 (120-160)	2	2
6	7/27	15:20		X	B-43 (160-200)	2	2
					Trip Blanks	2	2
					95-045-87-28		
					Total Bottle Count		

136577

REMARKS:
-1
-2
-3
-4
-5
-6
-7
Next 24/hr turn-around for Analyses to include TCE
Cis 1,2-DCE
Trans 1,2-DCE
Vinyl Chloride

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
John P. Hilton	7/27/99 19:00				
		RECEIVED FOR LABORATORY BY (SIGNATURE): Doris Jones	DATE/TIME: 7/28/99 1:22	REMARKS: Analyses per MPI Agreement w/ Kathy Wager	

Distribution: Original accompanies shipment, copy to coordinator field files

FLI
FRIEND LABORATORY · N · C

ONE RESEARCH CIRCLE WAVERLY, NY 14892-1532
TELEPHONE (607) 565-3500 FAX (607) 565-4083

DATE 29-JUL-1999

LAB SAMPLE ID L36577-7

Malcolm Pirnie, Inc. - Orchard Park
Jim Richert
40 Centre Drive
Buffalo, NY 14219

SAMPLE SOURCE	FRIEND LABORATORY, INC.
ORIGIN	95-045-87-28
DESCRIPTION	TRIP BLANK
SAMPLED ON	26-JUL-99 00:00 by FLI/BB
DATE RECEIVED	28-JUL-99 13:22
P.O. NO.	N/A

Analysis Performed	Result	Units	Detection Limit	Date Analyzed	Method	Notebook Reference
EPA 8021						
Vinyl chloride	U	ug/l	1	28-JUL-99	EPA 8021	99-111-1705
trans-1,2-Dichloroethene	U	ug/l	1	28-JUL-99	EPA 8021	99-111-1705
cis-1,2-Dichloroethene	U	ug/l	1	28-JUL-99	EPA 8021	99-111-1705
Trichloroethene	U	ug/l	1	28-JUL-99	EPA 8021	99-111-1705
Surrogate Recovery:						
CFB-1	83	%				99-111-1705
CFB-2	94	%				99-111-1705

Approved by: _____ Lab Director

KEY: ND or U = None Detected < = less than ug/L = micrograms per liter (equivalent to parts per billion)
mg/L = milligrams per liter (equivalent to parts per million) mg/kg = milligrams per kilogram (equivalent to parts per million)
B = analyte was detected in the method or trip blank J = result estimated below the quantitation limit