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**RAPID RESPONSE INITIATIVE**

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**WISCONSIN AIR NATIONAL GUARD  
HEADQUARTERS, 128th TACTICAL FIGHTER WING  
TRUAX FIELD  
MADISON, WISCONSIN**

**SITE ASSESSMENT REPORT**

**VOLUME I**



HAZWRAP SUPPORT CONTRACTOR OFFICE  
Oak Ridge, Tennessee 37831-7606  
operated by

MARTIN MARIETTA ENERGY SYSTEMS, INC.  
for the

U.S. Department of Energy under contract DE-AC05-84OR21400

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**Site Assessment Report  
Wisconsin Air National Guard  
Headquarters, 128th Tactical Fighter Wing  
Truax Field  
Dane County Regional Airport  
Madison, Wisconsin**

**Volume I  
Final**

**Prepared for:  
National Guard Bureau  
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**Submitted to:  
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For the U.S. Department of Energy**

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**Under Contract No. DE-AC05-870R21706  
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**November 1991**

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## ACRONYMS

ASI	Advanced Sciences, Inc.
BGL	Below Ground Level
BTEX	benzene, toluene, ethyl-benzene, xylenes
CAP	Corrective Action Plan
CE	Civil Engineering
CME	Central Mining Equipment
DCE	1,2-Dichloroethene
DILHR	Department of Industry, Labor and Human Relations
EPA	Environmental Protection Agency
ESs	Enforcement Standards
GC	Gas Chromatograph
HAZWRAP	Hazardous Waste Remedial Actions Program
ILHR	Wisconsin Department of Industry, Labor and Human Relations
JP-4	Jet Propellant Number 4
KAPUR	Kapur and Associates, Inc.
LEL	Lower Explosive Limit
MOGAS	Motor Gas
MSL	Mean Sea Level
MW	Monitoring Well
ND	non-detect
NGB	National Guard Bureau
NR	Natural Resources
OD	Outside Diameter
PA	Preliminary Assessment
PALs	Preventive Action Limits
PEER	Peer Consultants, P.C.
PID	Photoionization Detector
PM	Project Manager
POL	Petroleum, Oils, and Lubricant
ppb	parts per billion
ppm	parts per million
PVC	Polyvinyl Chloride
SA	Site Assessment
SB	Soil Boring
SI	Site Investigation
SVOCs	Semivolatile Organic Compounds
TCE	Trichloroethane
TOC	Top of Casing
USTs	Underground Storage Tanks
VOCs	Volatile Organic Compounds
WANG	Wisconsin Air National Guard
WDNR	Wisconsin Department of Natural Resources

## 1.0 EXECUTIVE SUMMARY

Advanced Sciences, Inc. (ASI) conducted a Site Assessment (SA) from April 1 through 12, 1991 at the Wisconsin Air National Guard (WANG), 128th Tactical Fighter Wing. The WANG facility is located at the Dane County Regional Airport, Truax Field in Madison, Wisconsin. The purpose of the SA was to determine the extent of volatile and semivolatile compounds within the boundaries of the subject property. A previous Site Investigation (SI), conducted by Kapur and Associates (KAPUR) in September 1990, identified four locations within the WANG facility boundaries as potential sources of contamination.

Based upon the results of the SI (Kapur, 1990), and meetings with the National Guard Bureau (NGB) and the Wisconsin Department of Natural Resources (WDNR), 21 soil borings and five monitoring well locations were selected. The soil borings and monitoring wells were completed to evaluate the subsurface conditions at an active Petroleum, Oils and Lubricants (POL) facility; an historic JP-4 spill (August, 1985) associated with an abandoned waste oil tank; an active Motor Pool facility; and an active Aircraft Maintenance facility.

The soil and groundwater samples collected were analyzed for the presence of volatile and semivolatile compounds as indicator parameters associated with suspected underground storage tank (UST) releases. A Photovac model 10S55 portable gas chromatograph (GC) was utilized for on-site headspace analyses. The portable GC equipped with a photo-ionization detector was selected as the analytical tool to provide an immediate determination of the presence or absence of on-site releases of volatile or semivolatile compounds. Based on the results of the GC headspace analysis samples were selected for laboratory confirmation at RMT Laboratories, a WDNR approved laboratory. Preliminary results from the portable GC indicated the presence of chlorinated solvents in the soils and groundwater facility wide. Based on these results, it was decided to rely on an H-Nu model 101 PID Photoionization Detector (PID) headspace survey with laboratory confirmation for field interpretation, and to concentrate the SA investigation on petroleum-based hydrocarbons, specifically benzene, toluene, ethyl-benzene and xylenes (BTEX).



Concentrations of volatile constituents identified by the PID headspace survey in the soils ranged from 2 parts per million (ppm) to 196 ppm. BTEX concentrations identified in the groundwater by RMT Laboratories ranged from non-detectable (ND) to 9800 parts per billion (ppb) for benzene; 250 ppb to 2000 ppb for toluene; 520 ppb to 1200 ppb for ethyl-benzene; and ND to 3900 ppb for xylenes. Trichloroethane (TCE), a chlorinated hydrocarbon, was also identified in the groundwater at 9 ppb to 17 ppb. A minimum detection limit of 1 ppb was used for each constituent.

The soil boring and groundwater investigation confirmed that there have been on-site releases of petroleum-based hydrocarbon compounds and chlorinated solvents. Petroleum-based hydrocarbons are present at Site 4, the POL facility; chlorinated solvents are present at the Site 7 the Aircraft Maintenance facility; and the remaining areas of concern, Sites 5 and 6 were found to have levels below WDNR action limits for the constituents of concern.

ASI also identified an additional area of concern in the vicinity of monitoring well MW-15. Monitoring well MW-15 was installed to fulfill the "upgradient background" requirement established by field protocol. The location of MW-15, upgradient of identified sources of contamination, was chosen to be representative of background conditions. Analytical data indicate elevated levels of petroleum-based hydrocarbons present at this location. The probable source of this contamination may be the abandoned hydrant fuel system or the historic operation and maintenance activities associated with Hanger 412.

Based on the data collected and the interpretation of that data, it is recommended that additional investigations be conducted to delineate the total extent of the chlorinated solvent contamination identified at Site 7, delineate the extents of the petroleum-based hydrocarbons identified in monitoring well MW-15, conduct aquifer tests to determine hydraulic parameters for corrective actions in the groundwater, and develop a Correction Action Plan (CAP) to remediate the soils and groundwater at Site 4. Site 5, UST 1201-1 and Site 6, the Motor Pool facility, need no further action. It is also recommended that all USTs scheduled to be removed and/or replaced be closed following WDNR UST requirements ILHR 10.732 and 10.734.

## 2.0 INTRODUCTION

### 2.1 Background

Between December 1989 and February 1990, volumetric tightness testing was conducted on nineteen underground storage tanks (USTs), in accordance with applicable Federal and State UST regulations, at the Wisconsin Air National Guard (WANG) facility. Appendix A includes a UST inventory summary that indicates results of the volumetric tightness test and current status of facility USTs. An abandoned fuel transfer pipe line and refueling hydrant system associated with the Petroleum, Oils, and Lubricants (POL) facility were identified in an initial Preliminary Assessment (PA) completed in August 1988. The PA (Peer, 1988) reported that both the abandoned transfer line and hydrant system have not been documented or confirmed to be cleaned, purged, or appropriately sealed.

A Site Investigation (SI), completed in September 1990, of the soil and groundwater was performed at the WANG facility to assess the nature and extent of any contamination associated with facility USTs and two historic (March 1981 and August 1985) JP-4 (Jet Fuel) spills. The investigation included a soil vapor survey, soil borings, monitoring well installations, headspace analyses of soils, and soil and groundwater sampling and analytical analyses. The SI (Kapur, 1990) identified four sites at the WANG that have suspected petroleum hydrocarbons and chlorinated solvents in the soil and groundwater at concentrations exceeding state action levels promulgated by the Wisconsin Administrative Code.

The SI Report (Kapur, 1990) was reviewed by the National Guard Bureau (NGB), and the need was identified for additional data to confirm the extent of soil and groundwater contamination at the four sites. Based upon the investigation results and identified additional data requirements, the NGB determined that additional data to further characterize the extent and source(s) of petroleum hydrocarbon and chlorinated solvent contamination from the four sites was required.

## 2.2 Environmental Setting

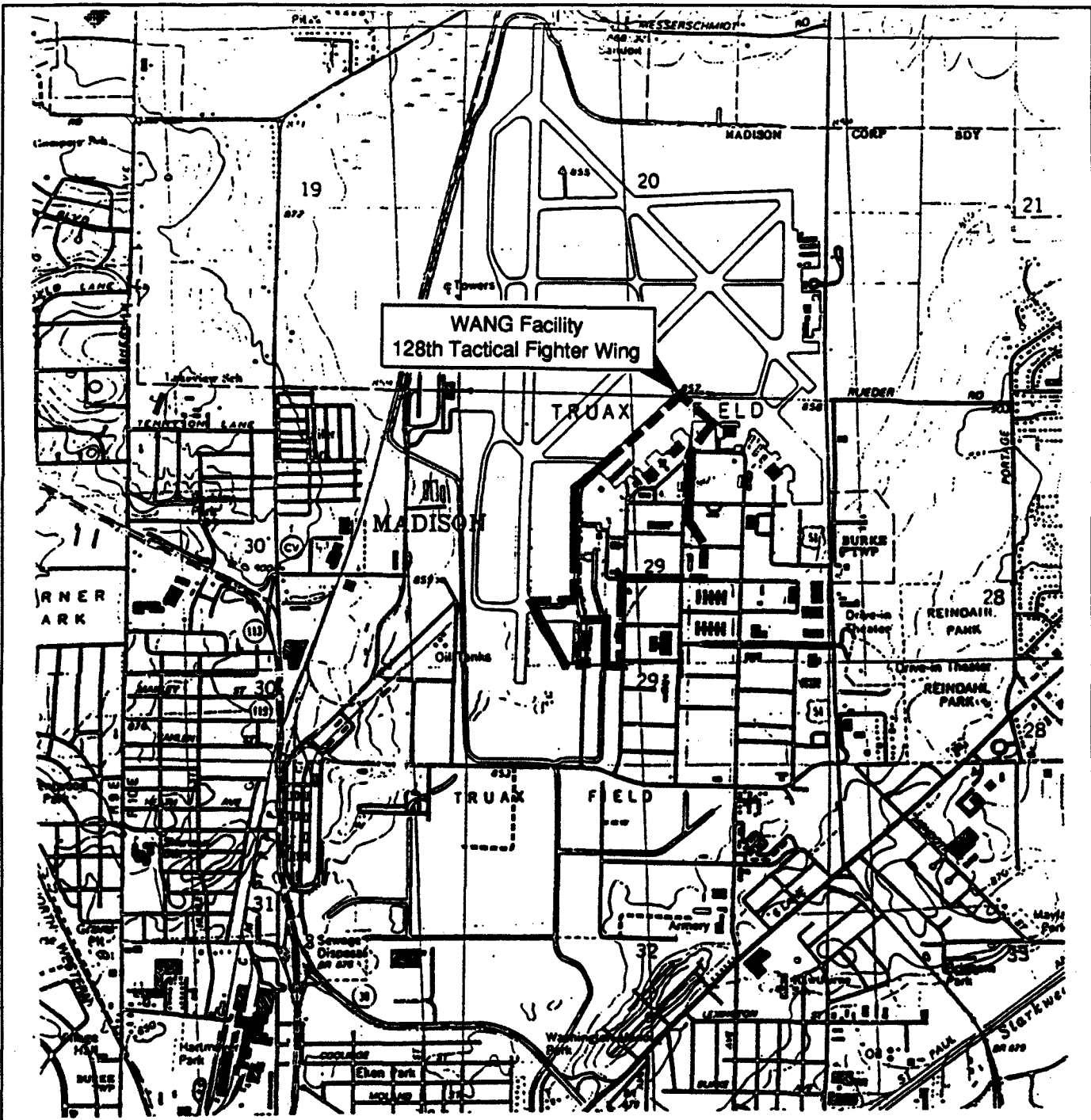
### 2.2.1 Site Description

The WANG facility is located at Dane County Regional Airport, Truax Field. The facility has been in operation since October, 1942. The facility is situated in the north half of Section 29, Township 8 North, Range 10 East, approximately five miles northeast of downtown Madison, Wisconsin (Figure 1). The WANG base occupies approximately 155 acres of the Truax Field complex (Figure 2). Figure 3 delineates the four sites of concern which were identified during the SI (Kapur, 1990).

Site 4, located at the POL facility, includes four 50,000 gallon USTs located next to Building 405. These USTs are constructed of steel, and have been in operation since 1952. The USTs currently contain JP-4 used to refuel military aircraft. Also, in the vicinity of Site 4, was an abandoned 300 gallon waste oil tank, located next to Building 415, that has been removed. Located north of Site 4 are four USTs, three of which have a 550 gallon capacity and contain detergent, waste oil, and waste solvent. The remaining UST is an abandoned in place 2000 gallon waste oil tank. A bulk fuel receiving system, 419-1, is also located on site. This system was misidentified during previous investigations as a UST.

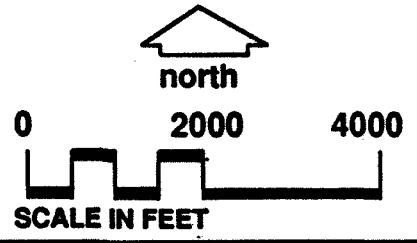
An abandoned underground fuel pipeline and hydrant system are associated with the POL facility. The fuel pipeline extends from an off-base tank farm, no longer in use, to the four 50,000 gallon USTs. The POL hydrant system extends from the four 50,000 gallon USTs to the northwest side of the active aircraft hanger, Building 412. The pipeline and hydrant systems were taken out of service in 1973. It is not known, at this time, if there is residual fuel remaining in either the pipeline or the hydrant system.

Site 5, located in the vicinity of Building 1201 has an abandoned 3000 gallon waste oil UST. Also associated with this site is an historic JP-4 spill (August, 1985) of approximately 100 gallons.

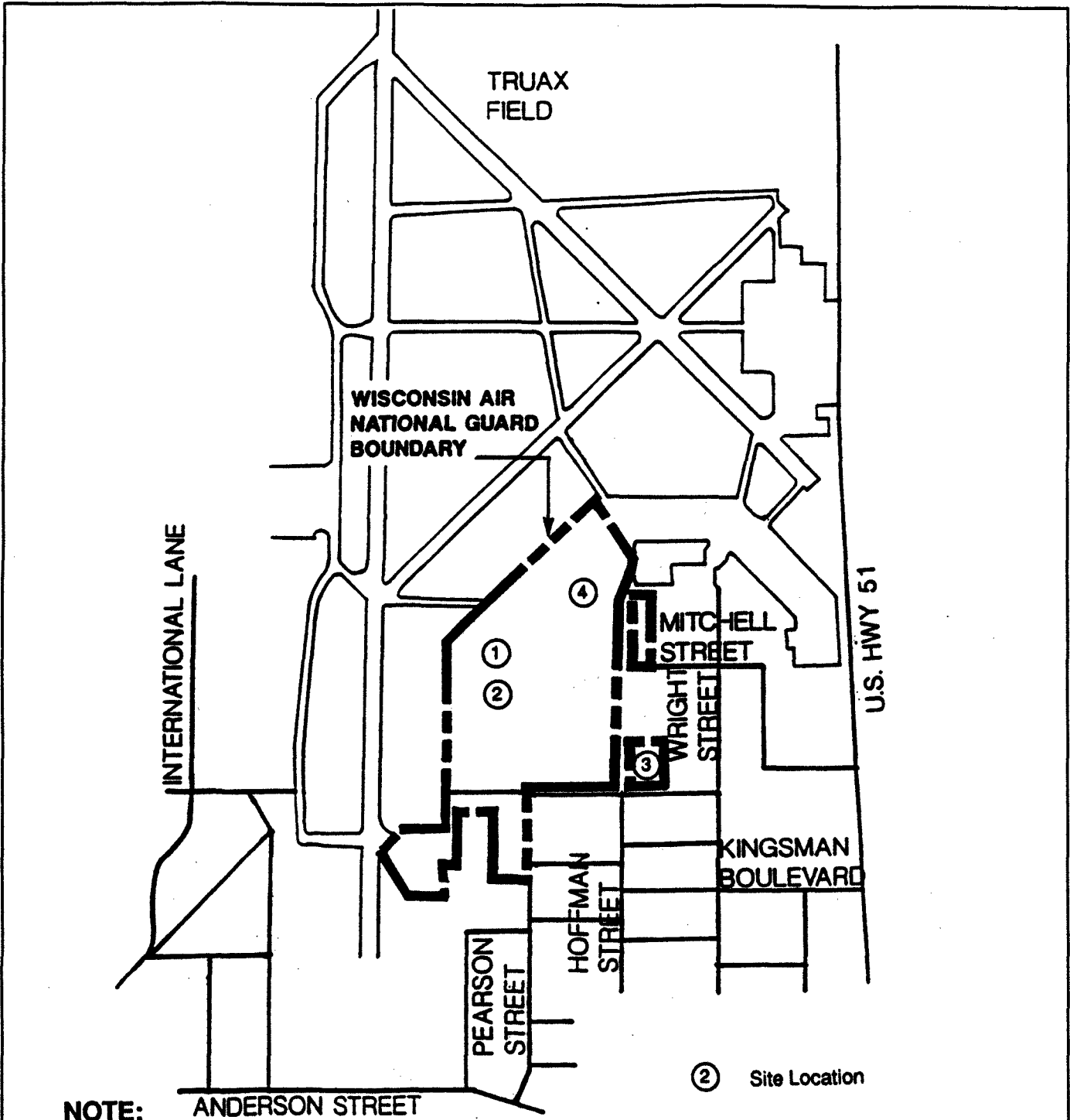


**NOTE:**

1. SITE LOCATION MAP DEVELOPED FROM THE MADISON EAST AND DEFOREST, WISCONSIN 7 1/2 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAPS, DATED 1983.



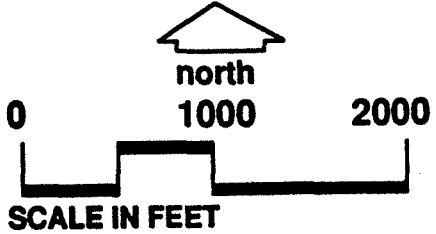
ADVANCED SCIENCES, INC.		FIGURE 1 WANG FACILITY LOCATION MAP	Wisconsin Air National Guard Headquarters, 128th Tactical Fighter Wing Truax Field Dane County Regional Airport Madison, Wisconsin
WANG28	NOVEMBER 1991		



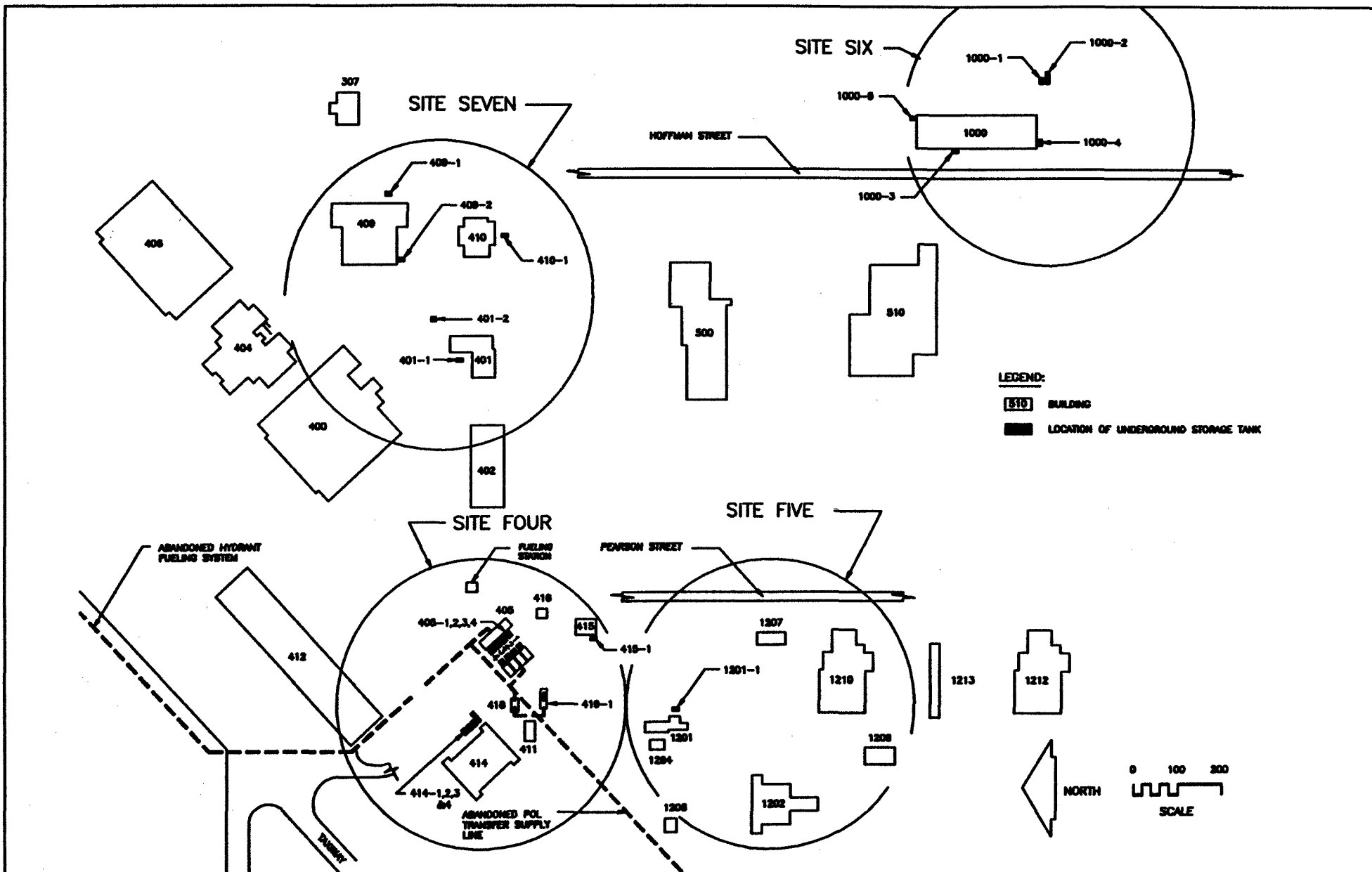
**NOTE:** ANDERSON STREET

1. BASE MAP DEVELOPED FROM LOCATION MAP FROM INSTALLATION RESTORATION PROGRAM PRELIMINARY ASSESSMENT SUPPLIED BY HAZWRAP SUPPORT CONTRACTOR OFFICE, MARTIN MARIETTA ENERGY SYSTEMS, INC. OAK RIDGE, TENNESSEE.

② Site Location



ADVANCED SCIENCES, INC.		FIGURE 2 WANG BASE BOUNDARY MAP	Wisconsin Air National Guard Headquarters, 128th Tactical Fighter Wing Truax Field Dane County Regional Airport Madison, Wisconsin
WANG29	NOVEMBER 1991		



ADVANCED SCIENCES, INC.  
 WANG12      NOVEMBER 1991

FIGURE 3. PROJECT SITE LOCATIONS

Wisconsin Air National Guard  
 Headquarters, 128th Tactical Fighter Wing  
 Truax Field  
 Dane County Regional Airport  
 Madison, Wisconsin

Site 6, located at the Motor Pool, Building 1000, includes three active USTs which include a 12,000 gallon MOGAS UST, a 6000 gallon diesel UST, and a 275 gallon waste oil UST. Also included with Site 6 are two abandon waste oil tanks, with capacities of 275 and 250 gallons, which have been removed from service.

Site 7, located at the Aircraft Maintenance facility, Building 400, includes two 250 gallon waste oil USTs (one abandoned in place), one 275 gallon oil/water separator, and one abandoned 250 gallon oil/water separator which has been removed.

### **2.2.2 Physiography and Geology**

Truax Field is situated near the center of the Central Lowlands Physiographic Province of the United States in Dane County, Wisconsin. The province is characterized by generally horizontal to gently dipping strata, and displays widespread topographic effects of glaciation.

The local stratigraphy includes Cambrian aged rock formations overlying precambrian aged bedrock. The Cambrian strata consist primarily of sandstones, shales, siltstones and dolomites. The Cambrian strata are overlain by highly weathered dolomites of Ordovician age. The entire area is covered by a veneer of unconsolidated glacial deposits of Quaternary age.

The WANG facility is located on a wedge of glacial drift approximately 300 feet thick, which overlies the Mt. Simon Sandstone. The glacial material is predominantly sands and silts with interbedded clays and gravels, and is believed to occupy the pre-glacial Yahara River Valley. Glacial deposits cover all but the southwestern quarter of Dane County. Truax Field is approximately 15 miles east and 15 miles northeast of the terminal moraines marking the southwestern extent of glaciation during the Wisconsinan period.

The uppermost glacial deposits near the WANG facility at Truax Field are mostly lacustrine silts and clays deposited in the former Lake Yohara existing during glacial periods. Outwash sands

and gravels generally occur near former glacial lake shorelines, within a few feet of the surface, beneath the finer-grained lake sediments.

### **2.2.3 Surface Water Drainage**

Drainage on the WANG facility is channeled by excavated ditches and culverts which are routed to Starkweather Creek. Current surface drainage at the WANG facility flows westward into drainage channels located within the facility boundaries. The drainage channels discharge into Starkweather Creek, with the outfall just south of the facility. Starkweather Creek discharges into Lake Monona further south of the WANG facility. Lakes Mendota, Monona and Waubesa are located to the west and south, and Cherokee Marsh is located to the northeast of the WANG (Figure 4).

## **2.3 Scope of Project**

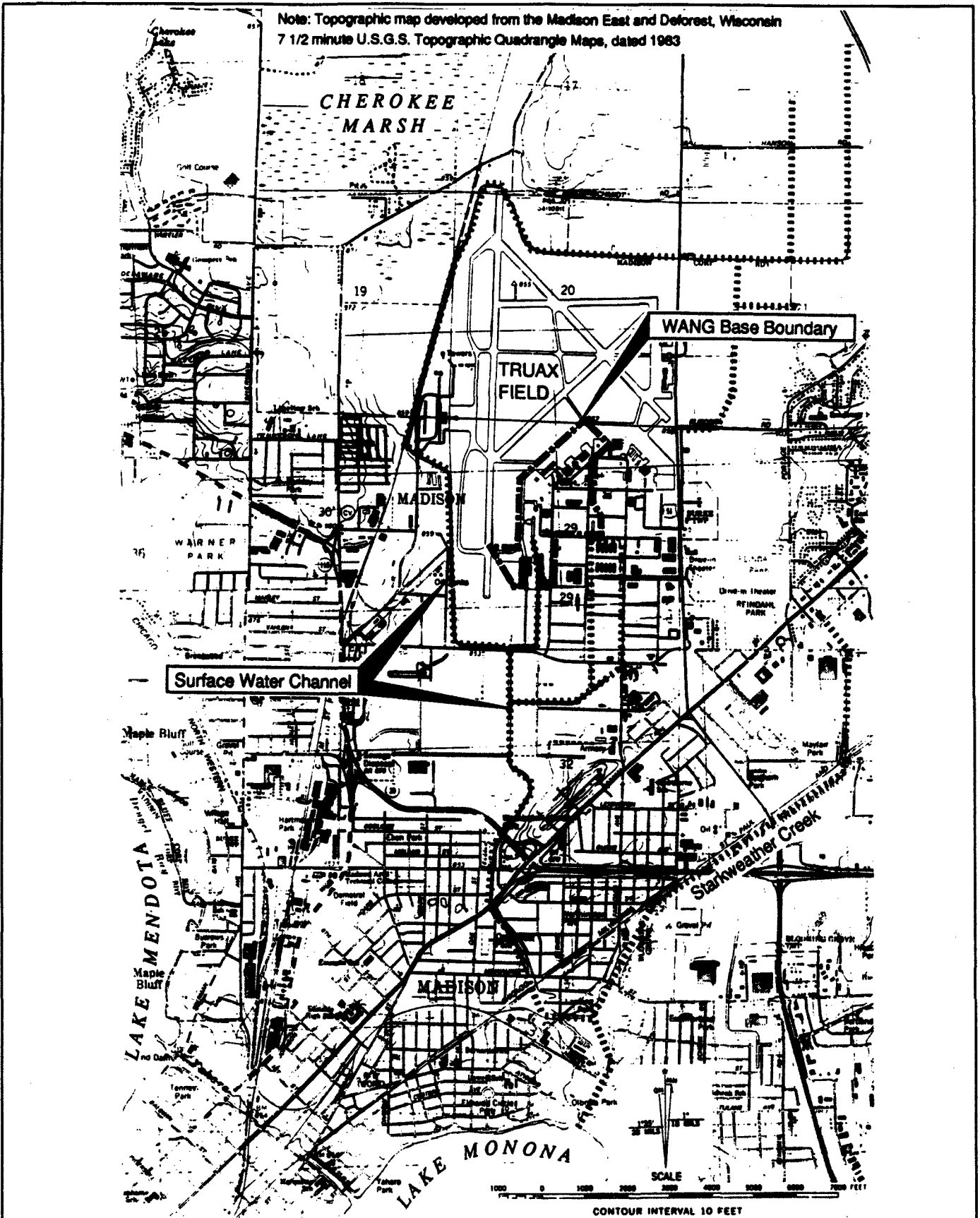
The primary purpose of the Site Assessment (SA) is to evaluate the horizontal and vertical extent of volatile and semivolatile compounds within the boundaries of the WANG facility at four locations identified in the previous SI (Kapur, 1990) as potential sources of contamination (Figure 3). The characterization and assessment of the subject property includes the following: ascertaining the release mechanism, determining the extent of release, and evaluating transportation pathways. The SA Work Plan, detailing performance requirements for the investigation, is presented in Appendix B.

The SA work plan objectives included: 1) providing an approximation of the extent (vertical and lateral) and 2) severity (quantification of specific constituents of concern) in the four affected areas. This SA assessed four individual sites which were identified during the previous SI (Kapur, 1990) (Figure 3).

To accomplish the objectives of this investigation, a SA program was developed (Table 1) which included sampling and analyses of twenty-one soil borings (Figure 5), sampling of fourteen



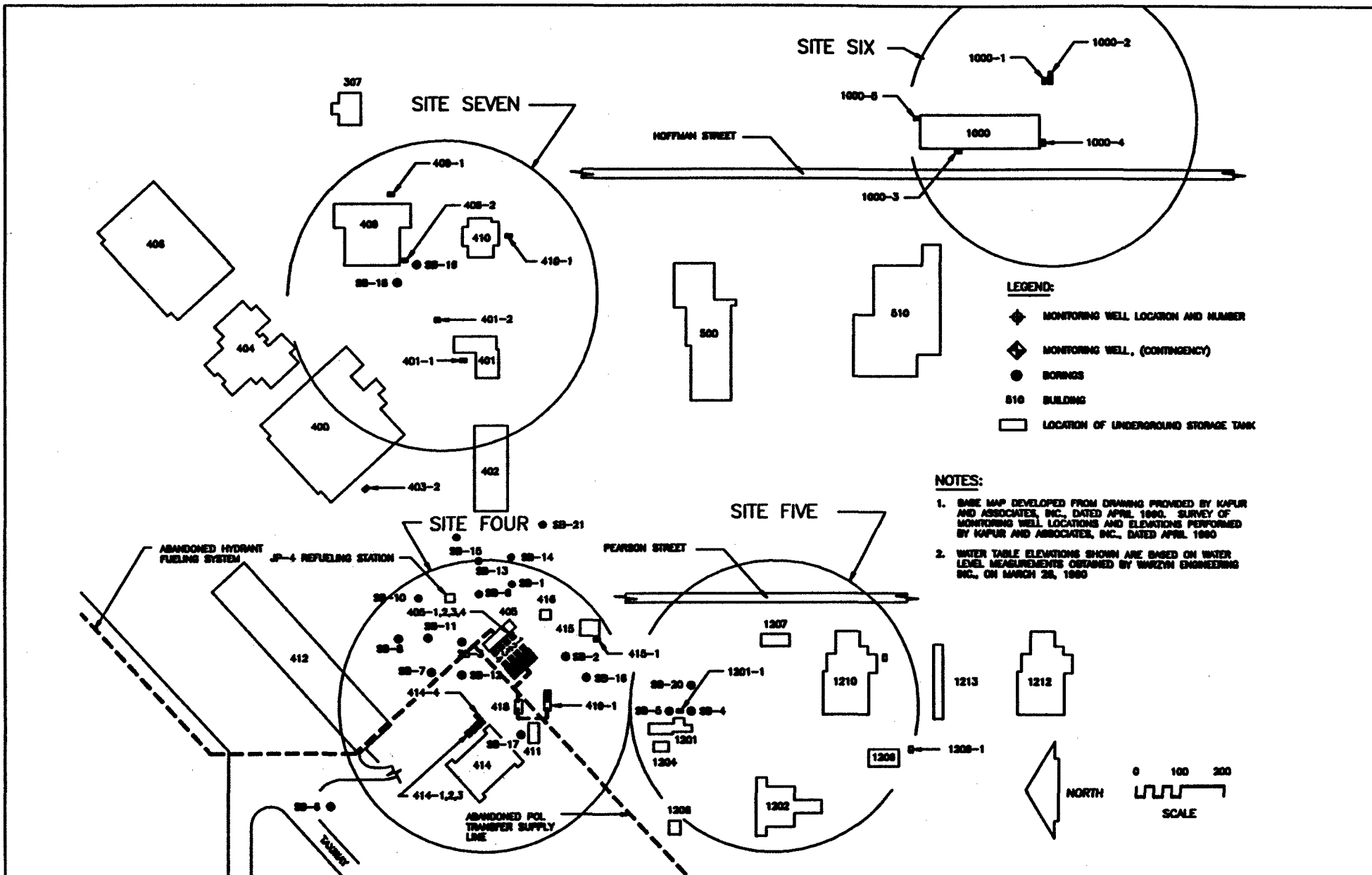
Note: Topographic map developed from the Madison East and DeForest, Wisconsin  
7 1/2 minute U.S.G.S. Topographic Quadrangle Maps, dated 1983



ADVANCED SCIENCES, INC.		FIGURE 4 TOPOGRAPHIC LOCATION MAP	Wisconsin Air National Guard Headquarters, 128th Tactical Fighter Wing Truax Field Dane County Regional Airport Madison, Wisconsin
WANG30	NOVEMBER 1991		

**TABLE 1**

Summary of Site Assessment Activities					
Location	Field Activities		Materials of Concern	Media Analysis	
	Screening	Confirmation		Groundwater	Soil
<b>Site 4</b> POL Facility USTs: 405-1, 2, 3, 4 414-1, 2, 3, 4 415-1 419-1: Bulk fuel receiving system	<ul style="list-style-type: none"> <li>• Visually inspect monitoring wells for free product</li> <li>• PID headspace survey of soil borings</li> </ul>	<ul style="list-style-type: none"> <li>• Sample monitoring wells MW-8, -9, -10, -11 and -12 for laboratory analysis</li> <li>• Complete 15 soil borings</li> <li>• Install three additional monitoring wells and sample for laboratory analysis: MW-15, -16, and -17</li> <li>• Laboratory analysis of soil samples identified by PID outside contaminant plume</li> </ul>	JP-4 Waste Oil Waste - Solvent	VOCs SVOCs	VOCs SVOCs
<b>Site 5</b> UST: 1201-1	<ul style="list-style-type: none"> <li>• Visually inspect monitoring wells for free product</li> <li>• PID headspace survey of soil borings</li> </ul>	<ul style="list-style-type: none"> <li>• Sample monitoring well MW-13 for laboratory analysis</li> <li>• Complete three soil borings</li> <li>• Laboratory analysis of soil samples</li> </ul>	JP-4 Waste Oil Waste - Solvent	VOCs SVOCs	VOCs SVOCs
<b>Site 6</b> Motor Pool USTs: 1000-1, 2, 3, 4, 5	<ul style="list-style-type: none"> <li>• Visually inspect monitoring wells for free product</li> <li>• PID headspace survey of soil borings</li> </ul>	<ul style="list-style-type: none"> <li>• Sample monitoring wells MW-1 and -2 for laboratory analysis</li> <li>• Install/replace one monitoring well, MW-18, for damaged MW-3 and sample for laboratory analysis</li> </ul>	Waste Oil Waste - Solvent	VOCs SVOCs	VOCs
<b>Site 7</b> Aircraft Maintenance USTs: 401-1, -2 409-1, -2 410-1	<ul style="list-style-type: none"> <li>• Visually inspect monitoring wells for free product</li> <li>• PID headspace survey of soil borings</li> </ul>	<ul style="list-style-type: none"> <li>• Sample monitoring wells MW-4, -5, -6 for laboratory analysis</li> <li>• Install one additional monitoring well, MW-19, and sample for laboratory analysis</li> <li>• Laboratory analysis of soil samples</li> </ul>	Waste Oil Waste - Solvent	VOCs SVOCs	VOCs SVOCs
POL - Petroleum, Oils and Lubricants USTs - Underground Storage Tanks PID - Photoionization Detector MW - Monitoring Well JP-4 - Jet Propellant Number 4 VOCs - Volatile Organic Compounds SVOCs - Semivolatile Organic Compounds					



ADVANCED SCIENCES, INC.

WANG16

NOVEMBER 1991

FIGURE 5. SOIL BORING LOCATION MAP

Wisconsin Air National Guard  
Headquarters, 128th Tactical Fighter Wing  
Truax Field  
Dane County Regional Airport  
Madison, Wisconsin

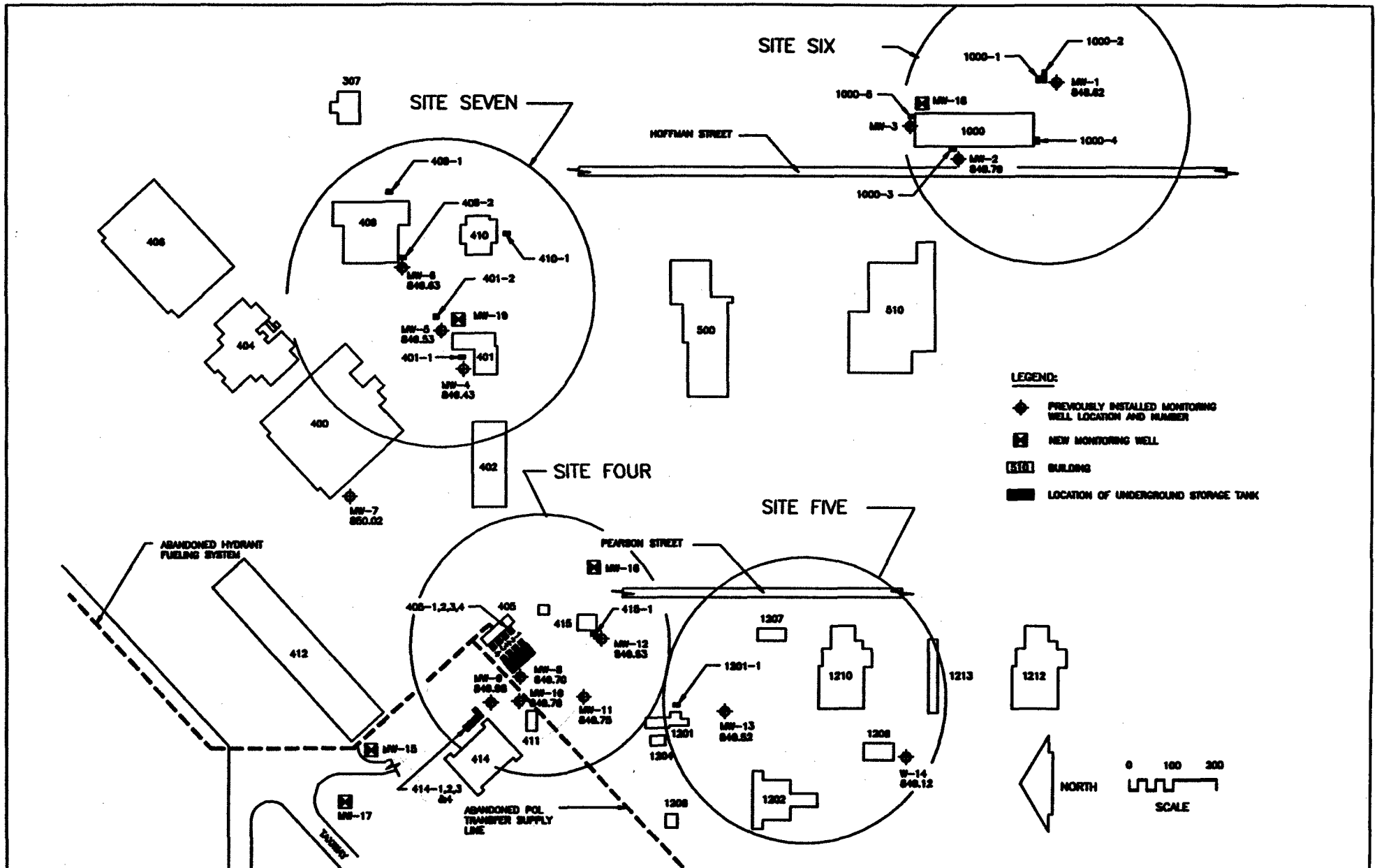
existing monitoring wells, installation of five additional monitoring wells (Figure 6), and removal of one nonfunctional monitoring well (MW-3).

Wisconsin groundwater quality standards as defined in Chapter NR 140.10, Wisconsin Administrative Code identifies two action limits for constituents of concern, Preventative Action Limits (PALs) and Enforcement Standards (ESs). PALs are concentrations levels that require monitoring where ESs are levels that require regulatory action. Therefore ES levels will be the standard to determine the need for environmental compliance and corrective action.

#### **2.4 Summary of Field Activities**

A CME-75 hollow stem auger drill rig was selected for well installation and soil sampling. Upon arrival to the site, and prior to any boring activities, the drill rig and equipment were thoroughly steam cleaned. After rig set up at each of the boring locations, the hollow stem auger was advanced to specified depths and samples were collected using a standard two-inch outside diameter (OD) stainless steel split spoon sampler. Soil borings were advanced to the vadose zone/saturated zone interface as specified in the Work Plan (Appendix B). Soil samples were collected in triplicate and analyzed for headspace measurements with the PID. Soil samples with the highest headspace reading, and the deepest unsaturated sample from each borehole were retained for field GC analysis. Soil samples identified by the field GC as being below state regulatory action limits were selected for confirmation analysis by RMT Laboratories, a WDNR state approved laboratory. The laboratory confirmation analysis allowed for the determination of the extent of the contamination at the WANG facility. Boring logs for all completed boreholes are presented in Appendix C. The boreholes and breathing zone were continuously monitored during drilling operations with an EXOTOX lower explosive limit monitor (LEL) and the PID. Readings from the PID and LEL are included at their respective sample intervals on the boring logs (Appendix C).

The SA assessed petroleum based hydrocarbons, specifically BTEX, at the WANG facility. The PID headspace survey with laboratory confirmation analyses were used for field interpretation



ADVANCED SCIENCES, INC.  
 WANG14      NOVEMBER 1991

FIGURE 6. MONITORING WELL LOCATION MAP

Wisconsin Air National Guard  
 Headquarters, 128th Tactical Fighter Wing  
 Truax Field  
 Dane County Regional Airport  
 Madison, Wisconsin

of the extents of BTEX in the soils and groundwater at the WANG facility. Site 7, the Aircraft Maintenance facility, was also investigated for the confirmation of the presence or absence of chlorinated hydrocarbons.

The boring locations were selected to delineate the lateral extent of contamination at both existing monitoring wells and the area adjacent to previous JP-4 spill sites. After a selected borehole was advanced to the specified depth, a groundwater monitoring well was installed. Once augering and PID field surveys were completed, monitoring wells MW-15 through MW-19 were individually completed. The remaining soil borings were backfilled in accordance with WDNR requirements NR141.25. All borehole cuttings were retained for disposal pending results from the PID headspace screening and laboratory confirmation activities.

The monitoring wells were constructed using 2-inch OD (nominal), flush joint, polyvinyl chloride (PVC) screen (0.010 inch slot) and riser, which were supplied precleaned and prepackaged by the manufacturer. The screen and riser were installed in each well by connecting individual sections as they were lowered into the borehole through the auger column. After the riser assembly had been installed, the auger flights were removed in 5-foot sections. Washed and sieved 45/55 Red Flint sand (filter pack) was poured into the auger annulus to fill the void as each flight was removed. Sand was placed to approximately two feet above the top of the screen. One foot of 4099 fine silicon sand was placed on top of the 45/55 sand according to WDNR specifications defined in Chapter NR 141.13. A bentonite seal was placed in the remainder of the well annulus to form an impervious barrier and prevent downward migration of moisture. Surface construction was completed with either the installation of a concrete slab flush with grade, with a 8-inch waterproof steel vault, (MW-15, -16, -18 and -19), or with a two foot riser stick-up surrounded by a steel protective casing with hinged cap, lock, and associated guard posts (MW-17). Monitoring wells MW-15 through MW-19 each have a 10-foot screen positioned approximately two to three feet above the static water level.

Monitoring wells were developed by purging a minimum of five borehole volumes of groundwater from each well in accordance with WDNR requirements NR 141.21. A well was

determined to be fully developed when the physical parameters of Ph, temperature and electrical conductance of water removed stabilized over three consecutive measurements taken at specified intervals. These intervals were based upon the respective monitoring well casing volumes. Appendix D presents the logs for sampling, purging and development of all monitoring wells installed at the WANG facility by ASI.

New and existing monitoring wells were sampled using a bottom-filling Teflon bailer. The newly installed monitoring wells (MW-15 through MW-19) were resampled two weeks after initial development, in response to a directive from WDNR representative Carol McCurry. Additionally, monitoring well MW-1 was resampled at this time. The WDNR requires that all samples collected for laboratory analysis must be analyzed by a WDNR approved laboratory. The samples were hand delivered, while adhering to strict chain-of-custody procedures, to RMT laboratories, Madison, Wisconsin, a WDNR approved laboratory. The groundwater samples were analyzed for volatile and semivolatile compounds according to EPA methods 8240 and 8270, respectively.

A topographic survey of the sites was conducted to verify the locations and elevations of the existing monitoring wells, and determine the new monitoring well elevations and locations. Elevations, to the top of the well casing (TOC) referenced to mean sea level (MSL), and well numbers were stamped on either the steel vault lids or protective steel casing cap. The static groundwater levels of all monitoring wells were measured with an ORS oil/water interface probe using the north side of TOC as a reference elevation. ASI also inspected all monitoring wells for the presence of free product by initially sampling each well with disposable acrylic bailers. No measurable floating product was observed in any of the wells.

### **3.0 SITE INVESTIGATION**

#### **3.1 Site Geology and Hydrology**

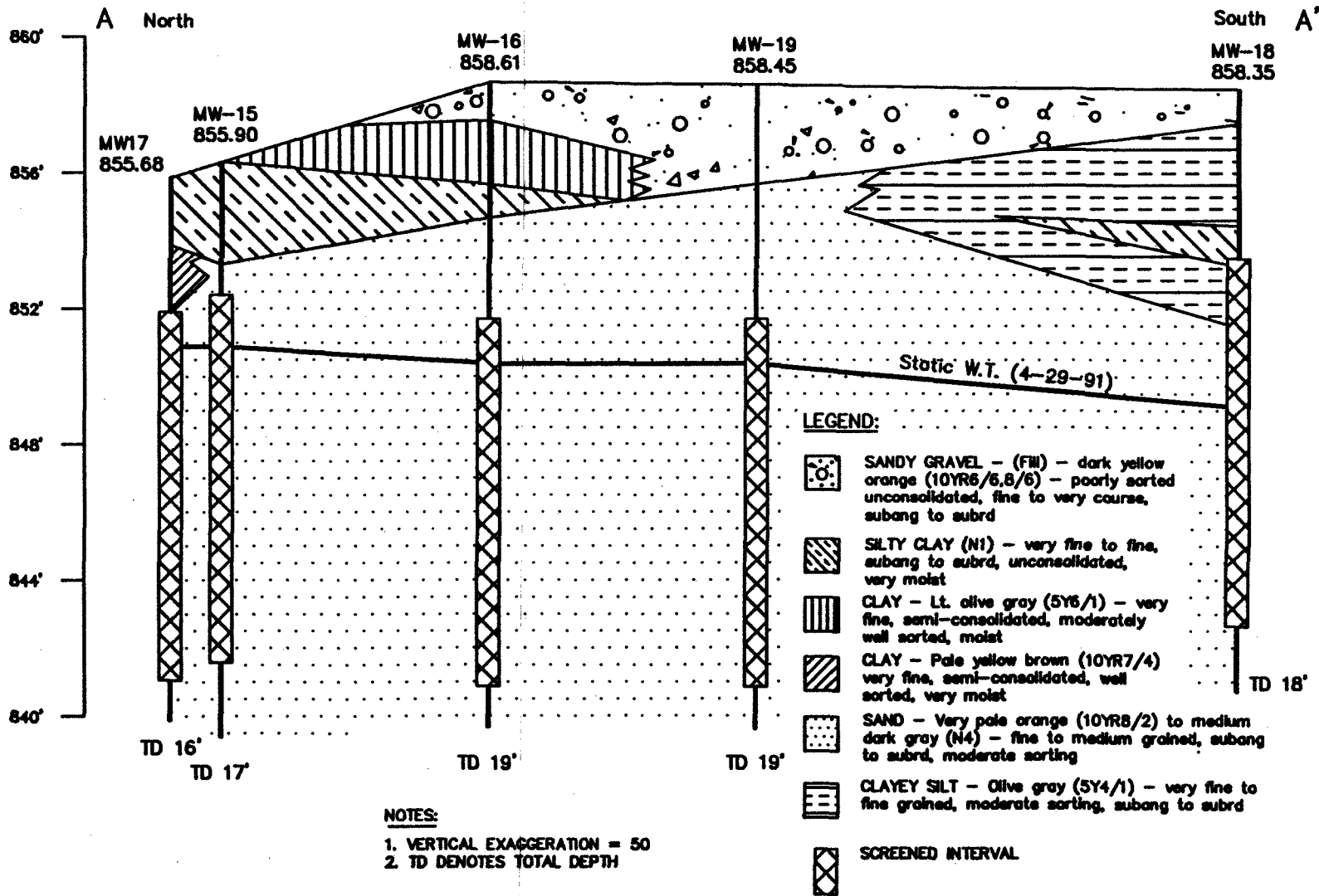
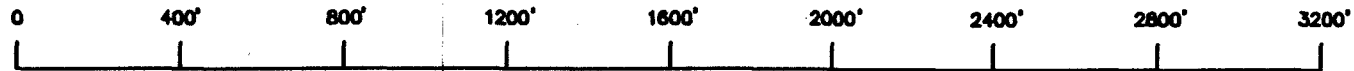
Truax Field is generally overlain by glacial outwash. A surficial layer of silty clay, approximately five feet in thickness, was encountered throughout the WANG facility. Below this clay layer, a fine- to medium-grained stratified sand was observed. Some gravelly sands were encountered with depth, but were discontinuous throughout the investigation area. In areas where construction activities have removed the surficial clays, replacement has been made with a sandy gravel fill material. Figure 7 is a generalized geological section through the WANG facility interpreted from Lithologic Logs (Appendix C) obtained during the current SA. Figure 8 illustrates the transect for the geological section.

The monitoring well elevations were surveyed and locations plotted by a licensed surveyor (Table 2). Static groundwater levels were recorded for all monitoring wells at the WANG facility (Table 3). Through comparison of the relative water levels throughout the facility, the local groundwater flow direction was determined to be south-southeast with a relative gradient of 0.001 (Figure 9).

#### **3.2 Subsurface Assessment**

The initial round of sampling by ASI was conducted April 8 through 19, 1991. A second round of groundwater sampling, as directed by the WDNR, was conducted April 19 through May 1, 1991. The analytical data for this investigation are presented in Appendix E. Data collected during the SI (Kapur, 1990) indicated levels of petroleum hydrocarbon constituents and chlorinated compounds exceeding regulatory standards, but did not accurately delineate the extent of contamination.





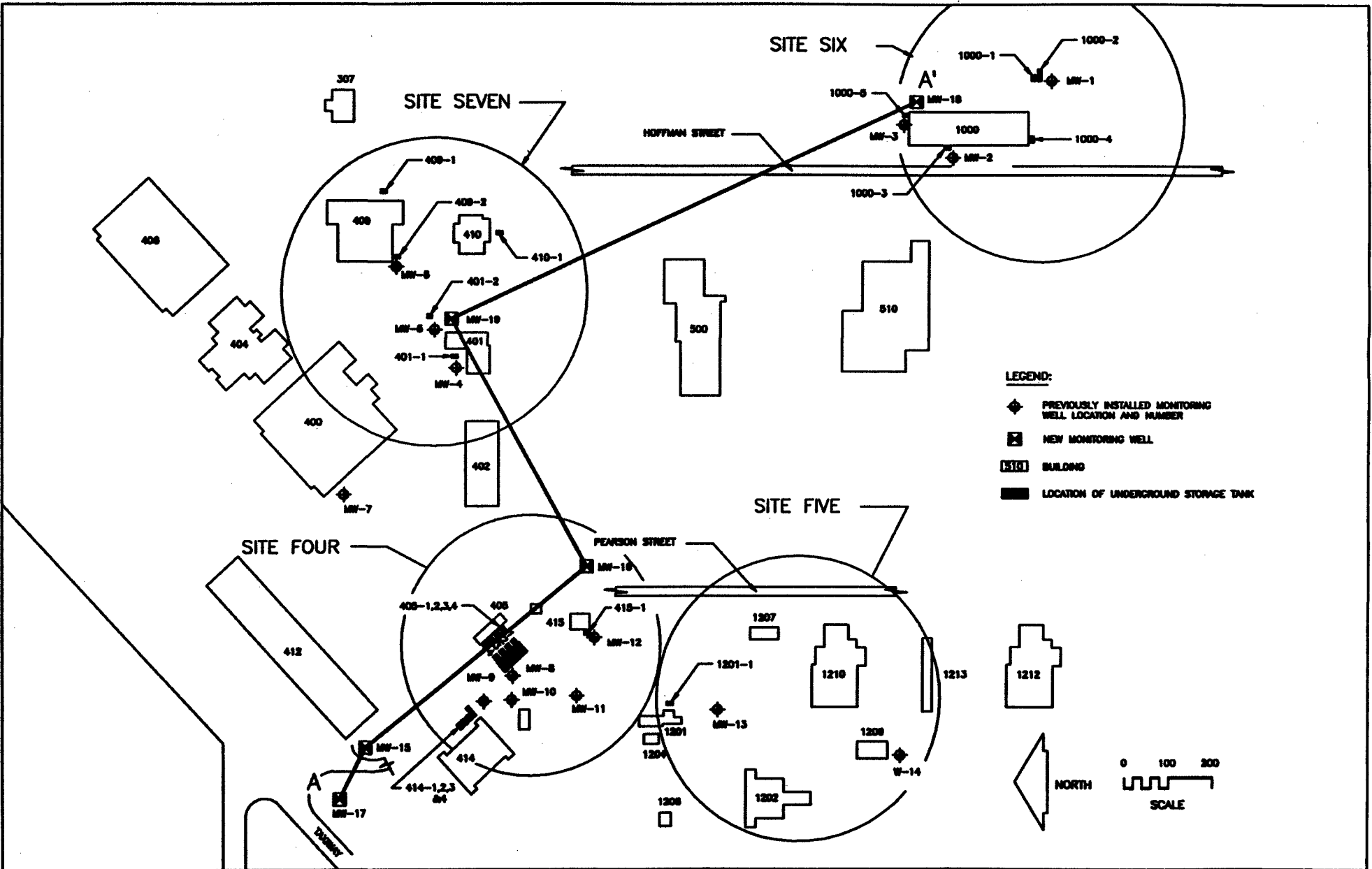
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**AADVANCED SCIENCES, INC**  
 WANG27      NOVEMBER 1991

**Figure 7**  
**Generalized Geologic Cross-Section**

Wisconsin Air National Guard  
 Headquarters, 128th Tactical Fighter Wing  
 Truax Field  
 Dane County Regional Airport  
 Madison, Wisconsin



**LEGEND:**

- ◆ PREVIOUSLY INSTALLED MONITORING WELL LOCATION AND NUMBER
- NEW MONITORING WELL
- ▭ BUILDING
- LOCATION OF UNDERGROUND STORAGE TANK

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FIGURE 8. GEOLOGICAL SECTION TRANSECT MAP

Wisconsin Air National Guard  
 Headquarters, 128th Tactical Fighter Wing  
 Truax Field  
 Dane County Regional Airport  
 Madison, Wisconsin

**TABLE 2**  
**MONITORING WELL ELEVATIONS AND LOCATIONS**

WELL NO.	NORTHING	EASTING	ELEVATION	
			GROUND	TOC
1	412,088.470	2,178,236.871	857.94	859.94
2	412,281.830	2,178,236.871	861.02	863.02
3	N/A	N/A	N/A	N/A
4	413,289.851	2,177,649.742	859.10	861.00
5	413,329.144	2,177,731.946	858.87	860.82
6	413,419.679	2,178,053.595	857.86	857.62
7	413,497.359	2,177,393.872	857.98	859.74
8	413,173.676	2,177,026.916	858.18	857.74
9	413,236.600	2,176,961.421	856.43	858.46
10	413,178.197	2,176,977.820	857.13	859.05
11	413,051.930	2,176,982.114	856.61	858.55
12	413,014.159	2,177,103.995	856.96	858.91
13	412,783.628	2,176,954.391	858.77	860.71
14	412,384.976	2,176,870.812	861.46	863.40
15	413,485.582	2,176,854.324	855.90	855.60
16	413,043.644	2,177,260.812	858.61	858.38
17	413,518.548	2,176,771.609	855.68	857.01
18	413,370.795	2,178,167.079	858.35	857.93
19	413,318.450	2,177,745.470	858.45	857.97

Elevations reported in feet above mean sea level

Northing and Easting coordinates based on state plane coordinate system

TOC = Top of Casing

MW-3 = Removed from service per WDNR ND 141.25

TABLE 3

GROUNDWATER LEVEL MEASUREMENTS AND ELEVATIONS

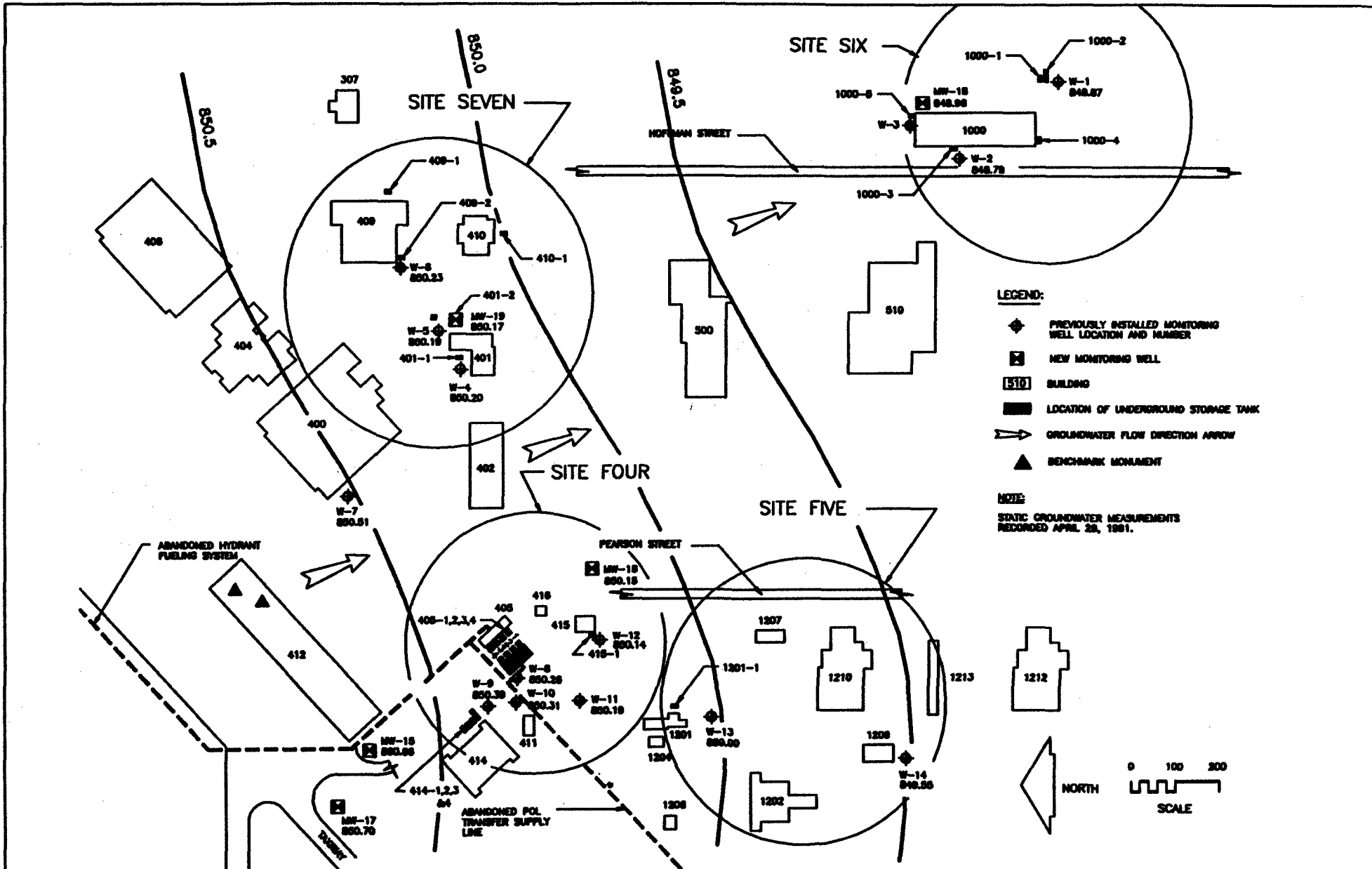
Locations	Elevation	11 April '91		29 April '91	
		Static (TOC)	Static Elevation	Static (TOC)	Static Elevation
MW-1	859.94	11.38	848.56	11.07	848.87
MW-2	863.02	14.85	848.17	14.23	848.79
MW-3	N/A	N/A	N/A	N/A	N/A
MW-4	861.00	11.85	849.15	10.80	850.20
MW-5	860.82	11.56	849.26	10.63	850.19
MW-6	857.62	8.26	849.36	7.39	850.23
MW-7	859.74	10.00	849.74	9.23	850.51
MW-8	857.74	8.30	849.44	7.48	850.26
MW-9	858.46	8.38	850.08	8.07	850.39
MW-10	859.05	9.55	849.50	8.74	850.31
MW-11	858.55	9.11	849.44	8.36	850.19
MW-12	858.91	9.57	849.34	8.77	850.14
MW-13	860.71	11.55	849.16	10.71	850.00
MW-14	863.40	14.54	848.86	13.85	849.55
MW-15	855.60	4.86	850.74	4.94	850.66
MW-16	858.38	8.89	849.49	8.23	850.15
MW-17	857.01	6.08	850.93	6.31	850.70
MW-18	857.93	9.45	848.48	8.95	848.98
MW-19	857.97	8.54	849.43	7.80	850.17

TOC - Top of Casing

Elevations reported in feet above mean sea level

N/A - Not Applicable

MW-3 - Removed from service per WDNR ND 141.25



**LEGEND:**

- ◆ PREVIOUSLY INSTALLED MONITORING WELL LOCATION AND NUMBER
- NEW MONITORING WELL
- BUILDING
- ▬ LOCATION OF UNDERGROUND STORAGE TANK
- GROUNDWATER FLOW DIRECTION ARROW
- ▲ BENCHMARK MONUMENT

**NOTE:**  
 STATIC GROUNDWATER MEASUREMENTS  
 RECORDED APRIL 28, 1991.

ADVANCED SCIENCES, INC.		FIGURE 9. GROUNDWATER FLOW DIRECTION MAP	Wisconsin Air National Guard Headquarters, 128th Tactical Fighter Wing Truax Field Dane County Regional Airport Madison, Wisconsin
WANG10	NOVEMBER 1991		

The data obtained during the current investigation has successfully delineated the extent of the hydrocarbon contaminants in the soils and groundwater at the four sites identified to be of concern at the WANG facility.

A PID headspace survey was conducted on the soil samples collected during the soil boring and monitoring well installation program. Soil samples were collected at intervals of 2-feet below ground level (BGL), 5-feet BGL and at the vadose-zone/saturated zone interface. The PID headspace survey results are included in Appendix F.

Monitoring well MW-15 was installed to fulfill the "upgradient background" requirements established by field protocol. It is located to the north-northwest approximately 350 feet upgradient of Site 4 on the west side of Building 412 (Figure 6). Being upgradient of identified sources, it was assumed that this area was free of contamination. Previous investigations had not identified this location as an area of concern. However, elevated levels of petroleum-based hydrocarbons exceeding the PALs and ESs, as defined in Chapter NR 140.10, Wisconsin Administrative Code, were identified in samples from this well. These levels were confirmed through laboratory analysis. Soil boring SB-6, located approximately 100 feet to the north-northwest of MW-15, was completed to obtain additional background information (Figure 5). The PID headspace survey of the soil samples collect from SB-6 identified this location to be free of any volatile constituents. Monitoring well MW-17 was installed at this location to fulfill the "upgradient" requirement (Figure 6). Analytical results for MW-17 are below detection limits for all constituents of concern. The PID headspace survey results for monitoring wells MW-15 and MW-17 including soil boring SB-6 are summarized in Appendix F. The analytical results for the groundwater samples collected from monitoring wells MW-15 and -17 are included in Table 4. The extent of the petroleum-based contamination in the vicinity of MW-15 has not been delineated at this time. The source of this contamination is most likely the abandoned hydrant fuel system and/or the historic operation and maintenance activities associated with the Aircraft Hanger, Building 412.

TABLE 4

**SUMMARY OF ANALYTICAL RESULTS MW-15 AND MW-17  
April 1991**

*Total Benzene 15000*

Compound	MW-15	MW-17	Detection Limit	PAL	ES
Benzene	1400 (9800)	ND	1	0.067	5.0
Toluene	250 (2000)	ND	1	68.6	343
Ethyl-benzene	880 (1200)	ND	1	272	1360
Xylenes	1400 (2200)	ND	1	124	620
1,1 Dichloroethene	ND	ND	1	0.024	0.24
Cis-1,2 Dichloroethene	ND	ND	1	10	100
Tetrachloroethene	ND	ND	1	0.1	1
Trichloroethene	ND	ND	1	0.18	1.8
Vinyl Chloride	ND	ND	1	0.0015	0.015
Naphthalene	130 (190)	ND	1	12	40
2-Methylnaphthalene	72 (130)	ND	1	NA	NA
Chrysene	ND	ND	1	NA	NA
2,4 Dimethylphenal	ND	ND	1	NA	NA
Phenanthrene	ND	ND	1	NA	NA
Fluoranthene	ND	ND	1	NA	NA
Pyrene	ND	ND	1	NA	NA
Benzo(a)Arthracene	ND	ND	1	NA	NA
Bis(2-ethylhexyl)phthalate	19 (ND)	ND	1	NA	NA
Dimethyl Phthalate	ND	12 (ND)	1	NA	NA

All concentrations reported in micrograms per liter  
 (130) - Values in parenthesis are results of the Phase II sampling event  
 NA - Not Applicable  
 PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140  
 ES - Enforcement Standard, Wisconsin Administrative Code NR 140  
 ND - Not Detected  
 MW - Monitor Well  
 Samples analyzed by EPA Methods 8240 and 8270

### 3.2.1 Site 4

Site 4 is located at the POL storage facility, Building 405. A PA (Peer, 1988) was completed to investigate the historic JP-4 spill of approximately 2000 gallons that occurred in March 1981. The PA reported that the site had been "sufficiently remediated." A subsequent SI (Kapur, 1990) was completed at the POL facility and identified elevated levels of petroleum-based hydrocarbons in the soil and groundwater (Table 5, Appendix F) but did not delineate the extents of contamination.

The current investigation has successfully delineated the extent of petroleum-base hydrocarbons in the soil and groundwater in the vicinity of the POL facility. The subsurface investigation included 15 soil borings (SB-1, -2, -3, -7 through -17, and SB-21) and the installation of an additional monitoring well (MW-16) (Figure 10). A PID headspace survey was conducted on all soil samples collected from the soil borings and monitoring well installation operations (Appendix F). Soil samples identified by the PID as being below state action limits were selected for confirmatory laboratory analysis (Table 6). Groundwater samples were collected from monitoring wells MW-8 through MW-12 and MW-16, and analyzed for volatile and semivolatile compounds (Table 7).

As indicated from the PID survey (Appendix F) volatile constituents are present in the soil. The affected soils extend from the surface to approximately seven feet below grade. Figure 11 illustrates a total volatile constituent isoconcentration map based on the PID headspace survey of soil samples collected at five feet below the ground surface. The WANG Civil Engineering (CE) personnel reported that the refueling station associated with the POL facility located on the east-northeast side of Building 405, approximately 100 feet away, has historically been associated with spills which could be related to this surficial contamination. CE personnel also reported that the refueling station had been moved and previously was located to the west-northwest approximately 100 feet from Building 405. When the refueling station was relocated, the associated fuel supply lines were cut off and allowed to remain in place. At this time, it is not known if the supply lines were purged or sealed.



TABLE 5

**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS  
KAPUR & ASSOCIATES  
March 26, 1990**

Compound	Detection Limit (ug/l)	W1(1)	W4	W5	W5Dup	W6(1)	W7	W9(1)	W13	W14	W14Dup	PAL	ES
Benzene	1.00	BMQL(4)	x	x	x	x	x	9.79(3)	x	x	x	0.067	5.0
Carbon Tetrachloride	1.00	BMQL(4)	x	x	x	x	x	x	x	x	x		
1,1 Dichloroethene	1.00	BMQL(4)	x	x	x	x	x	x	x	x	x	0.024	0.24
Cis-1,2-Dichloroethene	1.00	35.9(2)	x	x	x	1.80	x	x	x	BMQL	BMQL	10	100
Ethylbenzene	1.00	x	x	x	x	x	x	27.3	x	x	x	272	1360
Tetrachloroethene	1.00	x	x	x	x	x	BMQL(4)	x	2.00(3)	x	x	0.1	1
Toluene	1.00	x	x	x	x	1.77	x	3.07	x	x	x	68.6	343
Trichloroethene	1.00	x	2.36(3)	11.8(3)	9.18(3)	1.34(2)	x	x	x	x	x	0.18	1.8
Vinyl Chloride	1.00	x	x	x	x	1.90(3)	x	x	x	x	BMQL(4)	0.0015	0.015
Xylenes	1.00	x	x	BMQL	x	6.82	x	235(2)	x	x	x	124	620

No VOCs were detected in samples from wells W2, W3, W11, and W12. Wells W8 and W10 were not sampled due to the presence of free product.

All concentrations reported in micrograms per liter.

x = analyzed but not detected

BMQL - detected, but below method quantitation limit

PAL - Preventive Action Limit, Wisconsin Administrative Code Chapter NR 140

ES - Enforcement Standard, Wisconsin Administrative Code Chapter NR 140

All monitoring wells installed and sampled by Kapur and Associates, Inc., March 1990

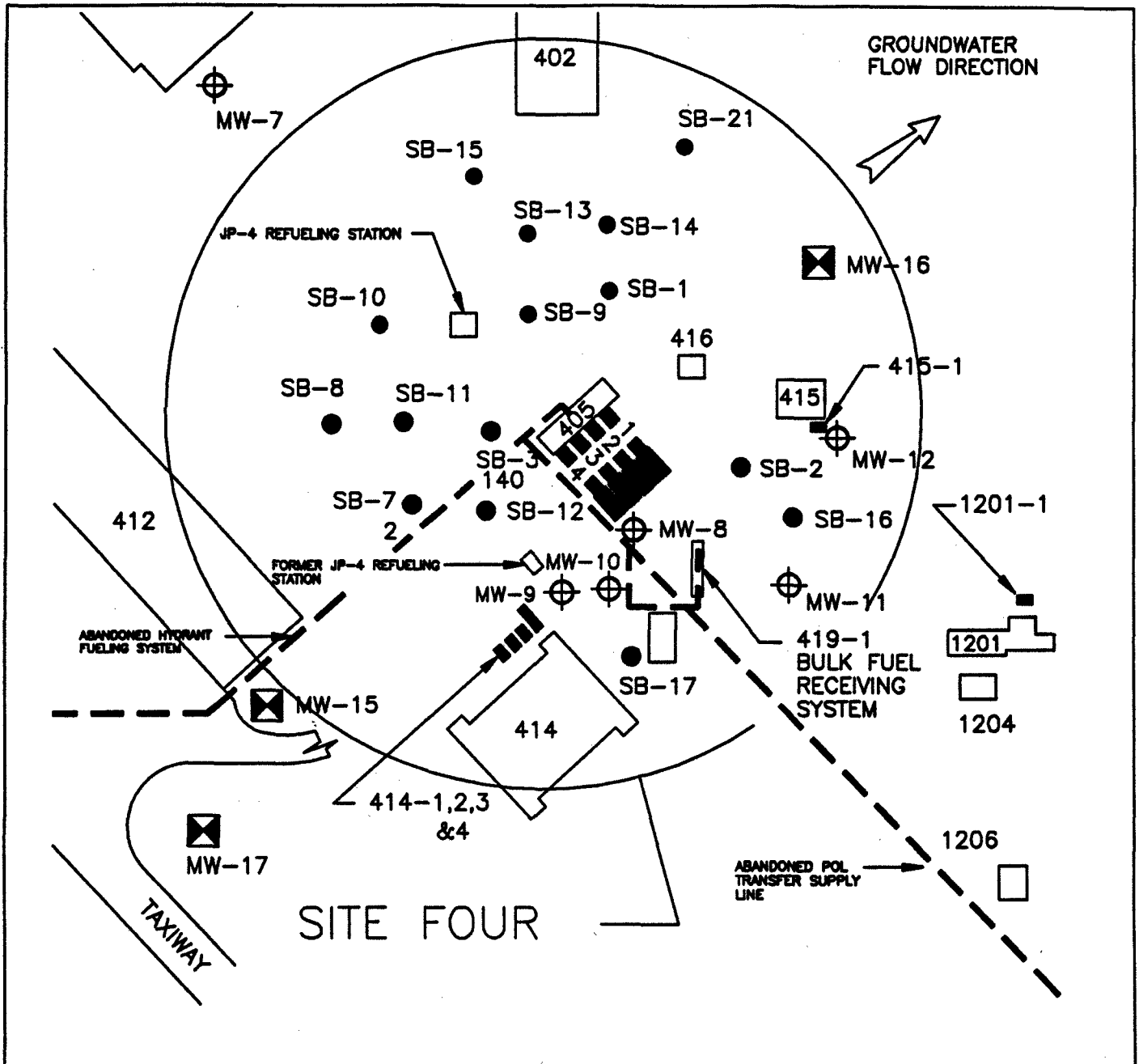
(1) Sample chromatogram contains unidentified VOC compounds other than those listed here.

(2) Concentration is above PAL but below ES.

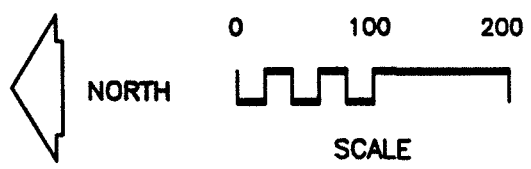
(3) Measured concentration is above ES.

(4) Compound detected but BMQL with reported detection limit above PAL or ES for the substance. A statistically sufficient number of analyses have not been performed to confirm the presence of the substance as stated in NR140. With a reported detection limit of 1.00 ug/L, a BMQL designation generally signifies that the compound is detected at a concentration between approximately 0.5 and 1.0 ug/L.

Table after Kapur and Associates, Inc., 1990



- LEGEND:**
- PREVIOUSLY INSTALLED MONITORING WELL LOCATION AND NUMBER
  - NEW MONITORING WELL
  - BUILDING
  - LOCATION OF UNDERGROUND STORAGE TANK
  - SB-16 SOIL BORING LOCATION



ADVANCED SCIENCES, INC.		FIGURE 10 SITE 4 LOCATION MAP	Wisconsin Air National Guard Headquarters, 128th Tactical Fighter Wing Truax Field Dane County Regional Airport Madison, Wisconsin
WANG25	NOVEMBER 1991		

**TABLE 6**  
**SUMMARY OF ANALYTICAL RESULTS**  
**SITE 4 SOILS**  
**April 1991**

Compound	SB-10	SB-15	SB-16	SB-21
Benzene	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND
1,2-Dichloroethene	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
Napthalene	ND	ND	ND	ND
2-Methlnaphthalene	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND
2,4-Dimethylphenal	ND	ND	ND	ND
Phenanthrene	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo(a)Arthracene	ND	ND	ND	ND
bis(2-Ethylhexyl)Phthalate	ND	ND	ND	ND
Dimethylphthalate	ND	ND	ND	ND
All concentrations reported in micrograms per liter SB - Soil Boring ND - Not Detected Samples analyzed by EPA Methods 8240 and 8270				

TABLE 7

SUMMARY OF ANALYTICAL RESULTS  
SITE 4 - GROUNDWATER

April 1991

TOTAL: BTex

10,000

60

770

ND

5

84

Compound	MW-8	MW-9	MW-10	MW-11	MW-12	MW-16	Detection Limit	PAL	ES
Benzene	<del>500</del>	28	240	ND	ND	38 (ND)	1	0.067	5.0
Toluene	ND	ND	ND	ND	ND	ND	1	68.6	343
Ethylbenzene	<del>500</del>	ND	ND	ND	ND	ND	1	272	1360
Xylenes	<del>2000</del>	32	730	ND	5	46 (ND)	1	124	620
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	1	0.024	0.24
1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	1	10	100
Tetrachloroethene	ND	ND	ND	ND	ND	ND	1	0.1	1
Trichloroethene	ND	ND	ND	ND	ND	ND	1	0.18	1.8
Vinyl Chloride	ND	ND	ND	ND	ND	ND	1	0.0015	0.015
Napthalene	<del>500</del>	ND	14	ND	ND	ND	1	12	40

All concentrations reported in micrograms per liter  
 (ND) - values in parenthesis are results of the Phase II sampling event  
 NA - Not applicable  
 PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140  
 ES - Enforcement Standard, Wisconsin Administrative Code NR 140  
 ND - Not detected  
 MW - Monitor Well  
 Samples analyzed by EPA Methods 8240 and 8270

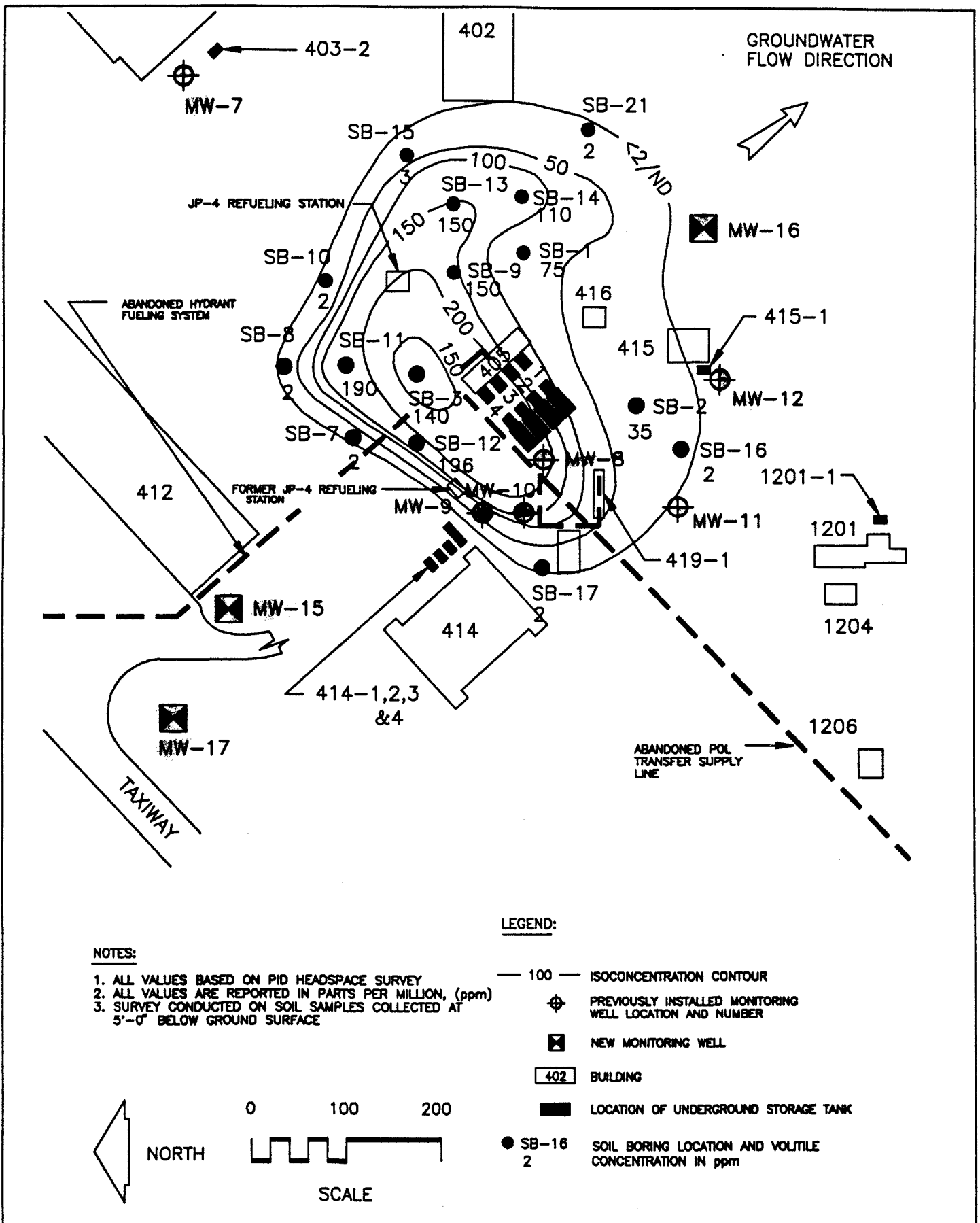
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TABLE 7 (continued)

**SUMMARY OF ANALYTICAL RESULTS  
SITE 4 - GROUNDWATER  
April 1991**

Compound	MW-8	MW-9	MW-10	MW-11	MW-12	MW-16	Detection Limit	PAL	ES
2-Methlnaphthalene	<del>460</del>	ND	ND	ND	ND	ND	1	NA	NA
Chrysene	<del>100</del>	ND	ND	ND	ND	ND	1	NA	NA
2,4-Dimethylphenal	ND	ND	<del>44</del>	ND	ND	ND	1	NA	NA
Phenanthrene	<del>210</del>	ND	20	ND	ND	ND	1	NA	NA
Fluoranthene	<del>300</del>	ND	36	ND	ND	ND	1	NA	NA
Pyrene	<del>260</del>	ND	29	ND	ND	ND	1	NA	NA
Benzo(a)Arthracene	<del>110</del>	ND	10	ND	ND	ND	1	NA	NA
bis(2-Ethylhexyl)Phthalate	ND	ND	ND	ND	ND	16 (ND)	1	NA	NA
Dimethylphthalate	ND	ND	ND	ND	ND	ND	1	NA	NA

All concentrations reported in micrograms per liter  
 (ND) - values in parenthesis are results of the Phase II sampling event  
 NA - Not applicable  
 PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140  
 ES - Enforcement Standard, Wisconsin Administrative Code NR 140  
 ND - Not detected  
 MW - Monitor Well  
 Samples analyzed by EPA Methods 8240 and 8270



ADVANCED SCIENCES, INC.		FIGURE 11 TOTAL VOLATILE ISOCONCENTRATIONS MAP IN SOIL AT SITE 4	Wisconsin Air National Guard Headquarters, 128th Tactical Fighter Wing Truax Field Dane County Regional Airport Madison, Wisconsin
WANG17	NOVEMBER 1991		

The initial round of groundwater sampling for the current investigation indicated benzene levels exceeding the ES of 5 ppb for monitoring wells MW-8, -9, -10, and -16. Benzene levels in these wells were 5,700 ppb, 28 ppb, 240 ppb and 38 ppb, respectively. Ethyl-benzene, at 520 ppb, exceeded the PAL of 272 ppb but is below the ES of 1360 ppb for monitoring well MW-8, while xylene exceeded the ES of 620 ppb for monitoring wells MW-8 and -10 at 3,900 ppb and 730 ppb, respectively (Table 7).

While sampling monitoring well MW-8, a non-measurable, green, oily film was observed. The WDNR representative, Carol McCurry, decided that the oily film did not constitute free product and analysis was not required. During the second sampling event, only the newly installed monitoring well MW-16 was sampled. No petroleum-based hydrocarbons were detected in MW-16 during this sampling event (Table 7). The extent of the petroleum-based hydrocarbons have been delineated for Site 4 from the data obtained during the current investigation (Tables 6 and 7).

USTs associated with the POL facility, Site 4, include four 50,000 gallon JP-4 USTs: 405-1, -2, -3 and -4; an abandoned and removed 300 gallon UST: 415-1; a bulk fuel intake system: 419-1; and four USTs: 414-1, -2, -3, and -4 located approximately 150 feet north-northwest of the POL facility. These USTs consist of one 2000 gallon fuel oil tank 414-1 which is currently empty and three 550 gallon tanks containing waste solvent (414-2), detergent (414-3), and waste oil (414-4).

The four 50,000 gallon JP-4 USTs, 405-1, -2, -3 and -4, have been determined to be structurally sound based on the volumetric tightness test (Kapur, 1990). The subsurface data collected to date suggest that the USTs have not leaked. These tanks are to be replaced pending fund approval. There should be minimal contamination associated with these USTs. The State of Wisconsin requires that all USTs that are to be abandoned and/or replaced be permanently closed per WDNR requirements. Therefore, the USTs shall be removed/replaced following WDNR closure requirements ILHR 10.732 as outlined in Section 6 of this document.

The abandoned 300 gallon waste oil tank, 415-1, was tested tight during the volumetric tightness test. The UST was removed between May and September 1990 but permanent closure requirements have not been completed with WDNR. Due to the density of subsurface utility lines, no soil boring samples were collected at this location. The abandoned UST must be permanently closed per WDNR regulations. Therefore, the former UST, 415-1, shall be permanently closed following the WDNR requirements ILHR 10.732 and 10.734 which are summarized in Section 6 of this report.

The bulk fuel intake system, 419-1, is not a UST but a fuel intake manifold system for the POL facility. The historic JP-4 spill (March, 1981) associated with 419-1 was investigated and found to be "sufficiently remediated" (Peer, 1988).

The four UST's located north-northwest of the POL facility, USTs 414-1, -2, -3, and -4, were volumetric tightness tested and found to be acceptable. No known leaks are associated with these USTs (Kapur, 1990).

Monitoring well MW-9 located directly down-gradient of the USTs, 414-1, -2, -3, and -4, was found to have benzene present at 28 ppb, ES is 5 ppb (Table 7). The benzene found in MW-9 is not suspected to be associated with the USTs. The USTs successfully passed the volumetric tightness test. Monitoring well MW-9 is located in the vicinity of the former refueling station, associated with the POL facility, which could be the probable source of the contamination.

The four USTs, 414-1, -2, -3, and -4 are scheduled to be removed pending fund approval. The State of Wisconsin requires that all USTs that are replaced or abandoned must be permanently closed per WDNR regulations. Therefore, the USTs shall be removed and permanently closed per WDNR requirements ILHR 10.732 and 10.734 as outlined in Section 6 of this document.

It is also recommended that corrective actions be completed to remediate the soils and groundwater at Site 4.



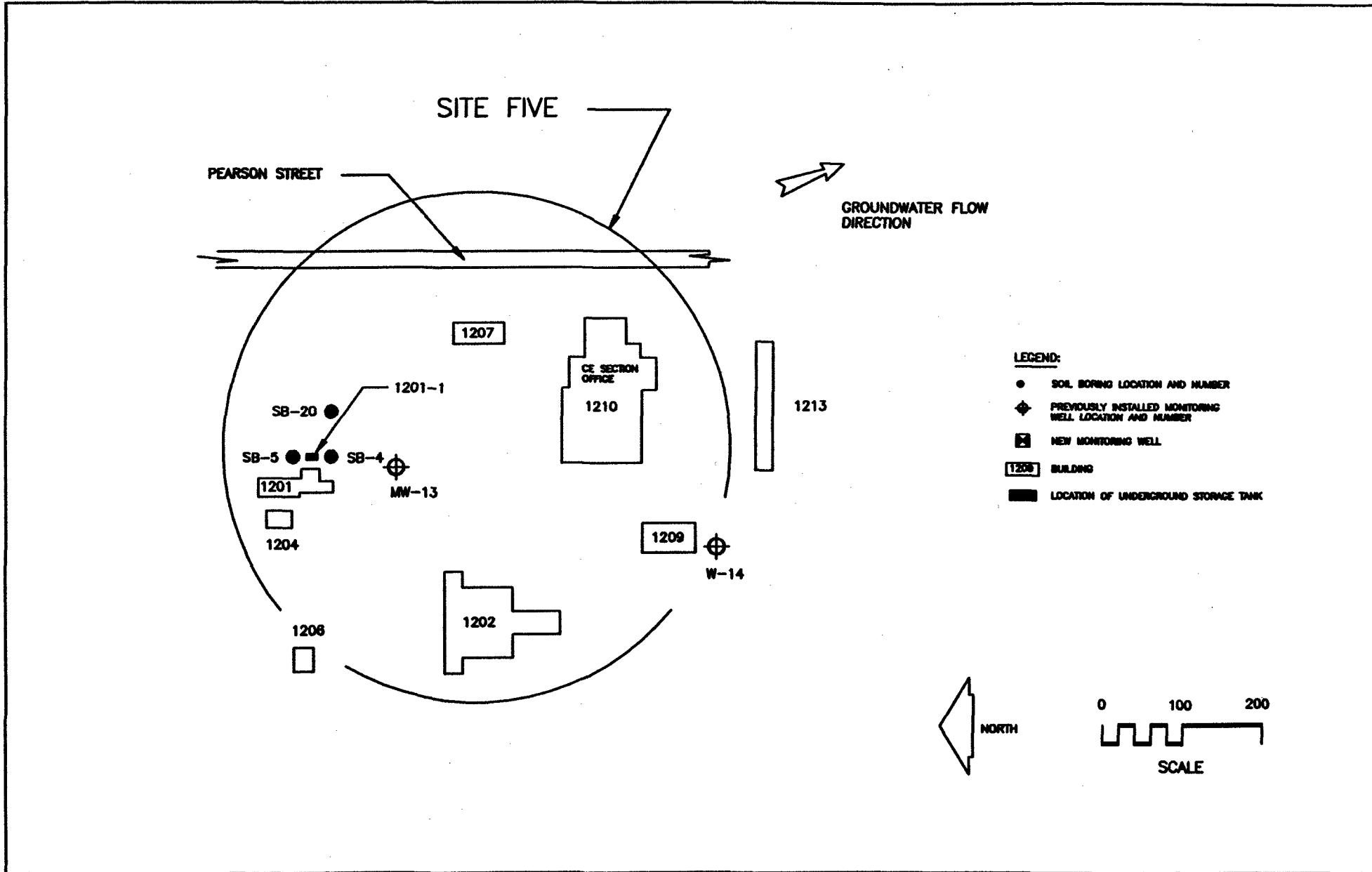
### 3.2.2 Site 5

Site 5 is located in the vicinity of Building 1201. Associated with Building 1201 is a 3000 gallon waste oil tank (1201-1) that failed the volumetric tightness test. A PA (Peer, 1988) was previously completed to investigate the historic JP-4 spill of approximately 100 gallons that occurred in August 1985 while disposing of used JP-4 into the waste oil tank. The PA reported that the spill had been adequately remediated. During the SI (Kapur, 1990) a monitoring well, MW-13, was completed approximately 70 feet west of the waste oil tank 1201-1 and identified the presence of chlorinated hydrocarbons in the groundwater. Analytical data from the SI (Kapur, 1990) identified trichloroethene (TCE) contamination at 2 ppb, ES is 1 ppb, in the groundwater (Table 5) and suggested that the UST was the probable source.

Results from the current investigation indicate the absence of TCE in the soils and groundwater at this site. The subsurface investigation included three soil borings (SB-4, -5 and -20) around the waste oil tank 1201-1 and also included the sampling of monitoring well MW-13 (Figure 12). A PID headspace survey was conducted on soil samples collected from the soil borings (Appendix F). The soil samples and the groundwater sample from monitoring well MW-13 were analyzed for volatile and semivolatile compounds by RMT Laboratories for confirmatory analysis (Tables 8 and 9).

As indicated by the PID headspace survey (Appendix F) and laboratory confirmation analysis (Table 8) there is no contamination associated with Site 5 in the soils.

Monitoring wells MW-13 and -14 are the only wells associated with Site 5. These wells were installed and sampled during the previous SI (Kapur, 1990). Tetrachloroethene (PCE) at 2 ppb, which exceeds the ES of 1 ppb, was detected in monitoring well MW-13 during the previous SI (Table 5). However, the analytical analysis for MW-13 collected during the current investigation indicated ND levels of PCE (Table 9). Previous analytical results (Kapur, 1990) for monitoring well MW-14 did not indicate any contamination (Table 5). Monitoring well MW-14 was not sampled during the current investigation based on the previous SI analytical data (Kapur, 1990).



ADVANCED SCIENCES, INC.	
WANG22	NOVEMBER 1991

FIGURE 12. SITE 5 LOCATION MAP

Wisconsin Air National Guard  
Headquarters, 128th Tactical Fighter Wing  
Truax Field  
Dane County Regional Airport  
Madison, Wisconsin

**TABLE 8**  
**SUMMARY OF ANALYTICAL RESULTS**  
**SITE 5 - SOIL**  
**April 1991**

Constituent	SB-4	SB-5	SB-21
Benzene	ND	ND	ND
Toluene	ND	ND	ND
Ethylbenzene	ND	ND	ND
Xylenes	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	ND	ND	ND
Tetrachloroethene	ND	ND	ND
Trichloroethene	ND	ND	ND
Vinyl Chloride	ND	ND	ND
Napthalene	ND	ND	ND
2-Methlnaphthalene	ND	ND	ND
Chrysene	ND	ND	ND
2,4-Dimethylphenal	ND	ND	ND
Phenanthrene	ND	ND	ND
Fluoranthene	ND	ND	ND
Pyrene	ND	ND	ND
Benzo(a)Arthracene	ND	ND	ND
bis(2-Ethylhexyl)Phthalate	ND	ND	ND
Dimethylphthalate	ND	ND	ND
All concentrations reported in micrograms per liter SB - Soil Boring ND - Not Detected Samples analyzed by EPA Methods 8240 and 8270			

**TABLE 9**  
**SUMMARY OF ANALYTICAL RESULTS**  
**SITE 5 - GROUNDWATER**  
**April 1991**

Constituent	MW-13	Detection Limit	PAL	ES
Benzene	ND	1	0.067	5.0
Toluene	ND	1	68.6	343
Ethylbenzene	ND	1	272	1360
Xylenes	ND	1	124	620
1,1-Dichloroethene	ND	1	0.024	0.24
1,2-Dichloroethene	ND	1	10	100
Tetrachloroethene	ND	1	0.1	1
Trichloroethene	ND	1	0.18	1.8
Vinyl Chloride	ND	1	0.0015	0.015
Napthalene	ND	1	12	40
2-Methinaphthalene	ND	1	NA	NA
Chrysene	ND	1	NA	NA
2,4-Dimethylphenal	ND	1	NA	NA
Phenanthrene	ND	1	NA	NA
Fluoranthene	ND	1	NA	NA
Pyrene	ND	1	NA	NA
Benzo(a)Arthracene	ND	1	NA	NA
bis(2-Ethylhexyl)Phthalate	ND	1	NA	NA
Dimethylphthalate	ND	1	NA	NA

All concentrations reported in micrograms per liter  
 NA - Not applicable  
 PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140  
 ES - Enforcement Standard, Wisconsin Administrative Code NR 140  
 ND - Not Detected  
 MW - Monitor Well  
 Samples analyzed by EPA Methods 8240 and 8270

Based upon data collected to date there is no contamination associated with Site 5 in the groundwater.

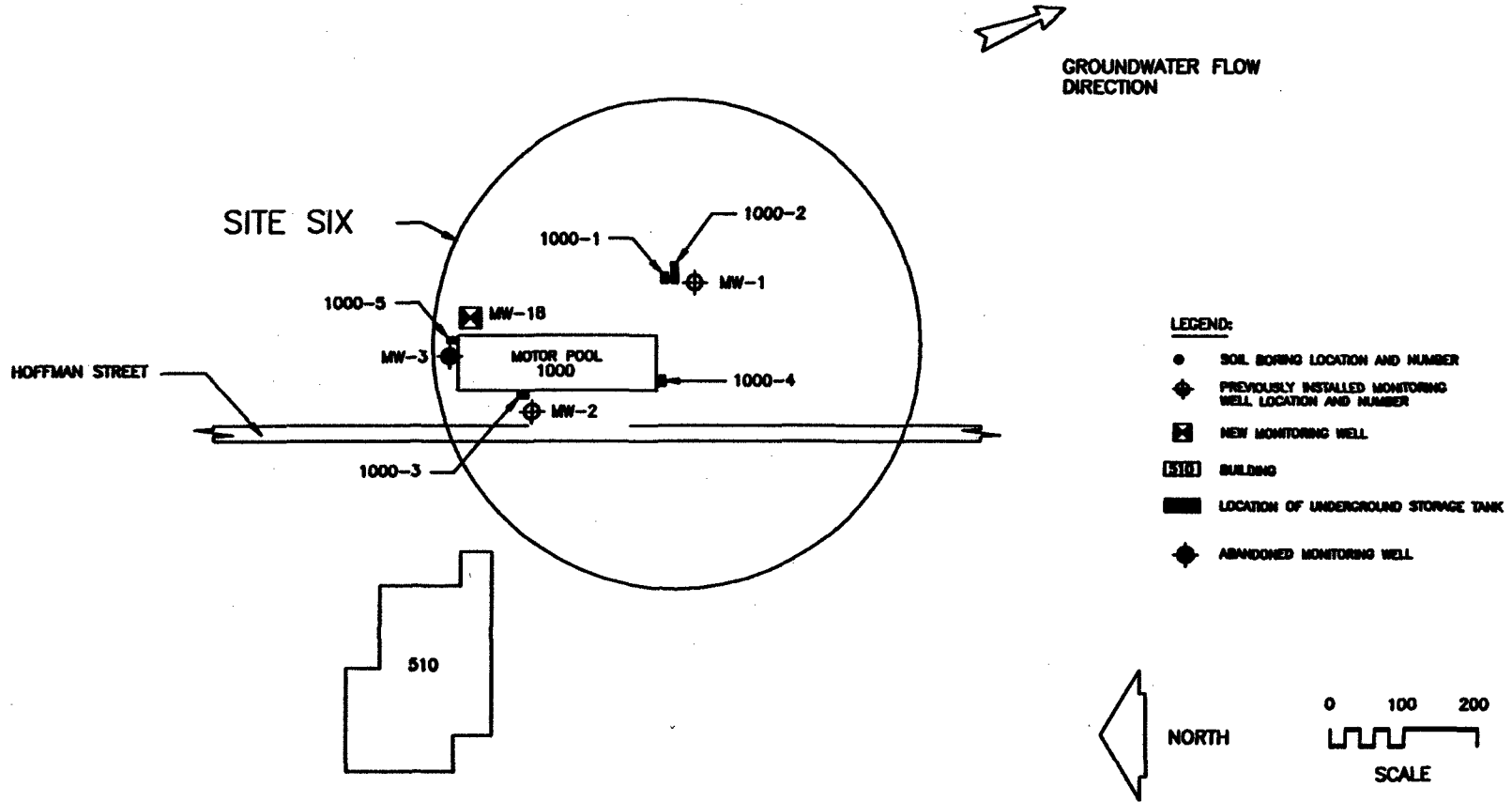
The waste oil tank 1201-1 is currently empty and is scheduled to be removed. The UST failed the tank volumetric tightness test but CE personnel informed ASI that the UST vent line had been damaged and could be the probable cause for the results of the tightness test. The current investigation indicated that the UST has not affected the surrounding soils and groundwater (Tables 8 and 9). Tank 1201-1 is abandoned and the WDNR requires that abandoned USTs must be permanently closed per WDNR requirements. Therefore, the UST, 1201-1, shall be removed according to WDNR requirements ILHR 10.732 and 10.734 as outlined in Section 6 of this document.

### 3.2.3 Site 6

Site 6 is located at the Motor Pool, Building 1000. Historic waste oil/solvent storage operations are associated with this site. A PA (Peer, 1988) was completed to investigate the USTs at this site. The PA reported that no spills or leaks have occurred. The SI (Kapur, 1990) identified trace amounts of chlorinated solvents in the groundwater (Table 5) but did not determine the extent or source of the constituents.

The previous investigation found that the levels of chlorinated compounds were below the WDNR ESs, therefore this site poses minimal risk to the environment. Site 6 was not included in the soil boring program for this investigation based on this data.

Site 6 includes monitoring wells MW-1, -2, -3 and -18 (Figure 13). Monitoring well MW-3 was found to be damaged and was abandoned per WDNR requirement ND 141.25. Monitoring well MW-18 was installed to replace MW-3. The soils surveyed with the PID during monitoring well MW-18 installation operations indicated the absence of volatile constituents in the soil (Appendix F). Analytical results for groundwater samples collected from the wells are tabulated in Table 10. Groundwater samples collected during the current investigation indicated levels of 1,2-



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FIGURE 13. SITE 6 LOCATION MAP

Wisconsin Air National Guard  
Headquarters, 128th Tactical Fighter Wing  
Truax Field  
Dane County Regional Airport  
Madison, Wisconsin

TABLE 10

**SUMMARY OF ANALYTICAL RESULTS  
SITE 6 - GROUNDWATER  
April 1991**

Compound	MW-1	MW-2	MW-3	MW-18	Detection Limit	PAL	ES
Benzene	ND	ND	NA	ND	1	0.067	5.0
Toluene	ND	ND	NA	ND	1	68.6	343
Ethylbenzene	ND	ND	NA	ND	1	272	1360
Xylenes	ND	ND	NA	ND	1	124	620
1,1-Dichloroethene	ND	ND	NA	ND	1	0.024	0.24
1,2-Dichloroethene	(33)	ND	NA	5 (6)	1	10	100
Tetrachloroethene	ND	ND	NA	ND	1	0.1	1
Trichloroethene	ND	ND	NA	ND	1	0.18	1.8
Vinyl Chloride	ND	ND	NA	ND	1	0.0015	0.015
Napthalene	ND	ND	NA	ND	1	12	40
<p>All concentrations reported in micrograms per liter  (33) - values in parenthesis are results of the Phase II sampling event  NA - Not applicable  PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140  ES - Enforcement Standard, Wisconsin Administrative Code NR 140  ND - Not detected  MW - Monitor Well  MW - 3 was removed from service per WDNR ND 141.25  Samples analyzed by EPA Methods 8240 and 8270</p>							

TABLE 10 (continued)

SUMMARY OF ANALYTICAL RESULTS  
 SITE 6 - GROUNDWATER  
 April 1991

Compound	MW-1	MW-2	MW-3	MW-18	Detection Limit	PAL	ES
2-Methlnaphthalene	ND	ND	NA	ND	1	NA	NA
Chrysene	ND	ND	NA	ND	1	NA	NA
2,4-Dimethylphenal	ND	ND	NA	ND	1	NA	NA
Phenanthrene	ND	ND	NA	ND	1	NA	NA
Fluoranthene	ND	ND	NA	ND	1	NA	NA
Pyrene	ND	ND	NA	ND	1	NA	NA
Benzo(a)Arthracene	ND	ND	NA	ND	1	NA	NA
bis(2-Ethylhexyl)Phthalate	ND	ND	NA	ND	1	NA	NA
Dimethylphthalate	ND	ND	NA	ND	1	NA	NA

All concentrations reported in micrograms per liter  
 (33) - values in parenthesis are results of the Phase II sampling event  
 NA - Not applicable  
 PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140  
 ES - Enforcement Standard, Wisconsin Administrative Code NR 140  
 ND - Not detected  
 MW - Monitor Well  
 MW - 3 was removed from service per WDNR ND 141.25  
 Samples analyzed by EPA Methods 8240 and 8270

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Dichloroethene (DCE) at 33 ppb which exceeds the PAL of 10 ppb but below the ES of 100 ppb for monitoring well MW-1. The analytical results for monitoring well MW-18 identified trace amount of DCE at 5 to 6 ppb which is below the PAL of 10 ppb (Table 10). During the previous SI (Kapur, 1990) only monitoring well MW-1 indicated the presence of DCE at 35.9 which is below the ES of 100 ppb (Table 5).

Monitoring well MW-2 was sampled during the previous and current investigation and was found to be free of any constituents of concern (Tables 5 and 10). Monitoring well MW-3 was sampled during the previous investigation and was found to be free of any constituents of concern (Table 5).

Associated with Site 6 are five USTs, 1000-1, -2, -3, -4, and -5 all of which successfully passed the volumetric tightness test. Two of the USTs, 1000-4, a 2000 gallon UST, and 1000-5, a 250 gallon UST, were removed sometime between May and September 1990 and contained fuel oil and waste oil, respectively. These tanks have not completed the permanent closure requirements in accordance with WDNR regulations. The USTs are not known to have leaked. Monitoring well MW-18 is located downgradient from the approximate former location of UST 1000-5. The soil and groundwater data from MW-18 indicates that there is no contamination associated with the former UST. The State of Wisconsin requires that all abandoned USTs be permanently closed per WDNR requirements. Therefore, the USTs 1000-4 and 1000-5 shall be closed according to WDNR requirements ILHR 10.732 and 10.734 as outlined in Section 6 of this document.

The remaining three USTs include a 12,000 gallon MOGAS UST, 1000-1; a 6,000 gallon diesel UST, 1000-2; and a 275 gallon oil/water separator, 1000-3 all of which are to be replaced pending fund approval. Monitoring well MW-1 is located downgradient of USTs 1000-1 and 1000-2. Groundwater data from this well indicate that the USTs have not leaked. Tank 1000-3 is an oil/water separator and no known leaks have been associated with this tank. The State of Wisconsin requires that USTs being removed from service be permanently closed per WDNR

requirements. Therefore, these USTs shall also be removed and closed according to WDNR closure requirements ILHR 10.732 as outlined in Section 6 of this document.

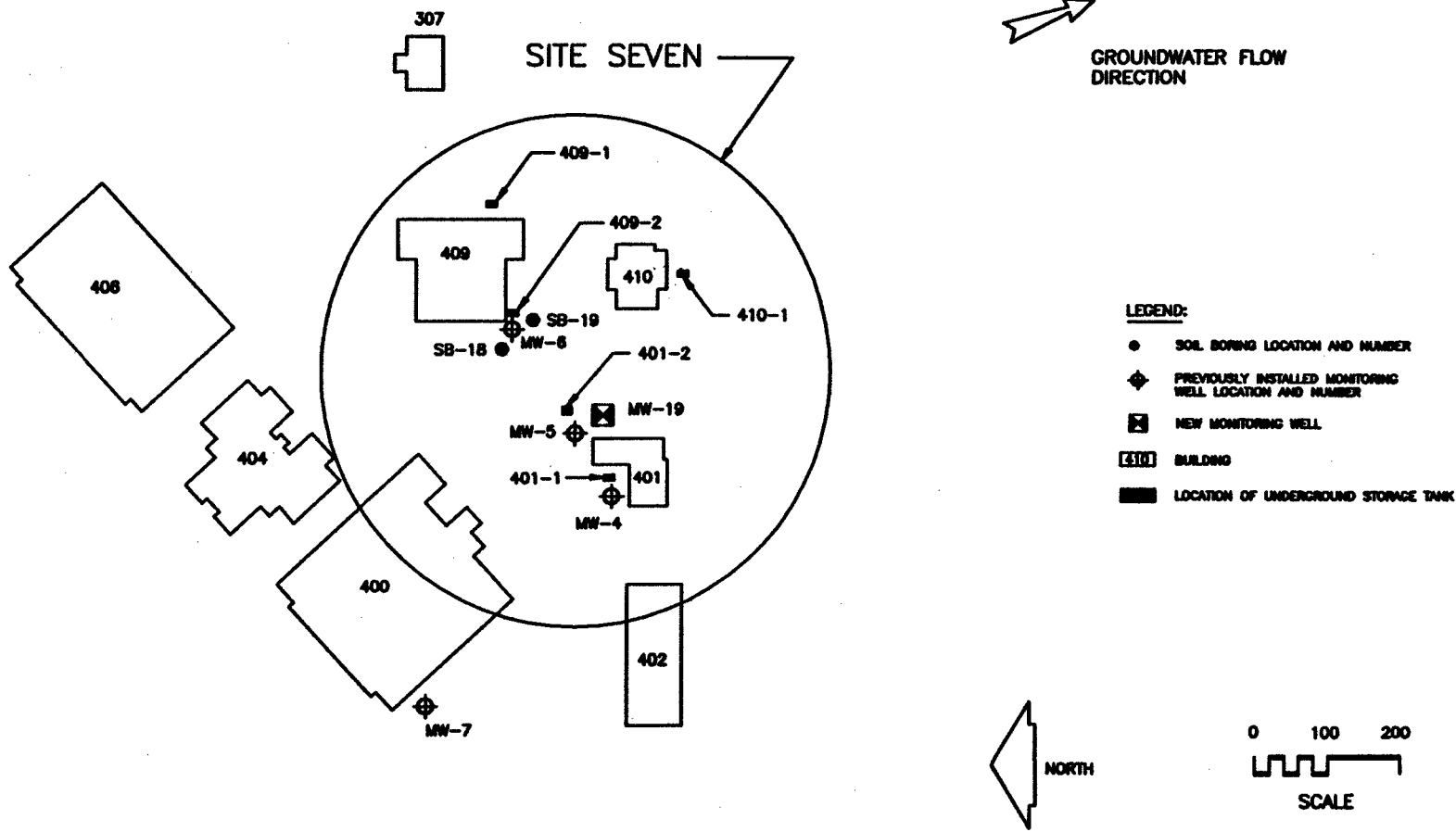
### 3.2.4 Site 7

Site 7 is located at the Aircraft Maintenance facility, Buildings 400, 401, 409 and 410. A PA (Peer, 1988) was completed to investigate the USTs at this site, UST 401-1, -2, 409-1, and 410-1 (Appendix A). The PA reported that no spills or leaks have occurred. The SI (Kapur, 1990) identified elevated levels of chlorinated solvents in the groundwater (Table 5) but did not determine the extent or locate a source of the contamination.

The current investigation confirmed the presence of TCE in the groundwater at 17 ppb in MW-5 and 9 ppb in MW-19 both of which exceed the ES of 1 ppb. The subsurface investigation included two soil borings (SB-18 and -19) and the installation of an additional monitoring well (MW-19) (Figure 14). A PID headspace survey was conducted on all soil samples collected from the soil borings and monitoring well installation operations (Appendix F). Groundwater samples were collected from monitoring wells MW-4, -5, -6 and -19. Soil samples collected from borings SB-18 and -19 and the groundwater samples collected were analyzed for volatile and semivolatile compounds at the WDNR approved laboratory and are summarized in Tables 11 and 12, respectively.

As indicated from the PID headspace survey (Appendix F) and analytical analysis (Table 11) volatile constituents are absent in the soils at Site 7.

Site 7 includes monitoring wells MW-4, -5, -6, and -19. Monitoring wells MW-4, -5 and -6 were installed and sampled during the previous SI (Kapur, 1990). Elevated levels of TCE, exceeding the ES of 1 ppb, were detected in MW-4, -5 and -6 at 2.36 ppb, 11.8 ppb and 9.18 ppb, respectively (Table 5). Groundwater samples were collected during the current investigation from the monitoring wells and analyzed for volatile and semivolatile compounds. TCE exceeded the ES for monitoring wells MW-5 and -19 at 17 ppb and 11 ppb, respectively (Table 12).



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FIGURE 14. SITE 7 LOCATION MAP

Wisconsin Air National Guard  
Headquarters, 128th Tactical Fighter Wing  
Truax Field  
Dane County Regional Airport  
Madison, Wisconsin

**TABLE 11**  
**SUMMARY OF ANALYTICAL RESULTS**  
**SITE 7 - SOIL**  
**April 1991**

Constituent	SB-18	SB-19
Benzene	ND	ND
Toluene	ND	ND
Ethylbenzene	ND	ND
Xylenes	ND	ND
1,1-Dichloroethene	ND	ND
1,2-Dichloroethene	ND	ND
Tetrachloroethene	ND	ND
Trichloroethene	ND	ND
Vinyl Chloride	ND	ND
Napthalene	ND	ND
2-Methlnaphthalene	ND	ND
Chrysene	ND	ND
2,4-Dimethylphenal	ND	ND
Phenanthrene	ND	ND
Fluoranthene	ND	ND
Pyrene	ND	ND
Benzo(a)Arthracene	ND	ND
bis(2-Ethylhexyl)Phthalate	ND	ND
Dimethylphthalate	ND	ND
All concentrations reported in micrograms per liter SB - Soil Boring ND - Not Detected Samples analyzed by EPA Methods 8240 and 8270		

TABLE 12

**SUMMARY OF ANALYTICAL RESULTS  
SITE 7 - GROUNDWATER  
April 1991**

Constituent	MW-4	MW-5	MW-6	MW-19	Detection Limit	PAL	ES
Benzene	ND	ND	ND	ND	1	0.067	5.0
Toluene	ND	ND	ND	ND	1	68.6	343
Ethylbenzene	ND	ND	ND	ND	1	272	1360
Xylenes	ND	ND	ND	ND	1	124	620
1,1-Dichloroethene	ND	ND	ND	ND	1	0.024	0.24
1,2-Dichloroethene	ND	ND	ND	ND	1	10	100
Tetrachloroethene	ND	ND	ND	ND	1	0.1	1
Trichloroethene	ND	17	ND	9 (11)	1	0.18	1.8
Vinyl Chloride	ND	ND	ND	ND	1	0.0015	0.015
Napthalene	ND	ND	ND	ND	1	12	40
<p>All concentrations reported in micrograms per liter  (O) - values in parenthesis are results of the Phase II sampling event  PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140  ES - Enforcement Standard, Wisconsin Administrative Code NR 140  ND - Not detected  MW - Monitor Well  Samples analyzed by EPA Methods 8240 and 8270</p>							

TABLE 12 (continued)

**SUMMARY OF ANALYTICAL RESULTS  
SITE 7 - GROUNDWATER  
April 1991**

Constituent	MW-4	MW-5	MW-6	MW-19	Detection Limit	PAL	ES
2-Methlnaphthalene	ND	ND	ND	ND	1	NA	NA
Chrysene	ND	ND	ND	ND	1	NA	NA
2,4-Dimethylphenal	ND	ND	ND	ND	1	NA	NA
Phenanthrene	ND	ND	ND	ND	1	NA	NA
Fluoranthene	ND	ND	ND	ND	1	NA	NA
Pyrene	ND	ND	ND	ND	1	NA	NA
Benzo(a)Arthracene	ND	ND	ND	ND	1	NA	NA
bis(2-Ethylhexyl)Phthalate	ND	ND	ND	ND	1	NA	NA
Dimethylphthalate	ND	ND	ND	ND	1	NA	NA
<p>All concentrations reported in micrograms per liter            (0) - values in parenthesis are results of the Phase II sampling event            PAL - Preventive Action Limit, Wisconsin Administrative Code NR 140            ES - Enforcement Standard, Wisconsin Administrative Code NR 140            ND - Not detected            MW - Monitor Well            Samples analyzed by EPA Methods 8240 and 8270</p>							

Laboratory analyses of groundwater samples from monitoring wells MW-4 and -6, did not detect any contamination (Table 12).

Monitoring well MW-7 is located to the north-northwest and upgradient of Site 7 (Figure 14). MW-7 was installed and sampled during the previous SI (Kapur, 1990). The analytical results from the previous SI indicate that MW-7 does not have any reportable levels of constituents of concern. Therefore no samples were collected during the current investigation base on this data.

Associated with Site 7 are five USTs which all have successfully passed the volumetric tightness test and are not known to have leaked. Two of the USTs, a 250 gallon oil/water separator (401-2), and a 2,000 gallon waste oil tank (409-1), have been removed. These USTs have not completed the state mandated permanent closure requirements per WDNR regulations. Therefore, the USTs shall be properly closed according to WDNR requirements ILHR 10.732 and 10.734 as outlined in Section 6 of this document.

One UST, a 250 gallon waste oil tank (410-1) has been abandoned in place. WDNR does not consider this tank a UST requiring closure status (personal communication with Carol McCurry, WDNR Hydrogeologist). The UST, 410-1, is a catch basin for the former flight simulator. The flight simulator has been removed and has never leaked or been associated with any spills. The UST drain/fill lines have been plugged with cement. Carol McCurry of WDNR stated that the UST does not pose any environmental liability and no action is required to decommission the UST and may be left in place.

A 275 gallon oil/water separator 409-2 is active and has been reported to be in good condition (Peer, 1988). The analytical results of monitoring well MW-6 and soil borings SB-18 and -19 in the vicinity of the oil/water separator 409-2 indicate that the surrounding soils and groundwater have not been impacted by this tank. The UST has not been associated with any leaks or spills and poses no immediate environmental concern.

The remaining UST, a 550 gallon waste oil tank (401-1), is to be replaced pending fund approval. No known leaks have been associated with this tank. The State of Wisconsin stipulates that USTs removed from service be permanently closed per WDNR requirements. Therefore, the UST shall be removed following WDNR closure requirements ILHR 10.732 as outlined in Section 6 of this document.

#### 4.0 CONCLUSIONS

At the WANG Facility, four sites of concern were identified to be characterized and assessed during this investigation. Of the four sites, the POL facility - Site 4, is the only area identified as having petroleum hydrocarbon contamination above WDNR ESs. Site 7 is the only area confirmed to have chlorinated hydrocarbons present above the ESs in the groundwater.

Throughout the investigation, no free product was identified in any of the wells. A non-measurable green, oily film was observed in monitoring well MW-8, Site 4, and was not identified as a constituent of concern. As indicated by the analytical data, Sites 5, 6, and 7 do not have BTEX levels above state action limits. However, DCE levels exceeding the PAL of 10 ppb has been detected in monitoring well MW-1 at Site 6; and TCE at levels above the ES of 1 ppb have been detected at Site 7 in monitoring wells MW-5 and -19. Petroleum-contaminated soils and groundwater are present at the POL facility, Site 4. Benzene and xylenes are above ESs of 5 ppb and 620 ppb respectively in monitoring wells MW-8, -9 and -10. Monitoring well MW-16, the downgradient well at Site 4, was identified as having elevated levels of benzene and xylene during the first round of sampling. These levels could be attributed to the introduction of contaminants during the development/purging and/or sampling operations. However, after the second round of sampling the analytical results indicated nondetect levels for all constituents of concern. This allowed ASI to delineate the extent of petroleum-contaminated soils and groundwater, based on the headspace survey and analytical results respectively at Site 4. The potential sources for the elevated levels of petroleum-based constituents found at Site 4 include the piping associated with the USTs and fuel receiving system, the fuel dispensing station and



associated piping, the abandoned pipelines for the hydrant refueling and supply systems, or historic operations and maintenance activities associated with the POL facility.

Elevated levels of petroleum-based constituents were also identified in monitoring well MW-15. The location of MW-15 is upgradient of Site 4 and was thought to be a clean representative background location. Analytical data suggested otherwise. The probable source of this contamination is the abandoned pipeline for the hydrant refueling system or from the historic operation and maintenance activities associated with Hanger 412.

The groundwater flow direction and gradient, determined from the topographic survey and static groundwater level measurements, is to the south-southeast across the WANG facility with a gradient of 0.001. Surface drainage is channeled off the WANG facility and discharges into Starkweather Creek. Potential receptors would likely be this creek, which discharges into Lake Monona located in central Madison, Wisconsin.

The USTs at the WANG facility have completed a volumetric tightness test. All, with the exception of UST 1201-1, passed the test. UST 1201-1 failed the tightness test most likely due to a damaged vent line. The subsurface data collected to date suggests that none of the USTs have adversely affected the environment. The USTs are scheduled to be removed pending fund approval. The analytical data suggests no reason to suspect that the USTs have leaked. Since the USTs pose no imminent environmental risk, no immediate response is necessary. However, out-of-service USTs must be closed in accordance with WDNR regulations as outlined in Section 6.

## 5.0 RECOMMENDATIONS

Based on the data collected and on the interpretation of that data, it is recommended that the following course of action be taken:

- Develop a Work Plan to identify the sources and extent of the chlorinated hydrocarbons identified at Site 7.
- Develop a Work Plan to identify the source and extent of contamination associated with monitoring well MW-15.
- Conduct aquifer tests to assist in determination of the migration rates of contaminants in groundwater and hydraulic parameters of the shallow aquifer.
- Excavate and remove the abandoned fuel pipelines for the supply and hydrant refueling systems associated with Site 4.
- Develop a Corrective Action Plan (CAP) to remediate the soil and groundwater at Site 4.
- Meet with WDNR personnel to present the results of the work performed to date, the CAP for Site 4, and the Work Plan for the additional investigations at the WANG facility.
- Close all UST systems scheduled to be removed/replaced following WDNR UST Permanent Closure requirements ILHR 10.732 and 10.734, as summarized in Section 6.0. The following table summarizes recommended action for facility USTs:

TABLE 13

## RECOMMENDED ACTION FOR FACILITY USTs

Tank	Site	Current Status			Recommendation
		Active	Abandoned	Removed	
400	NA	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
400-1 ✓	NA		<i>fuel oil</i>	X	Must be permanently closed per WDNR Requirements ILHR 10.734
400-2 ✓	NA		<i>fuel oil</i>	X	Must be permanently closed per WDNR Requirements ILHR 10.734
401-1	7	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
401-2 ✓	7		<i>not fuel oil</i>	X	Must be permanently closed per WDNR Requirements ILHR 10.734
403-1 ✓	NA			X	Must be permanently closed per WDNR Requirements ILHR 10.734
403-2	NA	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
405-1	4	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
405-2	4	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
405-3	4	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
405-4	4	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
406-1 ✓	NA		<i>fuel oil</i>	X	Must be permanently closed per WDNR Requirements ILHR 10.734
409-1 ✓	7		<i>fuel oil</i>	X	Must be permanently closed per WDNR Requirements ILHR 10.734
409-2	7	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
410-1	7		X	<i>OK</i>	No action required per WDNR, C. McCurry, State Hydrologist
414-1 ?	4		X	<i>??</i>	Must be removed and permanently closed per WDNR Requirements ILHR 10.732

NA - Not Applicable, UST was not included in current investigation

TABLE 13 (continued)

## RECOMMENDED ACTION FOR FACILITY USTs

Tank	Site	Current Status			Recommendation
		Active	Abandoned	Removed	
414-2	4	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
414-3	4	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
414-4	4	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
415-1 ✓	4		<i>fuel oil</i>	X	Must be permanently closed per WDNR Requirements ILHR 10.734
1000-1	6	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
1000-2	6	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
1000-3 ✓	6	X		XX	Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
1000-4 ✓	6		<i>fuel oil</i>	X	Must be permanently closed per WDNR Requirement ILHR 10.734
1000-5 ✓	6		<i>not fuel oil</i>	X	Must be permanently closed per WDNR Requirement ILHR 10.734
1201-1 ✓	5		<del>fuel oil</del>	XX	Must be removed and permanently closed per WDNR Requirements ILHR 10.732
1206	NA	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
1209-1	NA	X			Must be upgraded for leak detection and corrosion protection per Federal Regulations 40 CFR 280.20, 280.30 and 280.40
1210-1 ✓	NA			X	Must be permanently closed per WDNR Requirements ILHR 10.734
1212-1 ✓	NA			X	Must be permanently closed per WDNR Requirements ILHR 10.734

NA - Not Applicable, UST was not included in current investigation

**TABLE 14**  
**Compliance Requirement Dates**  
**For WANG UST's**  
**SEPTEMBER 1991**

Tank	Notice of Violation	Leak Detection By	Corrosion Protection By	Spill/Overfill Protection By
400	No	12/93	12/98	12/98
400-1	No	NA	NA	NA
400-2	No	NA	NA	NA
*401-1	No	12/89	12/98	12/98
*401-2	No	NA	NA	NA
403-1	No	NA	NA	NA
403-2	No	12/89	12/98	12/98
*405-1	No	12/89	12/98	12/98
*405-2	No	12/89	12/98	12/98
*405-3	No	12/89	12/98	12/98
*405-4	No	12/89	12/98	12/98
406-1	No	NA	NA	NA
*409-1	No	NA	NA	NA
*409-2	No	12/93	12/98	12/98
*410-1	No	NA	NA	NA
+*414-1	No	12/93	12/98	12/98
*414-2	No	12/93	12/98	12/98
*414-3	No	12/93	12/98	12/98
*414-4	No	12/93	12/98	12/98
*415-1	No	NA	NA	NA
*1000-1	No	12/92	12/98	12/98
*1000-2	No	12/89	12/98	12/98
*1000-3	No	12/89	12/98	12/98
*1000-4	No	NA	NA	NA
*1000-5	No	NA	NA	NA
+*1201-1	Yes	12/89	12/98	12/98
1206	No	12/93	12/98	12/98
1209-1	No	12/93	12/98	12/98
1210-1	No	NA	NA	NA
1212-1	No	NA	NA	NA

APPC1

\* UST's Located at Sites Involved in the Site Assessment.

NA - Not Applicable, UST removed

+ Abandoned UST's must comply with WDNR regulations until permanently removed

## 6.0 SUMMARY OF WISCONSIN REGULATIONS FOR UST CLOSURES

### Responsibilities during UST Closure

Basic responsibilities for the closure of an UST by removal and scrapping are to: remove all flammable and combustible liquids from the tank and lines; cap and plug pipes left in place; render tank vapor free; and, clean tank and dispose of the waste properly. Regulations indicate that documents need to be secured for the delivery of the tank and wastes, and that any openings in the tank are to be capped or plugged if it is to be transported to a remote area. Wisconsin regulations also require the filing of a Tank Inventory Form (SBD-7437) for each tank removed along with the conducting of a Closure Assessment if so indicated by the EPA or state. Finally, it should be noted that any discovered leakages are to be immediately reported to the WDNR District Office.

### Responsibilities during UST Closure Assessment

Wisconsin state regulations require samples to be taken from the native soil of each UST site at the following locations: beneath the bottom of each end of each tank; beneath the surface under each island on supply side; beneath piping runs if applicable; and, below remote fill openings. Also, samples are to be collected from the sides of the excavation pit at the locations previously mentioned if the water table is found within tank and/or piping excavation. It should be noted that all samples must be collected according to approved WDNR techniques, and that a closure statement need not be filed if free product is discovered.

The Closure Assessment Report must also include relevant information on: the background of each UST site; proper identification maps; field work descriptions and comments; and, proper documentation on tank, waste product, and sludge disposal. The final report must be sent to WDNR and Department of Industry, Labor and Human Relations (DILHR) and must include copies of the Tank Inventory forms (SBD-7437) for all tanks being closed.

## 6.1 Outline Wisconsin Regulations For UST Closures

### Responsibilities during UST Closure

1. Notification of the local fire chief, inspector, or other authorized DILHR agent must occur 30 days before UST closure.
2. Closure of UST by removal and scrapping:
  - obtain a qualified company to close the system,
  - remove all flammable and combustible liquids from tank and lines,
  - cap or plug pipes left in place,
  - render tank vapor free,

- clean tank and dispose of the waste properly,
- secure documents for the delivery of tank and wastes,
- report any leakages to the WDNR District Office,
- cap or plug any openings in the tank if it is to be transported to a remote area,
- conduct a Closure Assessment if required by EPA or state,
- file a Tank Inventory Form (SBD-7437) for each tank removed.

Responsibilities during UST Closure Assessment

1. Sampling responsibilities:

- obtain qualified sample collectors (and state qualifications in report),
- complete all samples in native soil not in excavation material,
- sample areas of strong odor or discoloration,
- sample 1 to 3 feet beneath bottom of each end of each tank,
- sample 3 feet beneath surface under each island on supply side,
- along piping runs sample 3 feet beneath surface every 20 feet or segment (preferably under swing joints, flex connections, and elbows), with a minimum of 2 samples,
- sample 5 feet below remote fill opening (if applicable),
- if water table is found within tank and/or piping excavation collect soil samples in sides of the excavation pit at the locations mentioned above,
- if free product is discovered WDNR must be notified and a closure statement need not be filed,
- samples must be collected according to approved WDNR techniques,

2. Background information on each UST site is to include:

- site owner and UST system owner/operator
- environmental consultant
- excavation contractor
- past and present property use
- previous geotechnical investigation results
- information on system leaks and repairs
- site address and township range description to the quarter/quarter section
- third party present at closure and closure assessment

3. Assessment report also is to include:

- site location map
- site layout/plot plan
- tabulated field and lab data
- narrative of observations encountered on site
- soil sampling techniques description
- field instrument methods utilized
- photos if applicable (no black and white photocopies or photographs)

4. Documentation on tank, waste product, sludge disposal must include:
  - tank cleaning methods used
  - names and addresses of the people and firms who removed and cleaned tank
  - final destination of tank
  - methods and firms used to store, transport, and dispose of tank waste residues
  - waste characterization data
  - copies of hazardous waste manifest and EPA generator I.D. numbers
  - disposal or treatment of contaminated soil and backfill.
5. Copies of Tank Inventory forms (SBD-7437) for all tanks being closed must be included in the Closure Assessment Report.
6. Manage all tank residues including remaining product, accumulations of sludge, contaminated water, etc. in accordance with WDNR and DILHR requirements.
7. Closure Assessment report must be sent to WDNR and DILHR with duplicate copies of any Tank Inventory forms (SBD-7437) completed.