
INSTALLATION RESTORATION PROGRAM

**CLOSURE ASSESSMENT REPORT FOR UST REMOVALS
AT SITES 4 AND 5 - PETROLEUM, OILS, AND
LUBRICANTS FACILITY**

**VIRGINIA AIR NATIONAL GUARD
192nd FIGHTER GROUP
RICHMOND INTERNATIONAL AIRPORT
SANDSTON, VIRGINIA**

**FINAL
NOVEMBER 1996**



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**Hazardous Waste Remedial Actions Program
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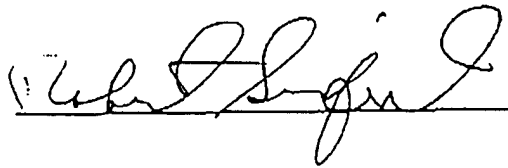
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CERTIFICATION OF CLOSURE

Sites 4 and 5 at the Virginia Air National Guard Base, Richmond International Airport, Sandston, Virginia have been closed in accordance with the requirements of the Commonwealth of Virginia's Department of Environmental Quality and the specifications and procedures described in the approved closure plan for Tank #4 at Site 4.

COL Robert O. Seifert
Base Commander



Joseph H. Hawk
Professional Engineer
Commonwealth of Virginia
License Number 0402 025417



NOTE: Professional engineering seal with original signature and date is on file with the Commonwealth of Virginia's Department of Environmental Quality.



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October 27, 1994

Laura J. Boyer
Virginia Air National Guard
5680 Beulah Road
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Re: PC# 95-4095, Site 4, POL Facility, Inactive USTs
PC# 94-4096, Site 5, POL Facility, Abandoned USTs

Dear Ms. Boyer:

This correspondence is in regard to the above mentioned facility and the Closure Assessment Report for UST removals. The report details the closure assessment activities for five of the USTs at Site 4 and all twelve USTs at Site 5. Based upon the data in this report and other assessment information, the Department has concluded that the remaining petroleum contamination at these sites does not appear to pose a significant environmental hazard. These investigations are considered to be closed and further corrective action is not required at this time.

Be advised that should environmental problems develop in these areas, then additional information and/or corrective action may be required in accordance with applicable State and Federal regulations.

If you require additional information, please Meade Anderson at (804) 527-5022.

Sincerely,

A handwritten signature in cursive script, appearing to read "A. L. Willett".

A. L. Willett
Regional Ground Water Manager

94-4095a/ma

INSTALLATION RESTORATION PROGRAM

**VIRGINIA AIR NATIONAL GUARD
192nd FIGHTER GROUP
RICHMOND INTERNATIONAL AIRPORT
SANDSTON, VIRGINIA**

**CLOSURE ASSESSMENT REPORT FOR UST REMOVALS AT
SITES 4 AND 5 - PETROLEUM, OILS, AND LUBRICANTS FACILITIES**

Prepared For:

**National Guard Bureau ANGRC/CEVR
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Prepared By:

**Advanced Sciences, Inc.
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Submitted To:

**Hazardous Waste Remedial Action Program
Oak Ridge, Tennessee 37831-7606
Managed by Lockheed Martin Energy Systems, Inc.
for the U.S. Department of Energy under contract DE-AC05-84OR21400**

November 1996

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LIST OF ACRONYMS/ABBREVIATIONS

ASI	Advanced Sciences, Inc.
AVGAS	aviation gasoline
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTUs	British Thermal Units
CLP	Contract Laboratory Program
DOE	Department of Energy
DRO	diesel range organics
GC	gas chromatograph
GRO	gasoline range organics
HAZWRAP	Hazardous Waste Remedial Actions Program
JP-4	Jet Propulsion - 4
LMES, Inc.	Lockheed Martin Energy Systems, Inc.
MeCl	methylene chloride
MSL	mean sea level
NGB	National Guard Bureau
NOAA	National Oceanic and Atmospheric Administration
PCBs	polychlorinated biphenyls
POL	petroleum, oil, and lubricants
RRI	Rapid Response Initiative
SVOCs	semivolatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TOX	total organic halides
TPH	total petroleum hydrocarbons
UST	underground storage tank
VADEQ	Virginia Department of Environmental Quality
VANG	Virginia Air National Guard
VOCs	volatile organic compounds

1.0 INTRODUCTION

1.1 BACKGROUND

The National Guard Bureau (NGB) developed the Rapid Response Initiative (RRI) to conduct site assessments, evaluate potential corrective actions, and design the selected remedies at leaking underground storage tank (UST) and spill sites at Air National Guard facilities. The U.S. Department of Energy (DOE) provides technical assistance in implementing the RRI for the NGB through an existing Interagency Agreement with the Air Force and through the Hazardous Waste Remedial Actions Program (HAZWRAP). Lockheed Martin Energy Systems, Inc. (LMES, Inc.) is assigned the responsibility of operating HAZWRAP for DOE.

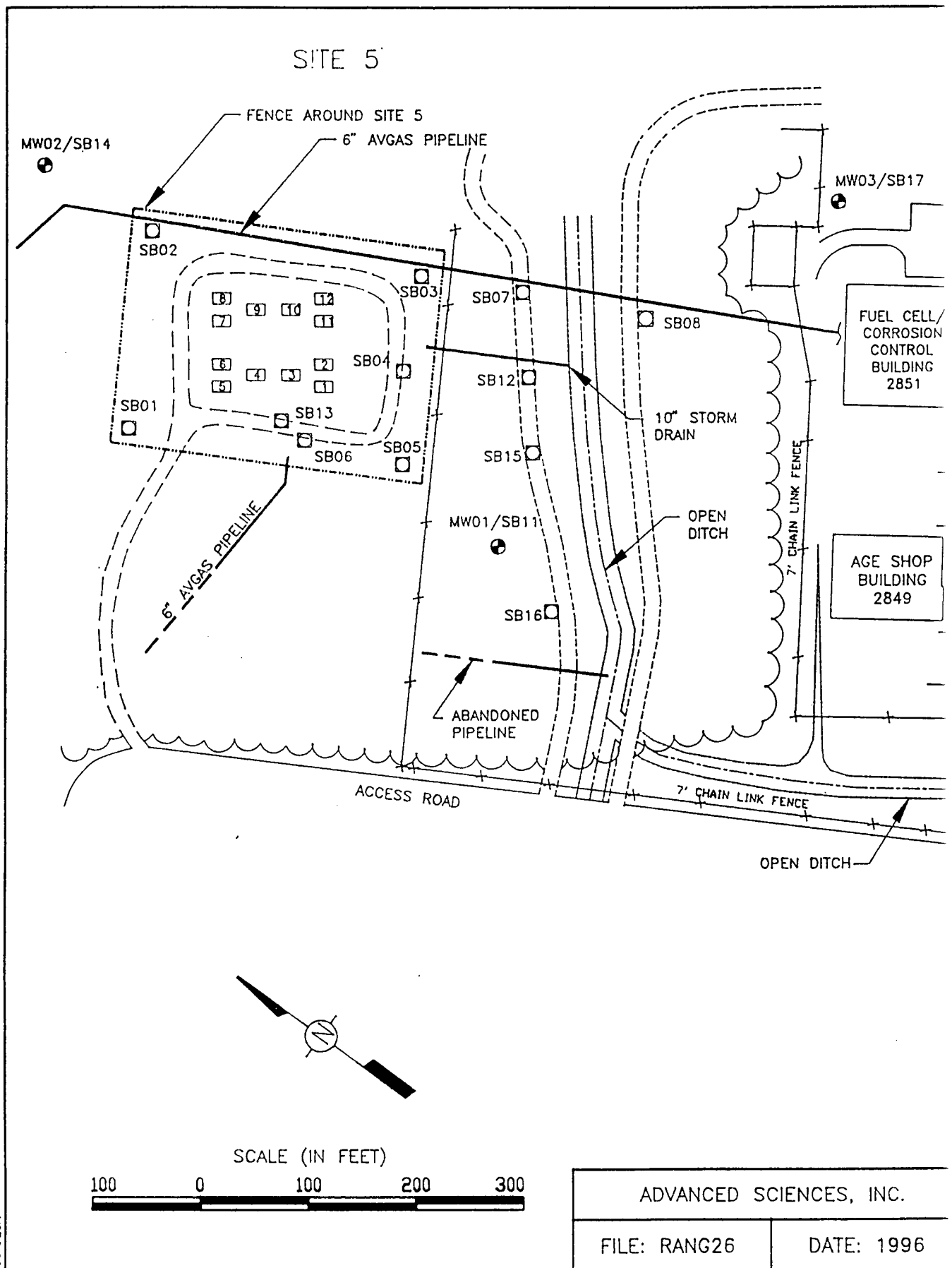
HAZWRAP selected Advanced Sciences, Inc. (ASI) to conduct closure assessment activities associated with UST removals at the Sites 4 and 5 Petroleum, Oils, and Lubricants (POL) facilities, located at the 192nd Fighter Group, Virginia Air National Guard (VANG), Richmond International Airport, Sandston, VA (hereinafter referred to as the Base) (Figure 1.1). Closure sampling activities and analytical results for soil samples within the excavations will be discussed in detail as well as the technical support role that ASI assumed during closure activities. All closure assessment activities were conducted in accordance with applicable requirements of the Virginia Department of Environmental Quality (VADEQ) Water Division and Waste Division.

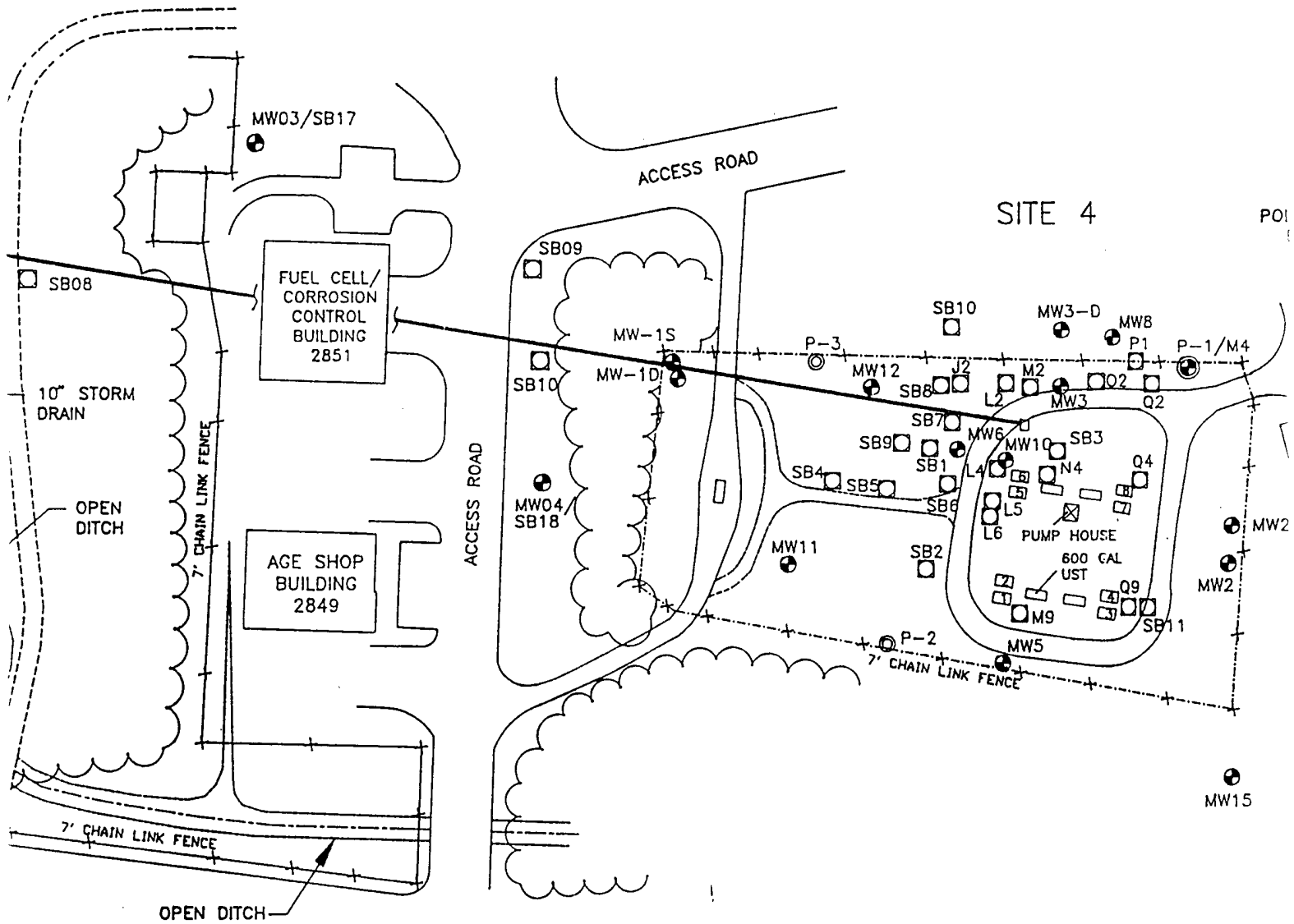
The Sites 4 and 5 POL facilities are located in the northeastern portion of the Richmond International Airport complex (Figure 1.2). A portion of Site 4 is currently used as the principal storage and transfer facility for aviation fuels and related petroleum products while the remaining portion of Site 4 is inactive. Site 5 was used for aviation gasoline (AVGAS) storage and distribution from approximately 1942 to 1954 and is currently inactive. Figure 1.3 displays the relationship between these two sites as well as borings and monitoring wells completed during previous site characterization activities. Closure activities were only conducted at Site 5 and the inactive portion of Site 4.

1.2 SITE DESCRIPTION

1.2.1 Site 4

The northern one-half of Site 4 is actively used for storage and dispensing of jet propulsion-4 (JP-4) fuel. As shown in Figure 1.4, the southern one-half of the Site 4 POL facility, inactive since 1955, consists of four 25,000gal USTs, one 600gal UST, four reinforced concrete tank manhead pits, two reinforced concrete aquatrap pits, and associated piping and equipment.





LEGEND:

-  UST NO. 1
-  SOIL BORING
-  MONITORING WELL
-  PIEZOMETERS
-  TREE LINE

ADVANCED SCIENCES, INC.

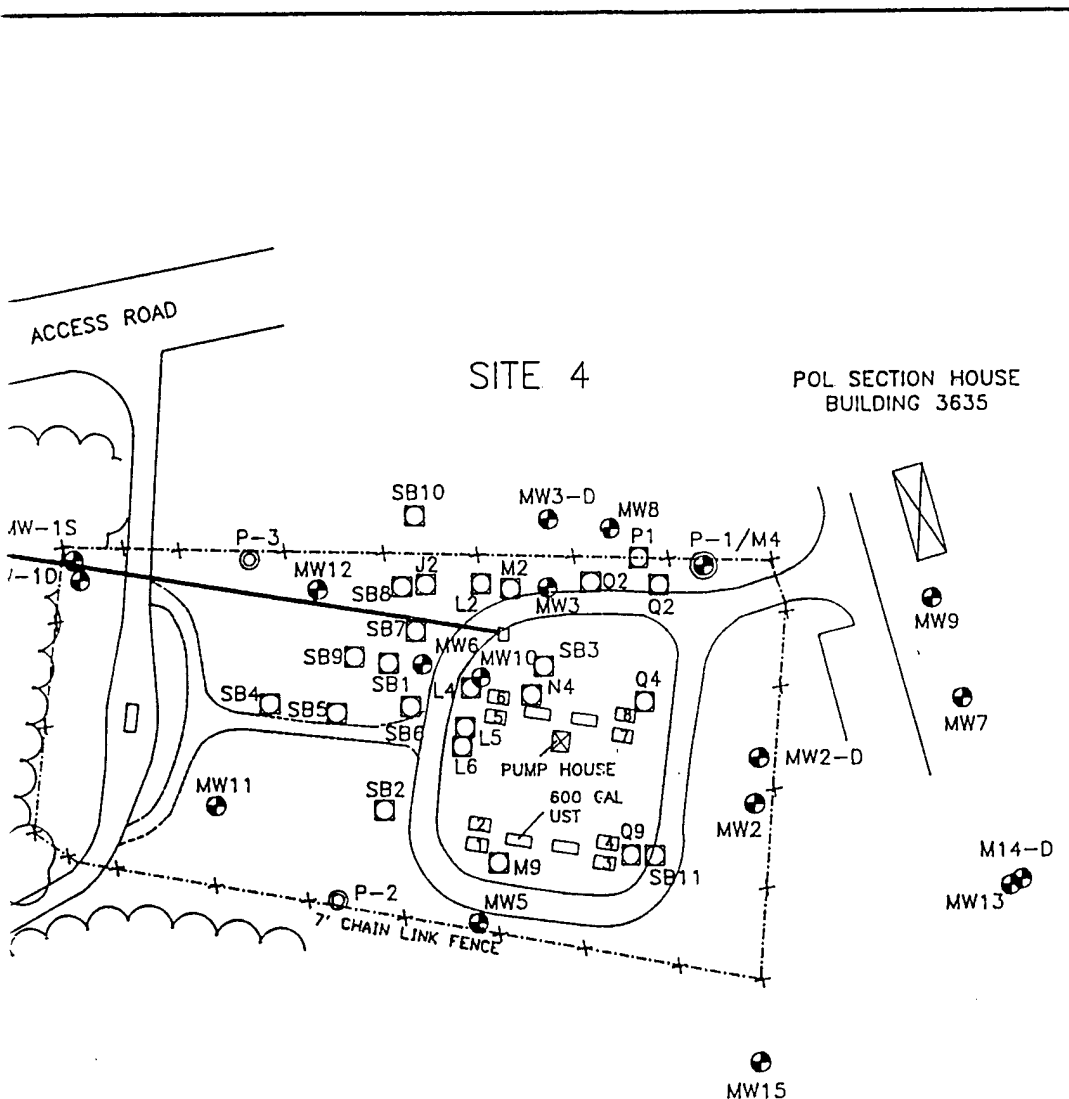
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FIGURE 1.3
Composite Activity Map - Site 4 and 5

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Richmond Internat
Sandston, V

2

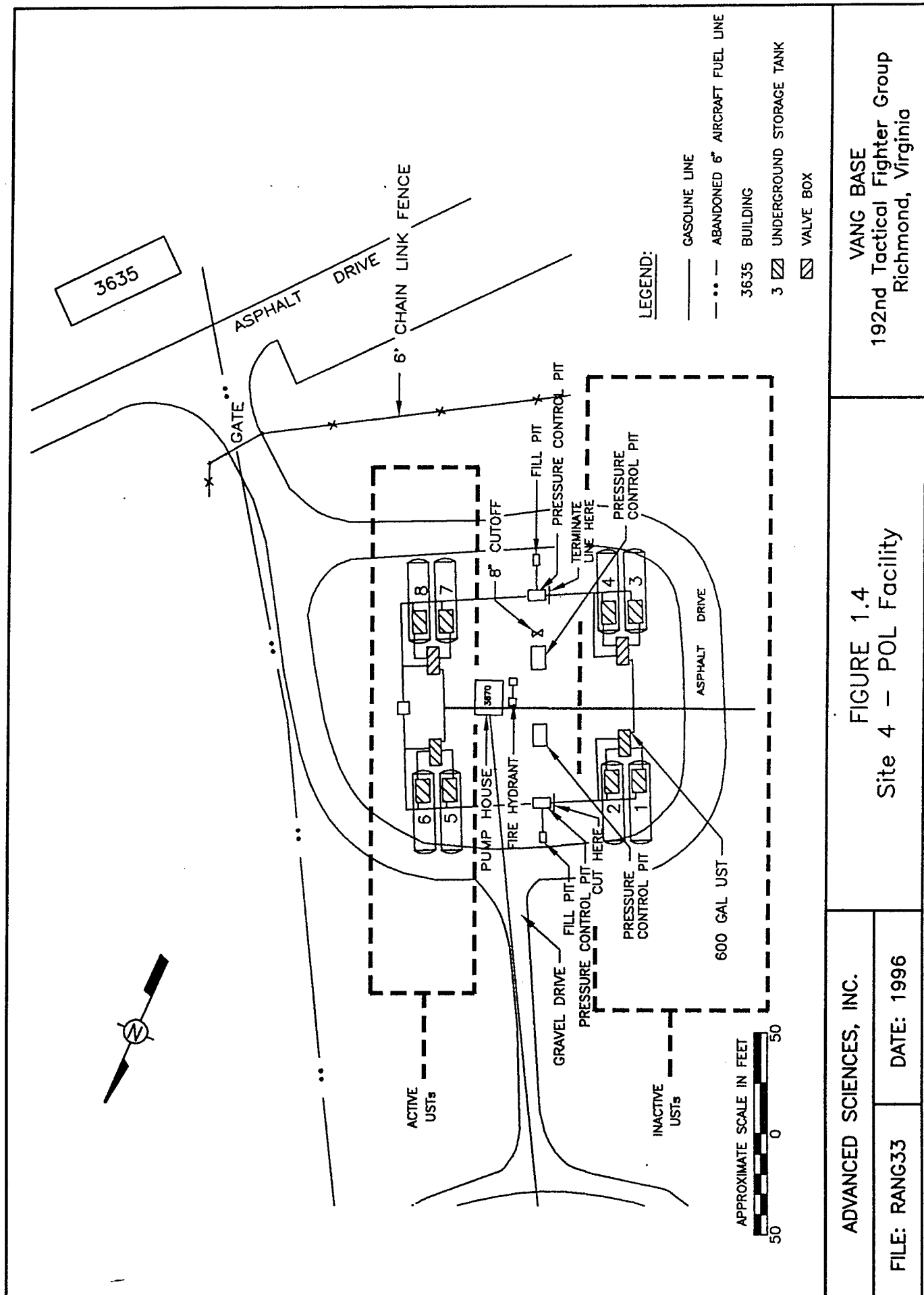


LEGEND:

-  UST NO. 1
-  SOIL BORING
-  MONITORING WELL
-  PIEZOMETERS
-  TREE LINE

FIGURE 1.3
Activity Map - Site 4 and 5

VANG BASE
192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia



1.2.2 Site 5

As shown in Figure 1.5, the Site 5 POL facility, inactive since 1954, consists of eight 25,000gal USTs, four 600gal USTs, reinforced concrete structures consisting of eight tank manhead pits, four aquatrap pits, two pressure control pits, three valve pits, two fill pits, one air separator pit, and associated fuel distribution piping and equipment.

1.3 ENVIRONMENTAL SETTING

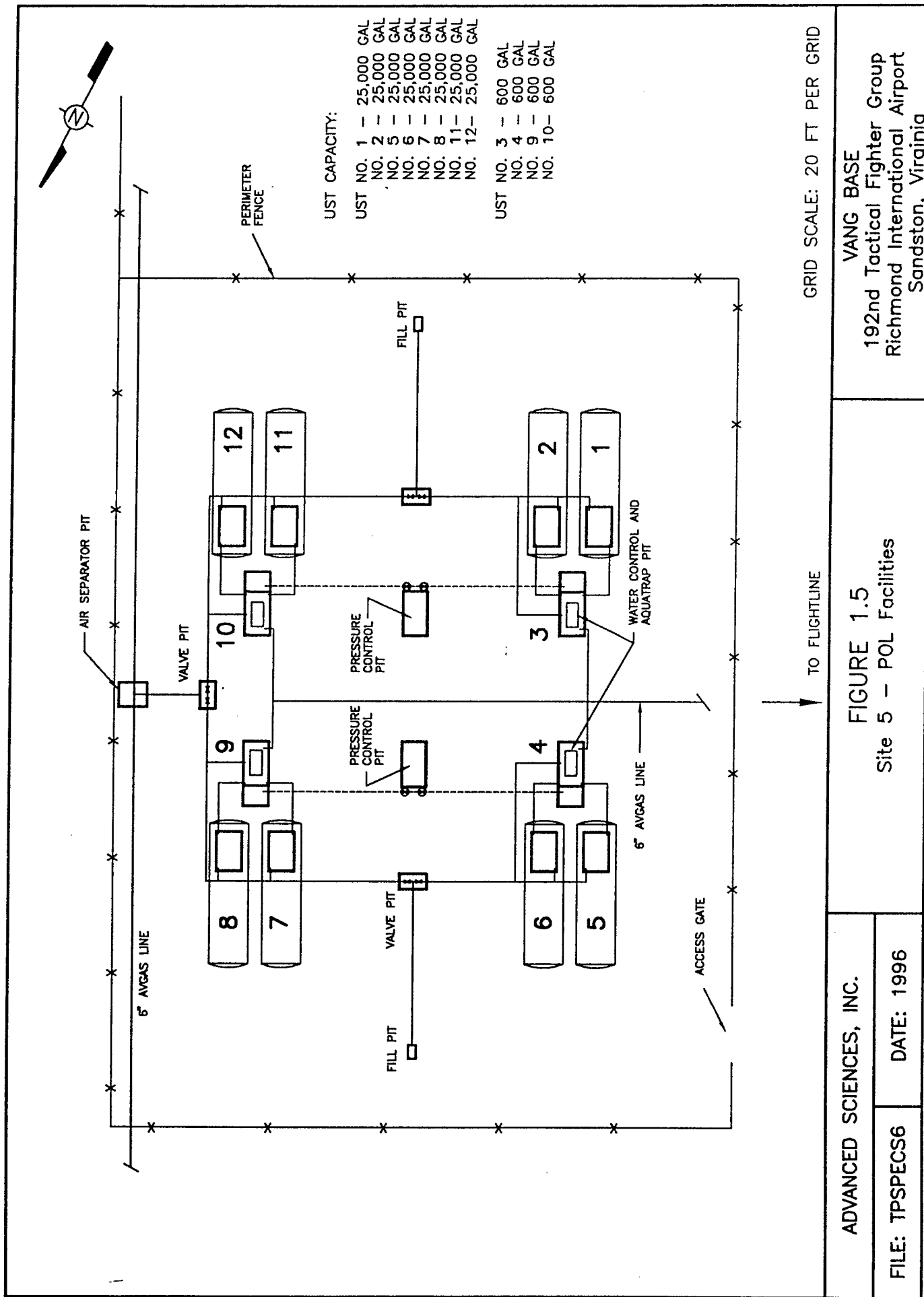
1.3.1 Meteorology

Based on information from the Soil Survey of Henrico County, Virginia (Clay 1975) and the National Oceanic and Atmospheric Administration (NOAA), the climate at the Base consists of humid summers and mild winters. Average mean annual temperatures range from 55° to 60°F. Mean annual precipitation is 43in/yr, and the annual evaporation rate is 40in/yr.

1.3.2 Geology And Hydrogeology

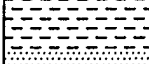
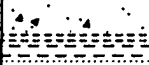
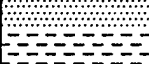
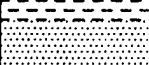
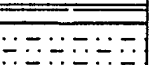
The Base is located in the Coastal Plain Province. The Coastal Plain Province consists of a layered sequence of sand and gravel aquifers separated by silt and clay confining beds. These sediments, which overlie metamorphic and igneous bedrock, thicken and dip eastward from their western limit (the Fall Line). Sediment thicknesses range from zero at the Fall Line to an estimated 350 to 400ft in the vicinity of the POL facility. This aquifer system is divided into an unconfined aquifer—the Yorktown Aquifer—and underlying confined aquifers called (in descending order) the Chickahominy, Aquia, and Potomac aquifers. Figure 1.6 shows the generalized sequence of unconsolidated sediments in the vicinity of the POL facility. Figures 1.7 through 1.10, represent the plan view and cross sectional views of the shallow subsurface soil/rock conditions in the vicinity of Sites 4 and 5. Specific shallow subsurface soil/rock descriptions are discussed in the following paragraphs.

The Yorktown Aquifer consists of sand and gravel, commonly clayey, interbedded with silt and clay. Although generally unconfined, it may be semiconfined locally. In the vicinity of the POL facility, it is 40–50ft thick. Recharge to the Yorktown Aquifer is a result of direct infiltration of precipitation. Recharge to the underlying confined aquifers originates chiefly at their outcrop areas near the Fall Line. The Calvert Formation, a plastic clay 25–30ft thick, separates the Yorktown Aquifer from the underlying Chickahominy Aquifer. It occurs at a depth of approximately 45ft below grade and acts as an aquitard, or semiconfining unit, retarding the vertical movement of groundwater. The stratigraphy of the Yorktown Aquifer encountered at Site 4 was generally consistent throughout the area. Except in areas where backfilling with sand has occurred, a uniform, gray-brown to reddish-yellow plastic, silty clay overlies the site from the ground surface to an approximate depth of 5ft. From 5 to 14ft below grade, a yellowish-red to brownish-yellow plastic, silty clay with higher sand content and iron staining is present. At depths of 14 to 21ft below grade, the soil consists of a yellowish-brown to light gray, fine- to medium-grained wet sand (M&E 1991a). The lower portion of the Yorktown Aquifer consists



GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.		FIGURE 1.5 Site 5 - POL Facilities	VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
FILE: TPSPCS6	DATE: 1996		

Age	Formation	Thickness	Lithology	Depth from Surface	Comments
Quaternary	Yorktown-Eastover	40-45'		10'	Underlies 8-10' of soil overburden Uppermost unconfined aquifer includes soil-water table
Tertiary	Calvert	25-30'		50'	Confining aquiclude separating confined aquifers from soil-water table aquifer
	Chickahominy	10'		80'	Chickahominy aquifer
	Nanjemoy	35-40'		90'	
	Marlboro	10'		130'	Confining Aquiclude
	Aquia	50'		140'	Aquia aquifer
				190'	
Cretaceous	Potomac	190-200'			Principal aquifer for groundwater supply; Potomac aquifer encompasses entire Potomac formation
Triassic	Basement			390'	"Basement Complex" Consolidated hard rock formations

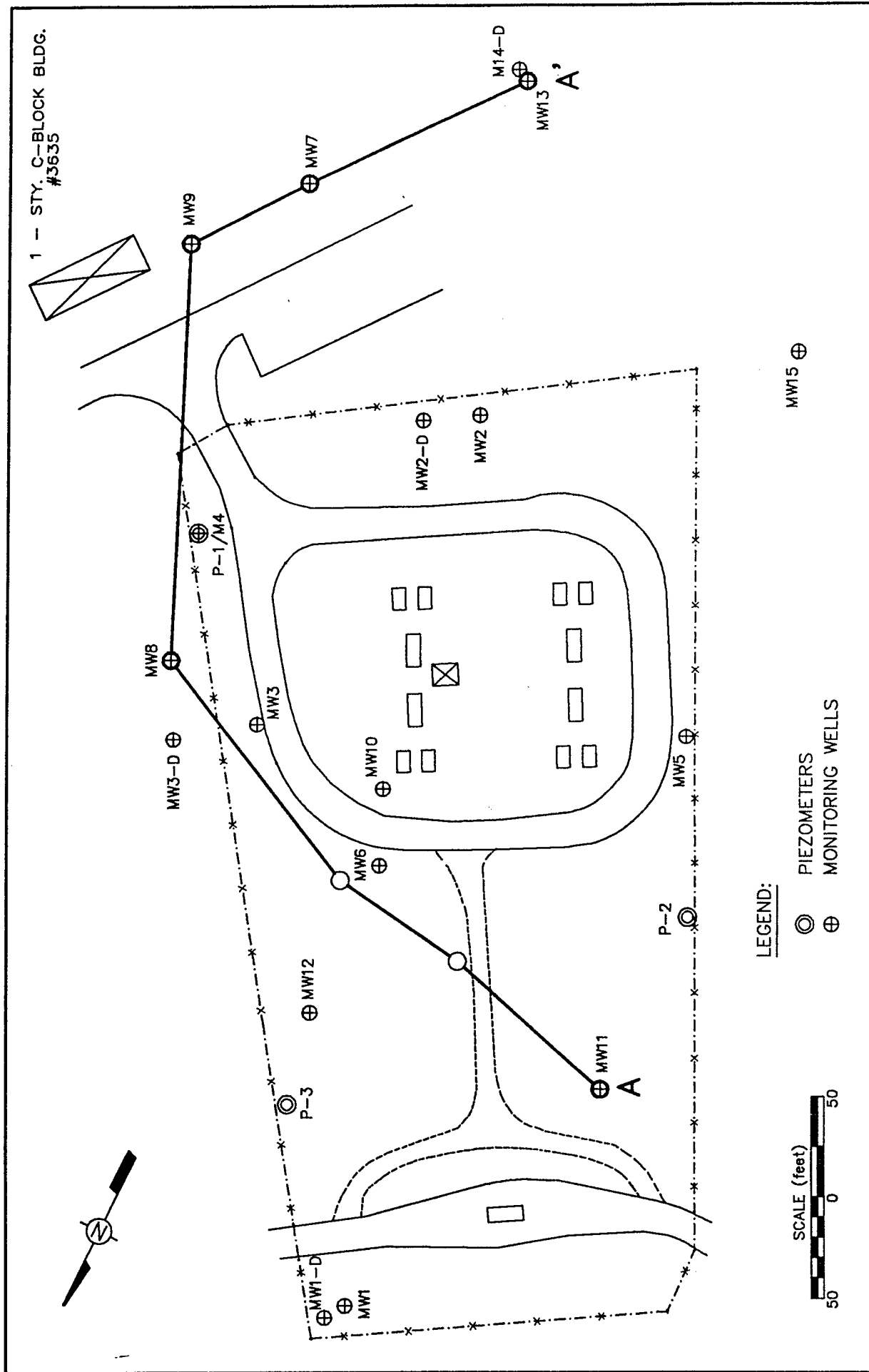
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	SAND
	CLAY
	FOSSILIFEROUS SAND
	BEDDED SANDSTONE
	LITHIFIED SHALE
	SILTY CLAY

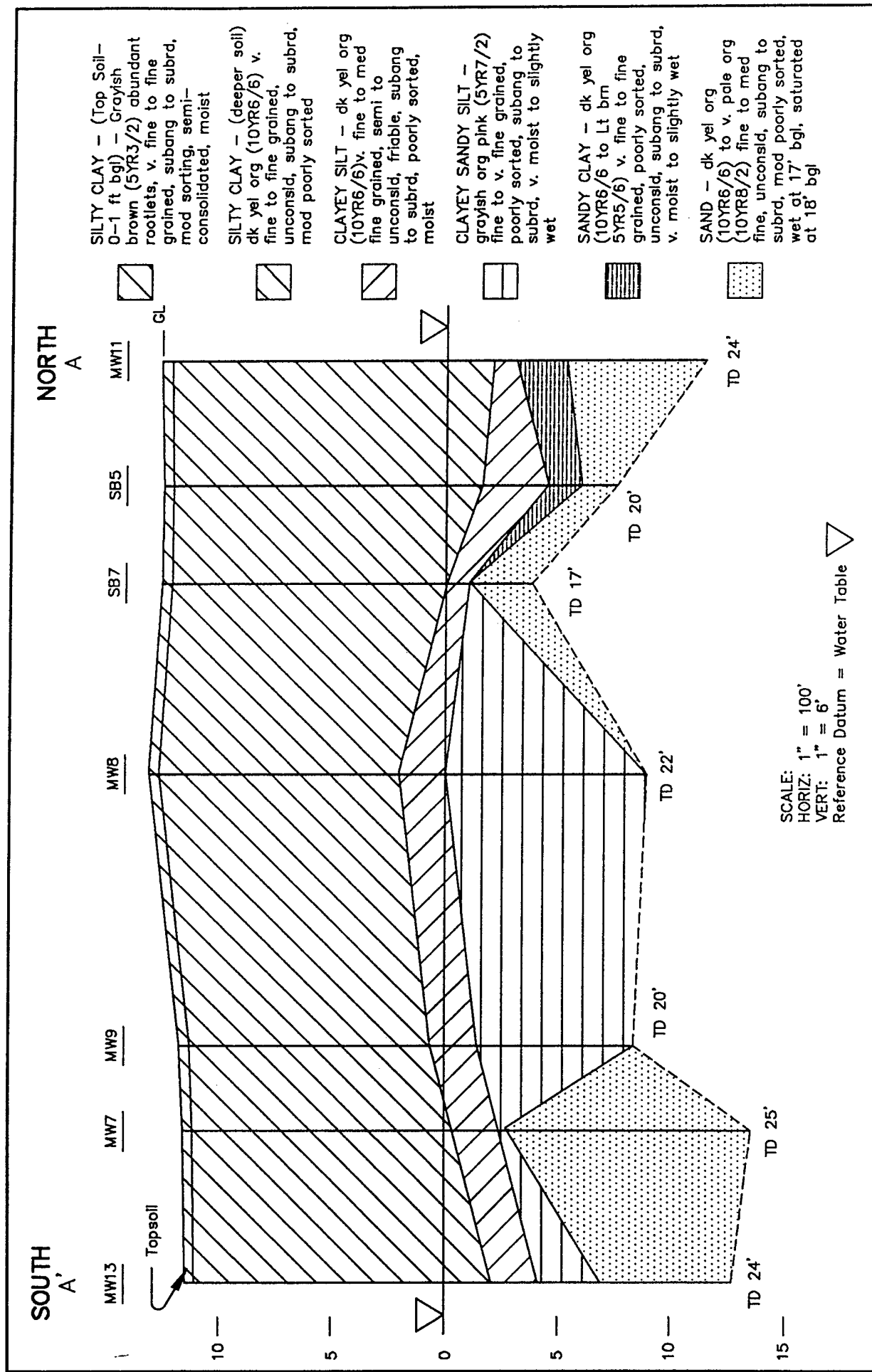
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SITE 4 SITE CHARACTERIZATION, FEB. 1991

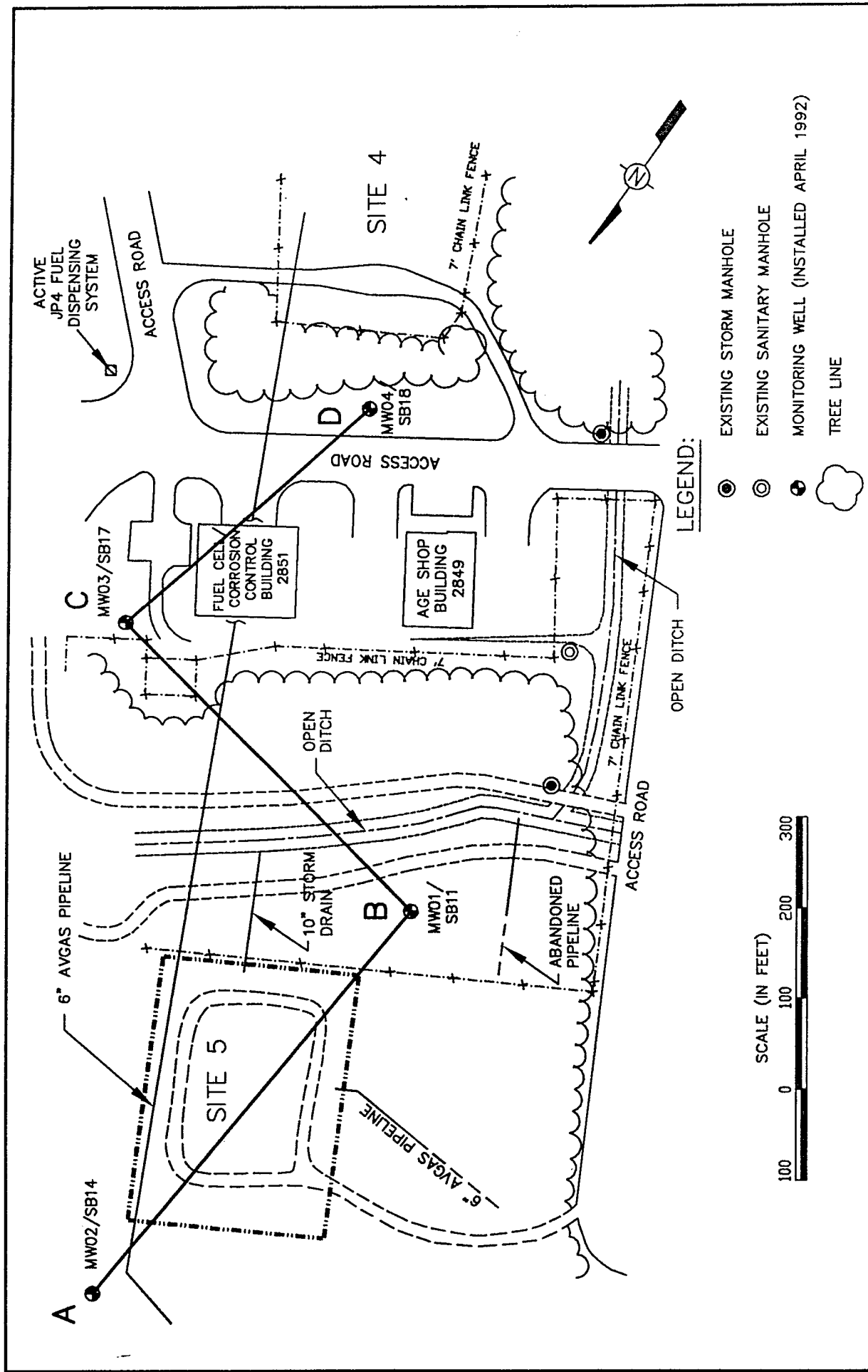
ADVANCED SCIENCES, INC.		FIGURE 1.6 Generalized Hydrogeologic Stratigraphic Column of the Study Area	VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
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ADVANCED SCIENCES, INC.		FIGURE 1.7 Site 4, Location Map, Geologic Cross Section A-A'	VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
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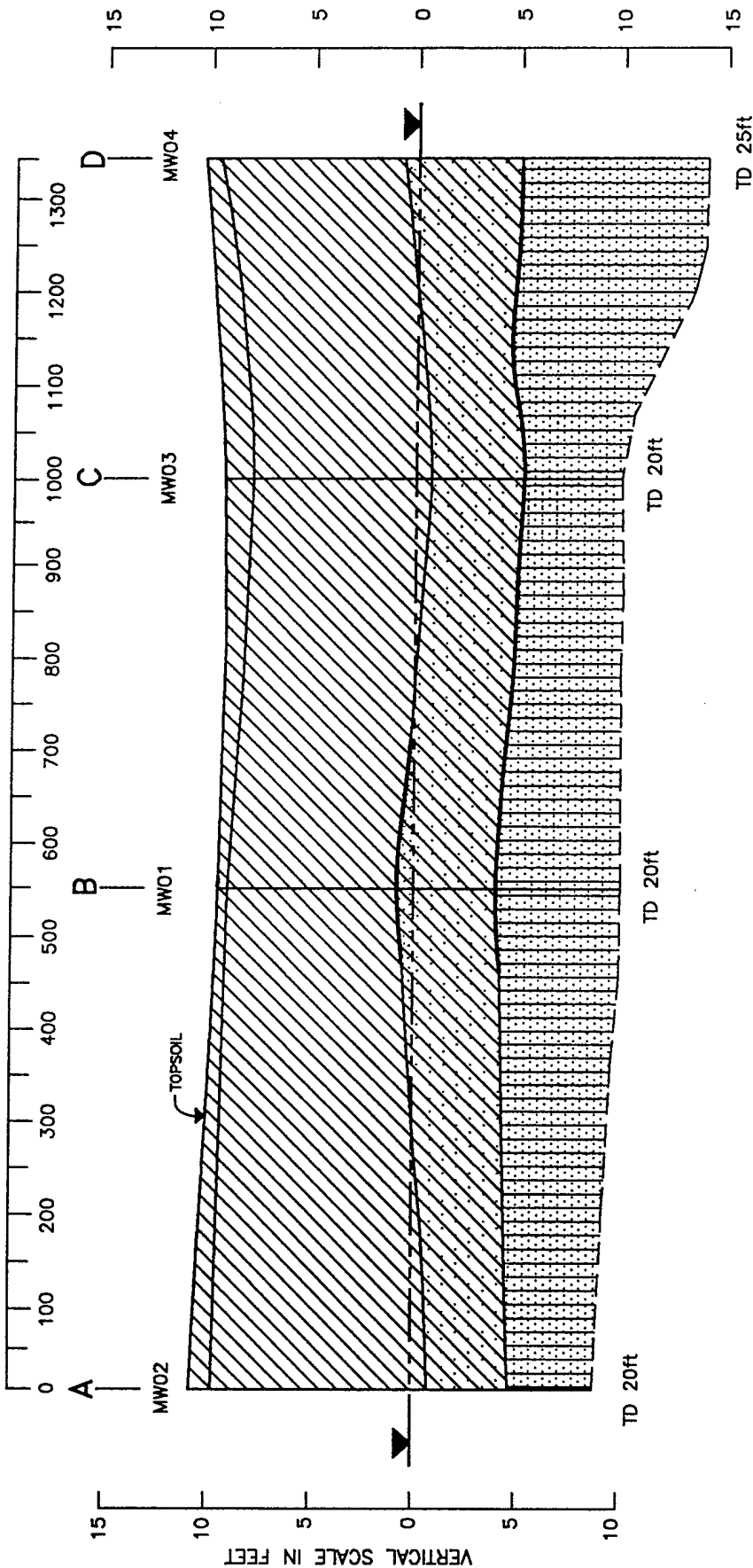


ADVANCED SCIENCES, INC.	FIGURE 1.8	
	Site 4 - Generalized Geologic Cross Section A-A'	VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
FILE: TPSPCS2	DATE: 1996	



ADVANCED SCIENCES, INC.		FIGURE 1.9 Site 4 & 5 Location Map, Cross Section A-D	VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
FILE: TPSPCS3	DATE: 1996		

HORIZONTAL SCALE IN FEET



ADVANCED SCIENCES, INC.

FILE: TPSPECS4

DATE: 1996

FIGURE 1.10

Site 4 & 5 — Generalized Geologic
Cross Section A-D

VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

of unconsolidated sands. To a depth of 29ft below grade, light gray to gray-brown, fine- to medium-grained wet sands are present, with the sand content increasing markedly at 21ft below grade. From 29 to 41ft below grade, strong brown wet sands with large quartz pebbles and rock fragments up to 0.75in in diameter were encountered. A plastic clay, which acts as the confining or semi-confining layer (Calvert Formation), is expected to be present at a depth of approximately 45ft below grade (M&E 1991a).

Groundwater data collected during previous investigations indicate the direction of groundwater flow is to the south-southeast. Falling head slug tests performed at Site 4 indicate hydraulic conductivity values for the Yorktown Aquifer ranging from $3.21\text{E-}4\text{cm/s}$ to $4.62\text{E-}5\text{cm/s}$. Using an average hydraulic conductivity value of $3.67\text{E-}4\text{cm/s}$ and an approximate hydraulic gradient of 0.8 percent, the average groundwater velocity beneath Site 4 in the Yorktown Aquifer was calculated at 0.0453ft/day (16.5ft/yr).

The Chickahominy Aquifer consists of about 10ft of shelly sand, interbedded with thin indurated shell beds. This aquifer is essentially confined in the area of the facility. Beneath the Chickahominy Aquifer is 35–40ft of sandy clay (Nanjemoy Formation) and 10ft of plastic clay (Marlboro Formation), which in turn overlies the Aquia Aquifer (M&E 1991a).

The Aquia Aquifer is about 50ft thick in the area of the POL facility. It consists of a shelly, glauconitic sand interbedded with thin, indurated shell beds and silty clay intervals. This aquifer overlies the Potomac Aquifer, which is the principal source of groundwater in the vicinity of Site 4. The Potomac Aquifer is generally about 200ft thick and consists of sand and gravel with lenses of silt and clay (M&E 1991a).

1.3.3 Current And Projected Groundwater Uses

Groundwater in Henrico County is used extensively for domestic, industrial, commercial, agricultural, and public supply purposes. The majority of the wells recorded for Henrico County are wells drilled to supply housing subdivisions. Groundwater in Henrico County is mainly derived from the unconsolidated Coastal Plain aquifers and is generally of good quality. Portions of Henrico County are supplied from wells drilled into the crystalline bedrock, most of which are located in the far western portion of the county.

Water supplied to the Base is purchased from the Henrico Department of Public Utilities. This water is derived from commercial water wells and an intake located on the James River approximately 8 miles south of the Base. The wells are screened in the Potomac Aquifer. Of 36 supply wells inventoried in the vicinity of the Base, 19 are screened in the Potomac Aquifer at depths of 225–275ft. Eleven wells are screened in the Aquia and Chickahominy Aquifers, at depths of 120–130ft and approximately 75ft, respectively. Six of the inventoried wells are screened in the uppermost Columbia Aquifer at depths of 35–40ft. None of these six wells, however, is closer than 3000ft to the Base. Of the six wells identified to be completed in the uppermost aquifer, only two domestic wells are located downgradient of the site. These two wells are located at least 3150ft away from the southern boundary of the Base.

1.3.4 Physiography And Surface Drainage

Henrico County, Virginia, which includes the Richmond International Airport, straddles the boundary between the Piedmont Province to the west and the Coastal Plain Province to the east. This boundary, which is referred to as the Fall Zone/Line, lies approximately seven miles west of the Base. The Piedmont area is characterized by gently rolling hills, while the Coastal Plain area is generally flat, with gently sloping topography. In the vicinity of the Base, the topography is nearly level, approximately 150–160ft above mean sea level (MSL).

The Base is located in the James River drainage basin. As shown on Fig. 1.2, surface drainage flow across the Base is to the east into White Oak Swamp Creek, which flows east-southeast into the Chickahominy River and ultimately into the James River, approximately 12 miles east of the Base.

2.0 SITE HISTORY

2.1 PREVIOUS INVESTIGATIONS — SITE 4

2.1.1 August 1990 Tank Sampling

On August 22, 1990, Tank No. 4 was determined to be full (25,021gal). Its contents were sampled and analyzed by Goode Environmental Services of Richmond, Virginia. Chemical analyses were performed on samples for flash point, corrosivity, reactive cyanide, reactive sulfide, EP toxicity, and volatile organic compounds (VOCs). The results are tabulated in Table 2.1. The fluids analyzed were indicative of fuel related compounds.

The Base contracted for the contents of Tank No.4 (approximately 25,000gal) to be removed and transported to GSX Services in Reidsville, North Carolina for incineration. The manifest used for transportation classified the wastes as D001, D006, D008, F002, F003, and F005 hazardous wastes (as designated in VR 672-10-1 Part III). After initial removal of Tank No. 4 contents, only small amounts of liquid and sludge remained at the bottom of the tank.

2.1.2 December 1990 Site Characterization

A site characterization was conducted by Metcalf & Eddy, Inc. in December 1990, in response to a fuel line leak on the active side of the POL facility. The fuel line leak was detected during a routine volumetric tightness test being conducted by the Base. The field investigation consisted of a soil gas survey, installation of soil borings, installation of piezometers and monitoring wells, and sampling and laboratory analysis of soil and groundwater. The purpose of the site characterization was to assess the nature and extent of the leak as well as to provide data to support future assessment activities at the POL facility.

In summary, the site characterization of the active northeastern side of the POL indicated that elevated levels of total petroleum hydrocarbons [(TPH) (54ppm to 1500ppm)] and benzene (0.98ppm) were primarily limited to the soils beneath the leak site. In the groundwater, which has a gradient that dips to the south/southeast, TPH (69ppm) and benzene (1.8ppm) were detected in a sample taken from MW6. MW6 is located immediately adjacent to the leak site. Characterization of the inactive southwestern one-half of the POL, which is cross-gradient from the leak site, indicated no elevated levels of contaminants were detected (by laboratory analysis) in the soil and/or groundwater.

In addition to the site characterization conducted in December 1990, contents of three 25,000gal USTs (Tank Nos. 1, 2, and 3) were sampled. The contents of these tanks were analyzed for: total metals, pH, Contract Laboratory Program (CLP) VOCs, CLP semivolatle organic compounds (SVOCs), polychlorinated biphenyls (PCBs), CLP pesticides, flashpoint, corrosivity,

TABLE 2.1
SITE 4
SUMMARY OF ANALYTICAL RESULTS FOR UST TANK NO. 4 CONTENTS
GOODE ENVIRONMENTAL SERVICES, AUGUST 1990.

Virginia Air National Guard
Richmond International Airport
Sandston, Virginia

	UNITS	RESULTS
Cadmium	mg/L	7.5
Lead	mg/L	56.0
Benzene	µg/L	960,000.00
Toluene	µg/L	2,200,000.00
Ethylbenzene	µg/L	370,000.00
1,1,1-Trichloroethane	µg/L	43,000.00
Flash Point	°F	84

Note: Tank Contents were found not to be Corrosive and Reactive.

reactivity (cyanide and sulfide), British Thermal Units (BTUs), and total organic halides (TOX). The results of these analyses are shown in Table 2.2. All constituents detected in the three tanks were typical of compounds found in AVGAS, except for methylene chloride (MeCl).

2.1.3 Supplemental Site Characterization Activities, February 1991

A supplemental site characterization was conducted by ASI at the Site 4 POL facility in February 1991 (ASI 1991a) to supplement information obtained during the site characterization conducted in December 1990 (M&E 1991a). The primary purpose of the supplemental site characterization was to verify the extent of soil and groundwater contamination from the line leak on the active side of the POL facility. A grab sample was also collected from the inactive 600-gal UST located adjacent to Tank Nos. 1 and 2. This sample was collected from the top of the tank fluids and was analyzed for TPH, benzene, toluene, ethylbenzene, and xylenes (BTEX), VOCs, SVOCs, Organochlorine Pesticides/PCBs, BTUs, TOX, flash point, reactivity, corrosivity, EP toxicity metals, and pH. In summary, the analyses of the 600gal UST fluids indicated that the detected concentrations of organics and petroleum hydrocarbons were typical of concentrations found in motor fuels, with the exception of the detection of MeCl (2700ppb). Because a field blank was not collected as part of this grab sample effort, the MeCl analyte could not be confirmed.

2.1.4 Site Assessment Activities, May 1991

In May 1991, ASI conducted additional site assessment activities at Site 4 to further define soil and groundwater contamination detected during previous investigations. Additional field activities in May 1991 included completion of eight soil borings, installation of five monitoring wells, resampling of previously installed monitoring wells and piezometers, and analyses of soil and groundwater samples. Falling-head slug tests were conducted at various monitoring wells to determine typical hydraulic conductivity values associated with the Yorktown Aquifer. The 600gal UST, adjoining UST Tank Nos 1 and 2, was resampled and in addition, Tank No.4 was inspected to determine the volume of fluid, if any, remaining in the tank.

Samples from the 600gal tank were analyzed using a field gas chromatograph (GC). Field GC results indicated the presence of MeCl, which was also detected in laboratory samples analyzed in February 1991. In addition the field GC detected the presence of 1,1,1-Trichloroethane. The field GC was a Photovac 10S55. The Photovac 10S55 operates with a single column and the results are based entirely on the column's retention time, as compared to a standard run two to three times a day. Once a standard value is selected following analysis of a standard, the machine will then identify any peak within 10 percent of the standard value as that compound. In some instances, many compounds may have nearly the same retention times and may be identified as target compounds solely because their retention time fell within the 10 percent window of identification. Making a positive identification is difficult with this portable instrument in cases where a great many compounds are present, such as fuel spills. Therefore,

TABLE 2.2
SITE 4 - SUMMARY OF ANALYTICAL RESULTS FOR TANKS 1, 2, AND 3.
(Metcalf & Eddy, Dec. 1990)
Virginia Air National Guard
Richmond International Airport
Sandston, Virginia

Chemical	Units	TANK 1		TANK 2		TANK 3			
		Sample Concentration	Method Reporting Limit	Sample Concentration	Method Reporting Limit	Top Layer		Bottom Layer	
						Sample Concentration	Method Reporting Limit	Sample Concentration	Method Reporting Limit
ARSENIC	mg/l	ND	0.2	ND	0.2	ND	2	ND	0.2
BARIUM	mg/l	ND	0.01	ND	0.01	ND	0.1	ND	0.01
BENZENE	mg/l	9.2	2.5	5.6	2.5			11	2.5
BENZYL ALCOHOL	mg/l	0.06	0.04	0.045	0.04			0.065	0.05
CADMIUM	mg/l	ND	0.01	ND	0.01	ND	0.1	ND	0.01
CHLORINE	mg/l					<0.1			
CHROMIUM	mg/l	ND	0.02	ND	0.02	ND	0.2	ND	0.02
CYANIDE	mg/l	ND	10	ND	10	ND	10	ND	10
LEAD	mg/l	0.2	0.1	0.2	0.1	143	1	0.1	0.1
MERCURY	mg/l	ND	0.0008	ND	0.0008	ND	0.02	ND	0.004
METHYLENE CHLORIDE	mg/l	ND	2.5	ND	2.5			5.1	2.5
2-METHYLNAPHTHALENE	mg/l	ND	0.04	ND	0.04			0.078	0.05
2-METHYLPHENOL	mg/l	.032	0.04	0.54	0.04			0.46	0.05
4-METHYLPHENOL	mg/l	0.09	0.04	0.064	0.04			0.12	0.05
NAPHTHALENE	mg/l	0.05	0.04	0.045	0.04			0.063	0.05
SELENIUM	mg/l	ND	0.3	ND	0.3	ND	1	ND	0.3
SILVER	mg/l	ND	0.02	ND	0.02	ND	0.2	ND	0.02
SULFIDE	mg/l	ND	32	ND	32	ND	43	ND	32
TOLUENE	mg/l	94	2.5	66	2.5			100	2.5
XYLENE (TOTAL)	mg/l	4.1	2.5	2.8	2.5			3.9	2.5
pH	S.U.	6.5		6.5				6.5	
FLASH POINT	F	>200		>200		<70		>200	
TOX	mg/l	ND	200	ND	200	ND	0.1%	ND	200
BRITISH THERMAL UNITS	BTU/lb	WNC		WNC		19100		WNC	

mg/l = MILLIGRAMS/LITRE = PPM
ND - CHEMICAL NOT DETECTED IN THIS SAMPLE
WNC (BTU/lb) - WILL NOT COMBUST

without a second column confirmation, the specific analytes such as MeCl and 1,1,1-Trichloroethane are difficult to confirm due to the many compounds that fall within the retention times for these analytes.

Based on measurements taken with an ORS oil/water interface probe, the inspection of Tank No.4 indicated that the bottom of the UST was at 16.24ft below the top of the fill pipe. The top of the liquid present in the UST was at 15.49ft below the top of the fill pipe. This indicates that approximately 0.75ft of fluid exists in the tank and that 0.29ft was petroleum-based product and the remainder was assumed to be water. The total amount of fluid in the tank is estimated to be 739gal, of which 381gal is petroleum-based product. It is assumed that the remaining 358gal of fluid is water, contaminated with aviation fuels, MeCl and 1,1,1-Trichloroethane. The contents of UST Tank No. 4 were not sampled during this field effort.

2.1.5 Site Assessment Activities, April 1992

In April 1992, ASI resampled the inactive 600gal UST adjoining UST Tank Nos 1 and 2 as well as the inactive UST Tank No. 3 to determine if either tank contained non-fuel organics. Analytical results are tabulated in Table 2.3.

In addition to the fuel related compounds, results of the inactive 600gal UST sampling show that the tank does not contain MeCl. The results of the UST Tank No. 3 sampling indicate that MeCl is present in addition to the fuel related compounds. These results are similar to those recorded by Metcalf & Eddy, Inc. in December 1990 (Table 2.2).

2.2 PREVIOUS INVESTIGATIONS - SITE 5

2.2.1 Tank Measurement/Sampling, December 1991

In December 1991, Hatcher-Sayre was retained by Electrical Consultants, P.C. to sample the contents of 12 USTs at Site 5. Prior to the sampling of these USTs, Hatcher-Sayre measured the liquid levels in each tank. Measurements pertaining to the petroleum product/water interfaces, descriptions of the tank contents and product and water volumes are summarized in Table 2.4.

The samples collected from the USTs were submitted to Wadsworth/Alert Laboratories (North Canton, OH) and analyzed for VOCs, Bomb TOX, toxicity characteristic leaching procedure (TCLP) metals, corrosivity, reactivity, and flashpoint. Analytical results are tabulated in Table 2.5. These results indicate the tanks contain mixtures of water and AVGAS.

2.2.2 Site Assessment Activities, April 1992

ASI conducted a site assessment of Site 5 in April 1992 (ASI, Sept 1992). This investigation consisted of the augering of 18 soil borings (SB01 through SB18) ranging in depth from 18ft to 30ft below grade. Four of the soil borings were converted to monitoring wells (MW01 through MW04) during the course of this investigation. Laboratory analyses of soil samples collected

TABLE 2.3
SITE 4 - SUMMARY OF ANALYTICAL RESULTS OF THE ABANDONED USTs (UST NO. 3; 600-GAL)
(ADVANCED SCIENCES, INC., APRIL 1992)
Virginia Air National Guard
Richmond International Airport
Sandston, Virginia

ASI/UST Laboratory Analytical Results, April 1992							
Location	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylene (ppb)	1,2-Dichloroethane (ppb)	Methylene Chloride (ppb)	1,1,1-Trichloroethane (ppb)
600 gal UST	122,579	12,121	24,554	54,667	24.8	ND	ND
UST No. 3	97,185	17,456	37,332	76,584	27.5	17.9	26.1
Tentatively Identified Compounds							
600 gal UST:	Cyclopentane 1,1-Dimethylcyclopentane Cyclohexane Methylcyclopentane 2,3-Dimethylbutane 2,2,3,4-Tetramethylpentane 2,4-Dimethylpentane 2,3-Dimethylpentane				UST 3: Cyclopentane 1,1-Dimethylcyclopentane Cyclohexane Methylcyclopentane 2,3-Dimethylbutane 2,2,3,4-Tetramethylpentane 2,4-Dimethylpentane 2,3-Dimethylpentane 2,2,5-Trimethylhexane		

ppb = Parts per billion
ND = Non Detect

UST = Underground Storage Tank

Analytical Methodology: Volatile Organics - EPA Method 8240 with confirmation analysis of halogenated hydrocarbon compounds using EPA Method 601.

TABLE 2.4
SITE 5 - DEPTH TO TOP OF PRODUCT AND WATER IN 12 USTs
ELECTRICAL CONSULTANTS, P.C/HATCHER-SAYRE, INC., JANUARY 1992
Virginia Air National Guard
Sandston, Virginia

TANK NO.	RISER PIPE LENGTH (FEET)	DEPTH FROM PROD RISER (FEET)	DEPTH FROM TANK (FEET)	DEPTH WATER FROM RISER (FEET)	DEPTH WATER FROM TANK (FEET)	TANK DIMENSION (FEET)	ELEV PROD IN TANK (FEET)	ELEV WATER IN TANK (FEET)	PRODUCT THICKNESS (FEET)	COMMENTS
1	4.33	4.42	0.09	4.56	0.23	10.50	10.41	10.27	0.14	PROD/H ₂ O
2	4.92	4.68	-0.24	5.50	0.58	10.50	10.74	9.92	0.82	PROD/H ₂ O
3	3.50	3.18	-0.32	—	—	3.50	3.82	—	3.50	PRODUCT
4	3.50	3.24	-0.26	6.44	2.94	3.50	3.76	0.56	3.20	PROD/H ₂ O
5	0.33	4.37	4.04	5.21	4.88	10.50	6.46	5.62	0.84	PROD/H ₂ O
6	4.17	4.41	0.24	5.46	1.29	10.50	10.26	9.21	1.05	PROD/H ₂ O
7	0.25	3.97	3.72	4.70	4.45	10.50	6.78	6.05	0.73	PROD/H ₂ O
8	0.58	4.45	3.87	5.01	4.43	10.50	6.63	6.07	0.56	PROD/H ₂ O
9	3.00	—	—	3.16	0.16	3.50	—	3.34	3.34	WATER
10	3.00	3.16	0.16	6.50	3.50	3.50	3.34	0.00	3.34	PROD/H ₂ O
11	4.67	—	—	4.39	-0.28	10.50	—	10.78	10.50	WATER
12	4.67	3.98	-0.69	4.98	0.31	10.50	11.19	10.19	1.00	PROD/H ₂ O

NOTES:

- = Depth to top of product from the top of the riser pipe.
- = Depth to top of product from the top of the tank.
- Negative numbers indicate that the liquid level is above the top of the tank.
- = Depth to top of water from the top of the riser pipe.
- = Depth to top of water from the top of the tank.
- = Elevation of top of product above the bottom of the tank.
- = Elevation of top of water above the bottom of the tank.

TABLE 2.5
SITE 5 - SUMMARY OF LABORATORY ANALYTICAL DATA, FOR CONTENTS OF 12-25,000GAL USTs
ELECTRICAL CONSULTANTS, P.C/HATCHER-SAYRE, INC., JANUARY 1992
Virginia Air National Guard
Sandston, Virginia

TANK	DATE SAMPLED	BENZENE	TOLUENE	TOTAL XYLENES	CORROSIVITY pH (S.U.)	FLASH POINT CLOSED CUP	BURN POINT	BOMB TOX	TCLP BARIUM	TCLP LEAD
1	12/09/91	21 mg/l	60 mg/l	ND	7.0	>180°F	—	0.13%	0.3 mg/l	ND
2	12/09/91	20 mg/l	73 mg/l	ND	7.0	>180°F	—	0.12%	ND	4.2 mg/l
3	12/10/91	12,000 mg/kg	71,000 mg/kg	14,000 mg/kg	7.0	DNF	75°F	0.61%	ND	50 mg/l
4	12/10/91	16,000 mg/kg	60,000 mg/kg	7,800 mg/l	7.0	DNF	73°F	1.3%	ND	14 mg/l
5	12/11/91	21 mg/l	29 mg/l	4.3 mg/l	7.0	DNF	75°F	0.13%	ND	4.9 mg/l
6	12/10/91	22 mg/l	52 mg/l	7.6 mg/l	7.0	DNF	61°F	ND	ND	3.9 mg/l
7	12/10/91	54 mg/l	52 mg/l	ND	7.0	DNF	72°F	0.12%	0.2 mg/l	0.7 mg/l
8	12/10/91	48 mg/l	45 mg/l	ND	7.0	>180°F	—	0.11%	0.2 mg/l	ND
9	12/11/91	15,000 mg/kg	55,000 mg/kg	4,900 mg/kg	7.0	DNF	75°F	0.64%	ND	69 mg/l
10	12/11/91	16,000 mg/kg	53,000 mg/kg	4,700 mg/kg	7.0	DNF	74°F	0.59%	ND	180 mg/l
11	12/11/91	28 mg/l	44 mg/l	ND	7.0	>180°F	—	ND	0.2 mg/l	ND
12	12/11/91	39 mg/l	51 mg/l	ND	7.0	DNF	75°F	0.19%	0.2 mg/l	ND

NOTES:

S.U. = Standard Units
ND = Not Detected
DNF = Did Not Flash

Burn Point data provided verbally by the laboratory on January 22, 1992.

in the POL area detected maximum TPH and BTEX concentrations of 42.4ppm and 7494.6ppb, respectively. Laboratory analyses of groundwater samples collected beneath the POL area and immediately downgradient indicate levels of BTEX that range from 47.1ppb to 5296.2ppb. Additionally, laboratory analyses indicate that an area immediately downgradient from the POL has levels of Trichloroethene that range from 34.2ppb to 1994.2ppb.

In addition to the soil boring/monitoring well installations completed at Site 5, resampling of the UST No. 4 contents was conducted. Since the Bomb TOX test data from the December 1991 sampling event reports only the percentage of halogens as total chlorines, it was concluded that the chlorinated compounds should be specifically identified. Since the UST No. 4 contents reportedly contained the highest percentage of total chlorine (1.3 percent), a sample from UST No. 4 was analyzed for VOCs (EPA Method 8240). Confirmation of the VOC analytes was obtained using EPA Method 601.

Table 2.6 shows the analytical results of this confirmation and the specific halogenated compounds identified. 1,2-Dibromoethane, 1,2-Dichloroethane, 1,1,1-Trichloroethane, and Trichloroethene were typically used as AVGAS additives required by piston-driven aircraft used in the 1940s and 1950s.

TABLE 2.6
 SITE 5 - SUMMARY OF LABORATORY ANALYTICAL DATA, UST NO. 4
 ADVANCED SCIENCES, INC., APRIL 1992
 Virginia Air National Guard
 Richmond International Airport
 Sandston, Virginia

Location	Benzene	1,2-Dibromoethane	1,2-Dichloroethane	Ethylbenzene	Toluene	1,1,1-Trichloroethane	Trichloroethene	Total Xylene
UST 4	220,112	57.8	22.0	57,887	21,249	37.3	27.9	97,886

Tentatively identified compounds (TIC) identified during the laboratory analysis include:

Cyclohexane
 Methylcyclopentane
 2,3-Dimethylbutane
 2,3-Dimethylpentane
 3-Methylhexane
 2,5-Dimethylhexane
 2,2,5-Trimethylhexane

All values are reported in parts per billion.

3.0 CLOSURE ASSESSMENT ACTIVITIES

3.1 OBJECTIVES

The objectives of the closure assessment were to determine the extent of contaminated soil adjacent to the USTs requiring excavation, to provide documentation of soil and groundwater conditions following excavation, and to document closure activities in accordance with applicable VADEQ regulations. During closure activities, ASI provided technical support to the Base to ensure that the UST removal contractor [(E & K, Inc.) hereinafter referred to as the Contractor] was in compliance with the technical requirements (as specified in the Plans and Specifications for Removal of Abandoned Underground Storage Tanks, Virginia Air National Guard, Richmond International Airport, Sandston, VA., dated July 1991 and revised April 1992, and Addendum Numbers 1 through 7) of the contract. ASI was also responsible for collecting soil and/or groundwater closure samples from the excavations, and providing off-site fixed based laboratory analysis to verify clean conditions within the excavations.

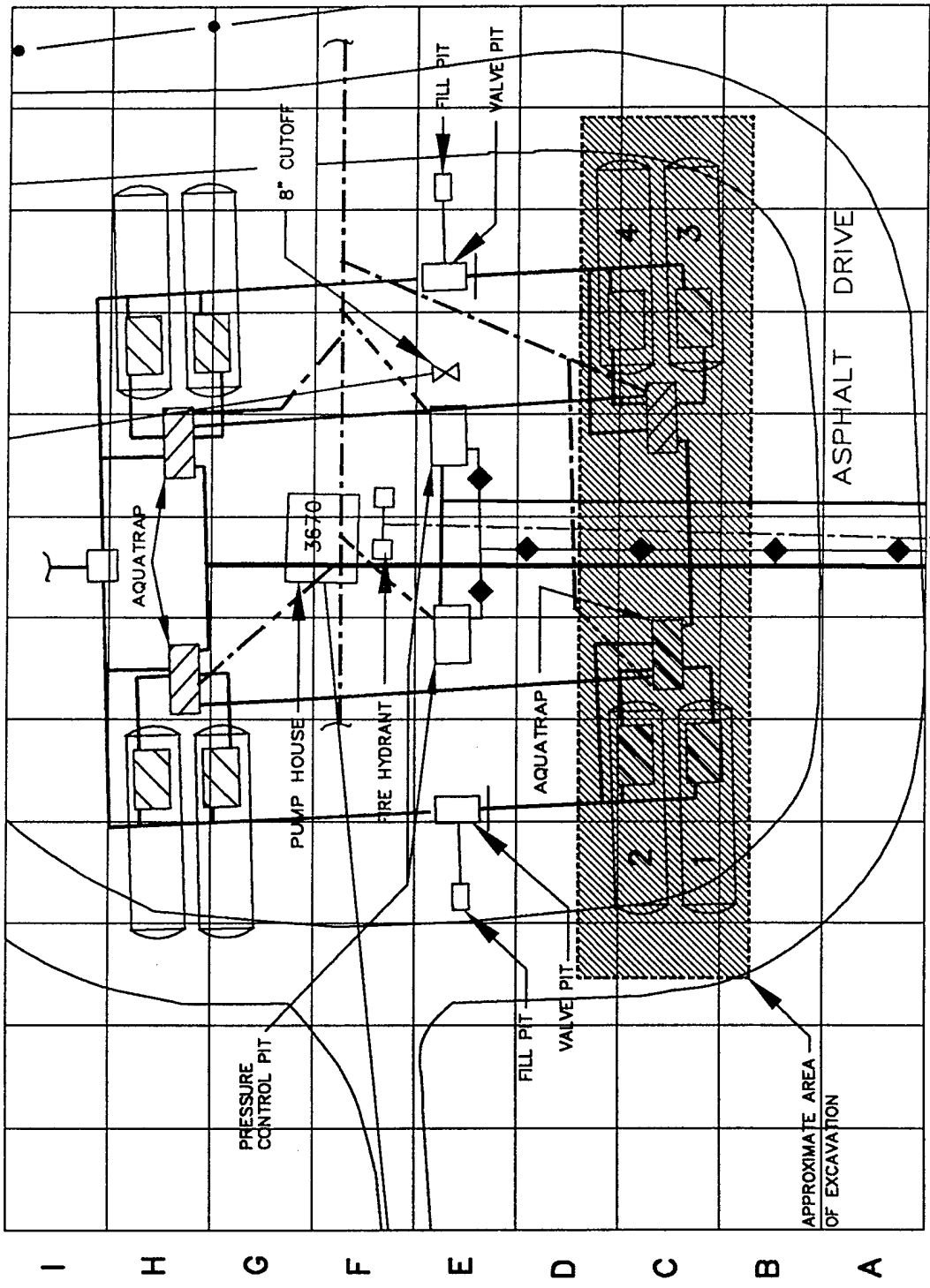
3.2 REGULATORY GUIDANCE

The Water Division of the VADEQ has jurisdiction over closure of petroleum USTs, and requirements for assessing petroleum UST sites at closure are specified in VR 680-13-02, "Underground Storage Tanks: Technical Standards and Corrective Action Requirements," Part VII, effective October 25, 1989. The excavation zone soil will be considered clean if analysis by an approved EPA method indicates TPH concentrations are less than 100ppm. The VADEQ Water Division has jurisdiction over closure activities associated with all aspects of the inactive side of the Site 4 POL facility (except Tank No. 4) and the whole Site 5 POL facility.

The Waste Division of the VADEQ has jurisdiction over closure of hazardous waste USTs, and requirements for assessing hazardous waste USTs at closure are specified in VR 672-10-1, "Hazardous Waste Management Regulations," dated January 4, 1993. Tank No. 4 at Site 4 is subject to a Compliance Agreement between the former Virginia Waste Management Board (currently the VADEQ Waste Division) and the Virginia Air National Guard. The agreement took effect on February 17, 1993. The Compliance Agreement requires the Virginia Air National to conduct closure activities associated with Tank No. 4 in accordance with requirements of the VADEQ Waste Division.

3.3 SITE 4 CLOSURE ACTIVITIES

Figure 3.1 depicts the USTs, tank manheads, valve pits, and associated fuel transfer piping that were removed from the inactive side of the Site 4 facility. Section 3.3.1 details closure activities associated with the petroleum USTs (Tank Nos. 1, 2, 3, and the 600gal tank), while Section 3.3.2 details closure activities associated with Tank No. 4. Selected photographs of closure activities conducted at Site 4 are shown in Appendix A.



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- NO. 2 - 25,000 GAL
- NO. 3 - 25,000 GAL
- NO. 4 - 25,000 GAL
- AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- 3 [Symbol] UNDERGROUND STORAGE TANK
- [Symbol] MANHEAD PITS
- [Symbol] WATER CONTROL VALVES/PIT
- [Symbol] ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- [Symbol] DENOTES LINE DISCONTINUITY
- 3635 BUILDING

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.		FIGURE 3.1 Site 4 - POL Facilities	VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
FILE: RANG40	DATE: 1996		

3.3.1 Closure Activities Associated with Petroleum USTs

3.3.1.1 Contractor Closure Activities

Closure activities are detailed as follows:

- Samples of contents from Tank Nos. 1, 2, and the 600gal tank were collected, composited, and sent for laboratory analysis by

Rickmond Environmental
1643 Merrimac Trail
Williamsburg, VA 23185

- Analysis of the composite sample(s) was performed by

Solutions Laboratories, Inc.
814-B Greenbrier Circle
Chesapeake, VA 23320

Although previous analyses had been performed on the tank contents, current characterization of the liquid contents was necessary for proper manifesting, treatment and/or disposal of the material. Analytical results are available through the Base Environmental Engineer.

- The contents of Tank Nos. 1, 2, 3, and the 600 gal tank were removed during the period of December 21, 1993 through January 5, 1994. Rickmond Environmental coordinated the removal, transportation, treatment and/or disposal of the petroleum-contaminated wastewater. Transportation of the fluids was performed by PTC, Inc. (EPA ID No. NCD986180867).

Rickmond Environmental removed approximately 76,200gal of benzene contaminated ballast water manifested as EPA-D018 (benzene; regular flammable liquid waste) (Table 3.1). All petroleum-contaminated wastewater was treated and/or disposed of at

ERC, Inc.
2nd & Maury Street
Richmond, VA 23224
(EPA ID No. VAD086293719)

- Excavation and removal of Tank Nos. 1, 2, 3, and the 600gal tank, tank manheads and aquatrap pits, and associated piping and equipment were performed from January 14, 1994 through January 27, 1994. The excavation contractor was Onslow Environmental, Inc., Jacksonville, NC. Each 25,000gal UST was approximately 40ft long and 10.5ft in diameter. Each 600gal tank was approximately 8ft long and 3.5ft in diameter.

TABLE 3.1
SITE 4 - UNIFORM HAZARDOUS WASTE MANIFEST LIST FOR PETROLEUM-CONTAMINATED
WASTEWATER REMOVED FROM UST NOS. 1, 2, 3, AND 600GAL TANK
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	DATE	GENERATOR'S EPA ID No.	MANIFEST DOCUMENT No.	TRANSPORTER COMPANY	TRANSPORTER'S EPA ID No.	DESIGNATED FACILITY	DESIGNATED FACILITY EPA ID No.	US DOT DESCRIPTION	CONTAINER No.	CONTAINER TYPE	TOTAL QUANTITY (gallons)	WASTE No.	COMMENTS
4	93/12/21	VA0572890002	00010	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/21	VA0572890002	00011	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	12400	D018	Pg. III, CLASS 3, BENZENE
4	93/12/22	VA0572890002	00012	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/22	VA0572890002	00013	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/22	VA0572890002	00014	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/22	VA0572890002	00015	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/22	VA0572890002	00016	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/22	VA0572890002	00017	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/22	VA0572890002	00018	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	43400	D018	Pg. III, CLASS 3, BENZENE
4	93/12/23	VA0572890002	00019	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/23	VA0572890002	00020	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/23	VA0572890002	00021	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
4	93/12/23	VA0572890002	00022	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	1200	D018	Pg. III, CLASS 3, BENZENE
											19600		
4	93/01/05	VA0572890002	00041	PTC, INC.	NCD986180867	ERC, INC	VAD086293719	Rg. Flammable liquid	001	TT	600	D018	Pg. III, CLASS 3, BENZENE
											600		
											76200		
										SUBTOTAL			

UST No. 4 (b)

NOTES:
 (a) ALL TOTAL QUANTITY VOLUMES ARE AS PER TRANSPORTER
 (b) TOTAL QUANTITY VOLUMES FOR UST No. 4 NOT YET AVAILABLE

RMD4BLST.WQ1/23-Jan-96

All excavated soil was visibly inspected and screened in the field using a photoionization detector before stockpiling. Potentially contaminated soil was stockpiled adjacent to the excavations on plastic sheets. All soil determined to be contaminated was treated and/or disposed of in accordance with all applicable regulations.

- All USTs and associated piping and equipment were decontaminated, transported, and disposed of off-site by D&S Metal Recycling, Glen Allen, VA.

Dry ice was placed in the USTs to displace any potential explosive vapors, and the tanks and associated piping and equipment were decontaminated using SUPERCLEAN, an alkaline mixture containing detergents, phosphates, butoxyethanol and water. The material safety data sheet for SUPERCLEAN is attached as Appendix B.

A tar coating was removed from the outside of each of the 25,000gal USTs. The tar coating was originally used to protect the steel from corroding, and was easily chipped off the outside of the USTs. The tar coating was transported off-site and properly disposed of by D&S Metal Recycling.

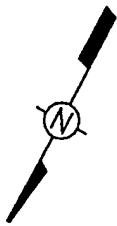
Each 25,000gal UST was gas-cut into eight sections and loaded onto a flatbed truck for transportation and disposal off-site. All decontaminated steel was disposed of as scrap metal.

- All reinforced concrete structures were demolished within the excavations and allowed to remain as backfill.
- Backfilling was completed using crushed granite sand. Excavated soil that was determined to be non-contaminated was used as top soil and graded to promote drainage of any precipitation away from the former UST locations.

3.3.1.2 ASI Closure Assessment Sampling Activities

As shown on Figure 3.2, a total of 11 samples were collected from the walls and floors of the excavations created by the removal of USTs Nos. 1, 2, 3 and the 600gal tank. The average depth at which these samples were collected in the excavations associated with the 25,000gal USTs was 16-18ft below grade. In the excavations associated with the aquatrap pits, samples were collected at an average depth of 8-10ft below grade. The grab soil samples were collected from the bucket of the hydraulic excavator and immediately placed into laboratory-provided glass containers.

The 11 soil samples were sent to Environmental Laboratories, Inc. and analyzed for gasoline range organics (GRO) and diesel range organics (DRO). Analyses for DRO and GRO were performed in accordance with EPA SW-846 Standard Methods 8100 and 8015, respectively. Analytical results are discussed in Section 4.



UST CAPACITY:

UST NO. 1 - 25,000 GAL
 UST NO. 2 - 25,000 GAL
 UST NO. 3 - 25,000 GAL
 UST NO. 4 - 25,000 GAL
 AQUATRAP - 600 GAL

LEGEND:

--- STORM DRAIN AND SANITARY SEWAGE
 --- WATER
 --- FIRE WATER LINES
 --- ABANDONED 6" AIRCRAFT FUEL LINE
 --- SPRINKLER SUPPLY LINE
 3 [Symbol] UNDERGROUND STORAGE TANK
 [Symbol] MANHEAD PITS
 [Symbol] WATER CONTROL VALVES/PIT
 [Symbol] ELECTRIC FOR REMOTE CONTROL
 --- GASOLINE LINE
 --- DRAIN
 [Symbol] 6" WATER SUPPLY
 [Symbol] DENOTES LINE DISCONTINUITY
 3635 BUILDING

GRID SCALE: 20 FT PER GRID

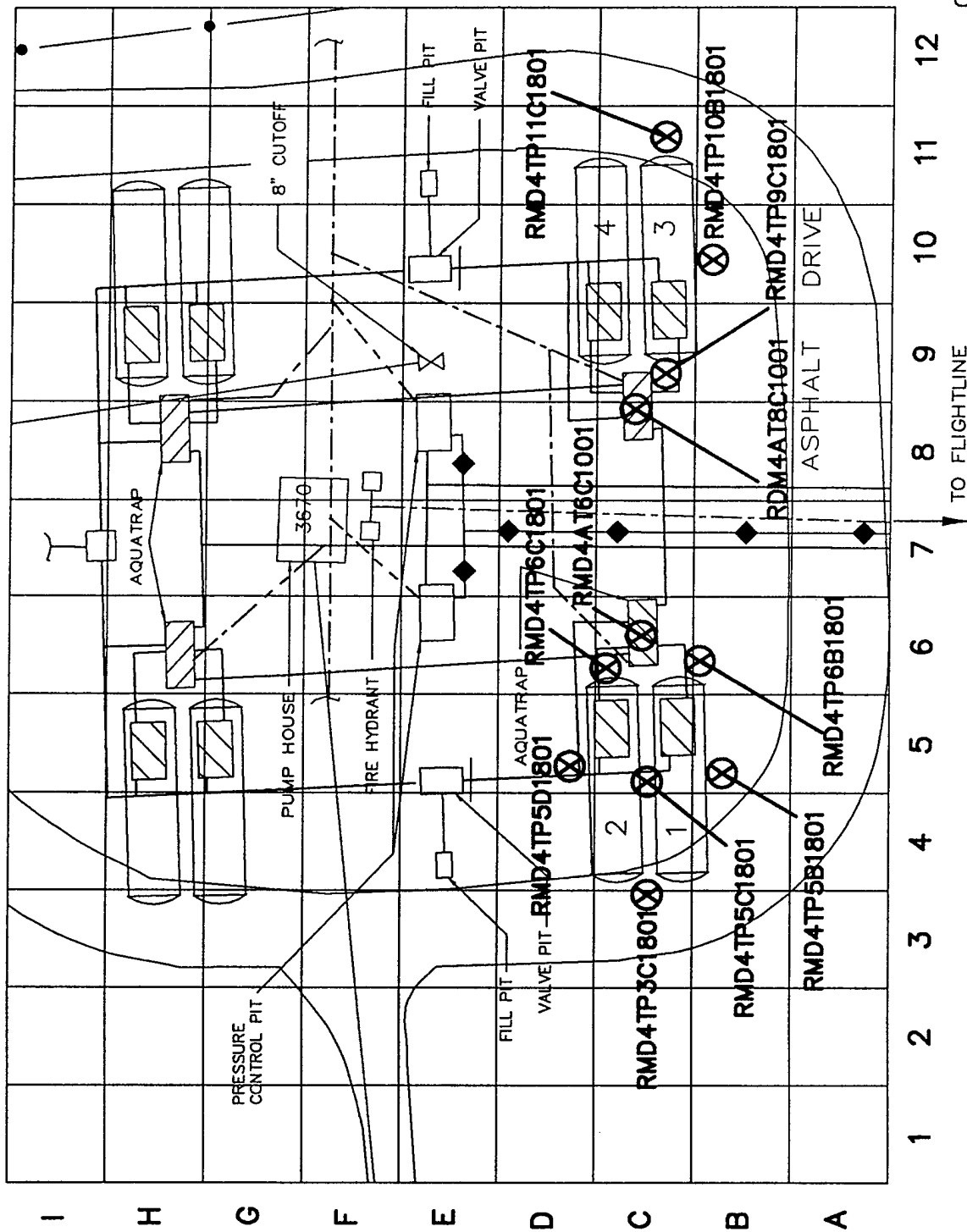


FIGURE 3.2

Site 4 - Sample Locations, UST Pit Nos. 1,2,3, and Aquatrap Pits

ADVANCED SCIENCES, INC.

FILE: RANG45 DATE: 1996

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia

3.3.2 Closure Activities Associated with Tank No. 4

3.3.2.1 Contractor Closure Activities

Closure activities are detailed as follows:

- Samples of Tank No. 4 contents (aqueous and non-aqueous phases) were obtained and sent for laboratory analysis by Rickmond Environmental. Analysis of the samples was performed by Solutions Laboratories, Inc. Samples were analyzed for TPH using EPA Method 418.1, TOX using EPA Method 9020, PCBs using EPA Method 8080, VOCs using EPA Method 8240, BTEX using EPA Method 8020, and reactivity, ignitability, corrosivity, and toxicity (TCLP metals only). Although previous analyses had been performed on the tank contents, current characterization of the liquid contents was necessary for proper manifesting, treatment and/or disposal of the material. Analytical results are attached as Appendix C.
- The contents of Tank No. 4 were removed on February 2, 1994. Rickmond Environmental coordinated the removal, transportation, treatment and/or disposal of the tank contents.
- On February 8, 1994, Tank No. 4 was exposed. The shallow soil that provided cover for the tank was excavated and stockpiled on plastic adjacent to the excavation. Deeper soil that could have been potentially impacted by the contents of the tank was excavated and placed in plastic-lined roll-off containers. On February 9, 1994, Tank No. 4 was removed using a 65 ton LinkBelt crane. The tank was placed on plastic adjacent to the excavation.
- Samples of the excavated soil associated with Tank No. 4 were taken on February 8, 1994 and sent for analysis to

EnviroCompliance Laboratories, Inc.
Glen Allen, VA 13060

All soil samples were analyzed for VOCs using EPA Method 8240. Analytical results are available through the Base Environmental Engineer.

- Tank No. 4 and its contents along with all excavated soil associated with the tank have been disposed of in accordance with the approved closure plan (ASI 1996). The tank was decontaminated and wipe sampled in accordance with the approved closure plan. Results of the wipe sample analyses are available through the Base Environmental Engineer.
- Backfilling of the excavation was completed using crushed granite sand. Excavated soil that was determined to be non-contaminated was used as top soil and graded to promote drainage of any precipitation away from the former UST location.

3.3.2.2 ASI Closure Assessment Sampling Activities

As shown on Figure 3.3, a total of four samples were collected from the walls and floor of the excavation created by the removal of Tank No. 4. These samples were collected at an average depth of 16-18ft below grade. All samples were sent to Environmental Laboratories, Inc. and analyzed for VOCs using EPA Method 8240 and RCRA metals.

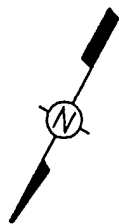
3.4 SITE 5

Figure 3.4 depicts the USTs, tank manheads, valve pits, and associated fuel transfer piping that were removed from the Site 5 facility. Section 3.4.1 details closure activities conducted by the Contractor. Section 3.4.2 details closure assessment sampling activities conducted by ASI. Selected photographs of closure activities conducted at Site 5 are shown in Appendix D.

3.4.1 Contractor Closure Activities

Closure activities are detailed as follows:

- Samples of contents from Tank Nos. 1, 2, 11, and 12 were obtained, composited, and sent for laboratory analysis by Rickmond Environmental. Analysis of the composite sample(s) was performed by Solutions Laboratories, Inc. Although previous analyses had been performed on the tank contents, current characterization of the liquid contents was necessary for proper manifesting, treatment and/or disposal of the material. Based on previous analyses of Site 5 tank contents, it was determined that a composite sample from Tank Nos. 1, 2, 11, and 12 would be representative of all tank contents from Site 5. Analytical results are available through the Base Environmental Engineer.
- The contents of all USTs and associated piping were removed during the period of December 17, 1993 through January 6, 1994. Rickmond Environmental coordinated the removal, transportation, treatment and/or disposal of the petroleum product and petroleum-contaminated wastewater. Transportation of the fluids was performed by Industrial Marine Services, Inc. and PTC, Inc. Rickmond Environmental removed approximately 209,900gal of petroleum-contaminated waste water manifested as EPA D-018 (benzene; regular flammable liquid waste) (Table 3.2). In addition, approximately 5,500gal of product were removed from the USTs and associated piping (Table 3.2). All petroleum-contaminated wastewater was treated and/or disposed of at ERC, Inc.
- Excavation of the USTs, valve pits, and associated piping began on December 16, 1993. The excavation contractor was Onslow Environmental, Inc. Soil that was visibly contaminated or contaminated as determined by periodic field screening using a photoionization detector was segregated from non-contaminated soil during excavation activities. Potentially contaminated soil was stockpiled adjacent to the



UST CAPACITY:

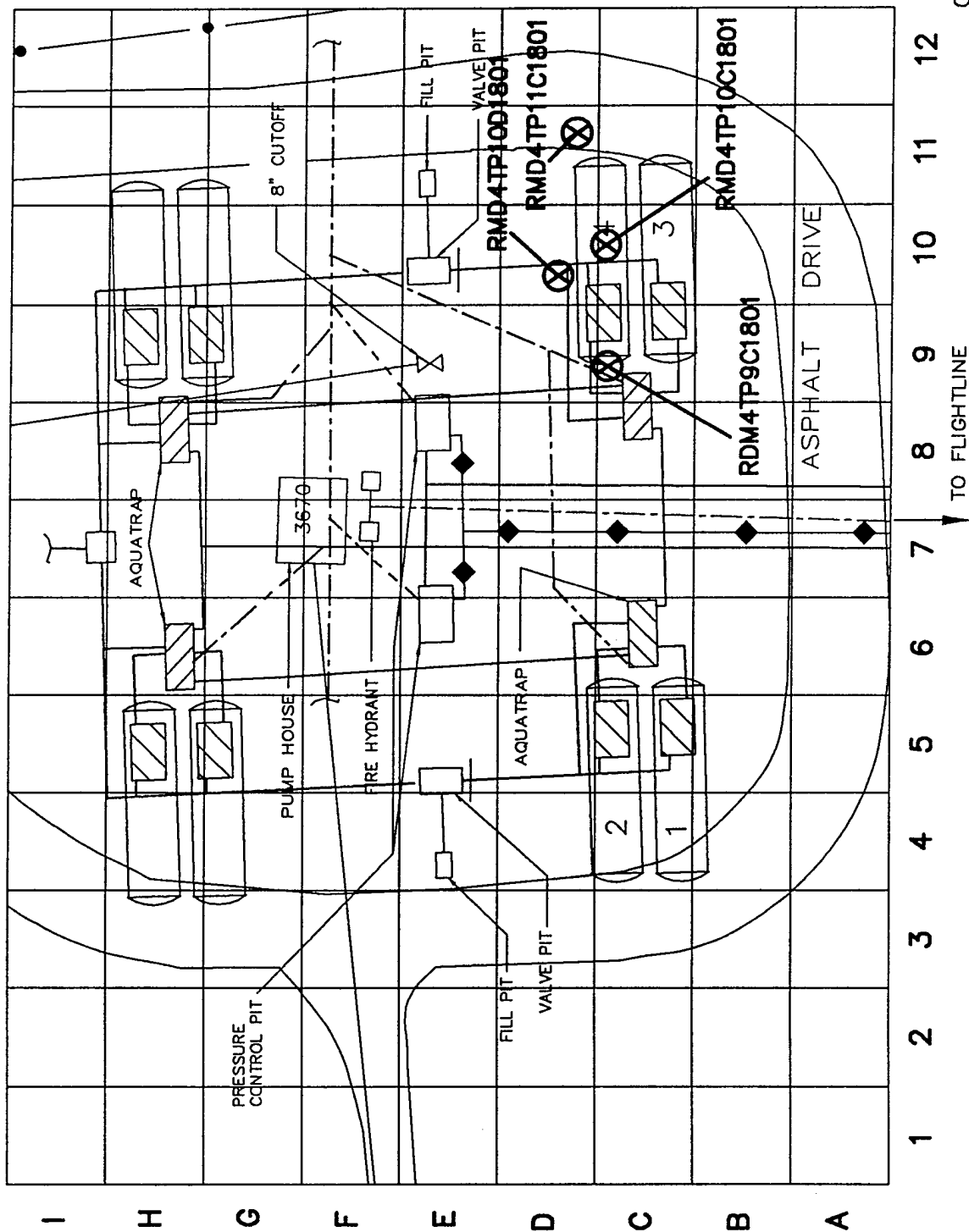
UST NO. 1 - 25,000 GAL
 NO. 2 - 25,000 GAL
 NO. 3 - 25,000 GAL
 NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- 3 [hatched box] UNDERGROUND STORAGE TANK
- [hatched box] MANHEAD PITS
- [diamond] WATER CONTROL VALVES/PIT
- [line with diamond] ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- [T symbol] 6" WATER SUPPLY
- [T symbol] DENOTES LINE DISCONTINUITY
- 3635 BUILDING

GRID SCALE: 20 FT PER GRID



ADVANCED SCIENCES, INC.

FILE: RANG44

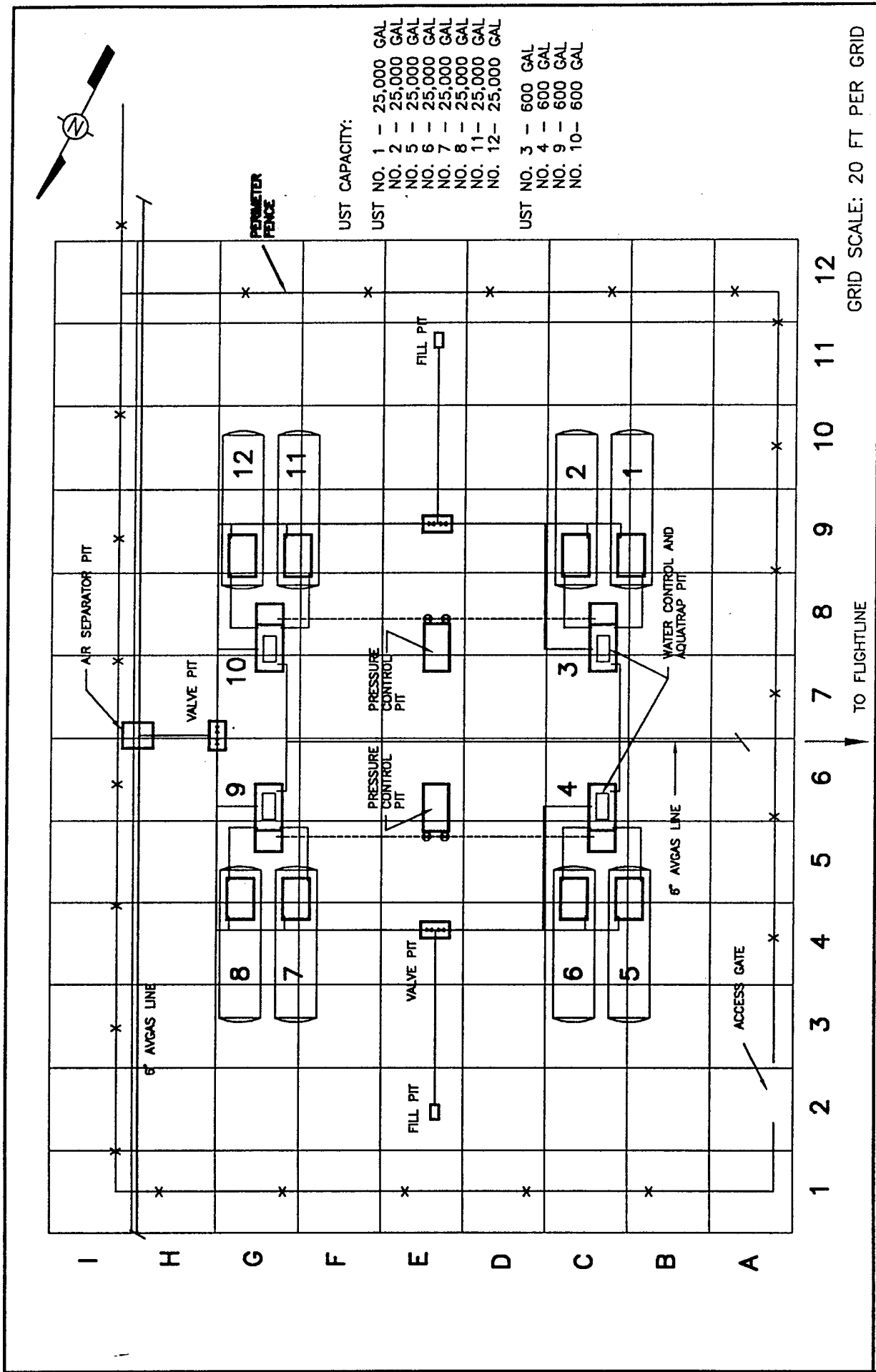
DATE: 1996

FIGURE 3.3

Site 4 - Sample Location, UST Pit No. 4

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia



ADVANCED SCIENCES, INC.		VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
FILE: RANG41	DATE: 1996	

FIGURE 3.4
Site 5 - POL Facilities

TABLE 3.2

SITE 5 -- UNIFORM HAZARDOUS WASTE MANIFEST LIST FOR PETROLEUM-CONTAMINATED
WASTEWATER AND PRODUCT REMOVED FROM TANKS AND ASSOCIATED PIPING
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	DATE	GENERATOR'S EPA ID No.	MANIFEST DOCUMENT No.	COMPANY	DESIGNATED FACILITY EPA ID No.	US DOT DESCRIPTION	CONTAINER No.	CONTAINER TYPE	CONTAINER QUANTITY (gallons)	WASTE No.	COMMENTS
UST Nos. 3, 4, 9, 10, and LINES											
5	93/12/17		BOL 4062	IMS, INC.		UN 1203					PRODUCT
								subtotal	5500		
									5500		
UST Nos. 1, 2, 5, 6, 7, 8, 11, 12											
5	93/12/18	VA0572890002	00001	IMS, INC.	VAD041441115	ERC, INC	001	TT	6495	D018	Pg. III, CLASS 3, BENZENE
5	93/12/18	VA0572890002	00002	IMS, INC.	VAD041441115	ERC, INC	001	TT	7620	D018	Pg. III, CLASS 3, BENZENE
5	93/12/18	VA0572890002	00003	IMS, INC.	VAD041441115	ERC, INC	001	TT	1702	D018	Pg. III, CLASS 3, BENZENE
									21817		
5	93/12/20	VA0572890002	00004	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
5	93/12/20	VA0572890002	00005	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
5	93/12/20	VA0572890002	00006	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
5	93/12/20	VA0572890002	00007	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
5	93/12/20	VA0572890002	00008	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
5	93/12/20	VA0572890002	00009	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
									37200		
5	93/12/23	VA0572890002	00022	PTC, INC.	NCD986180867	ERC, INC	001	TT	5000	D018	Pg. III, CLASS 3, BENZENE
5	93/12/23	VA0572890002	00023	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
5	93/12/23	VA0572890002	00024	PTC, INC.	NCD986180867	ERC, INC	001	TT	6200	D018	Pg. III, CLASS 3, BENZENE
									17400		
5	94/01/03	VA0572890002	00025	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/03	VA0572890002	00026	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/03	VA0572890002	00027	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/03	VA0572890002	00028	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/03	VA0572890002	00029	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/03	VA0572890002	00030	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
									48000		
5	94/01/04	VA0572890002	00031	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/04	VA0572890002	00032	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/04	VA0572890002	00033	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/04	VA0572890002	00034	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/04	VA0572890002	00035	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/04	VA0572890002	00036	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/04	VA0572890002	00037	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
									56000		
5	94/01/05	VA0572890002	00038	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/05	VA0572890002	00039	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/05	VA0572890002	00040	PTC, INC.	NCD986180867	ERC, INC	001	TT	8000	D018	Pg. III, CLASS 3, BENZENE
5	94/01/05	VA0572890002	00041	PTC, INC.	NCD986180867	ERC, INC	001	TT	5500	D018	Pg. III, CLASS 3, BENZENE
								subtotal	29500		
									209917		

NOTES:

(a) ALL TOTAL QUANTITY VOLUMES AS PER TRANSPORTER

excavations on plastic sheets. All soil determined to be contaminated was treated and/or disposed of in accordance with all applicable regulations.

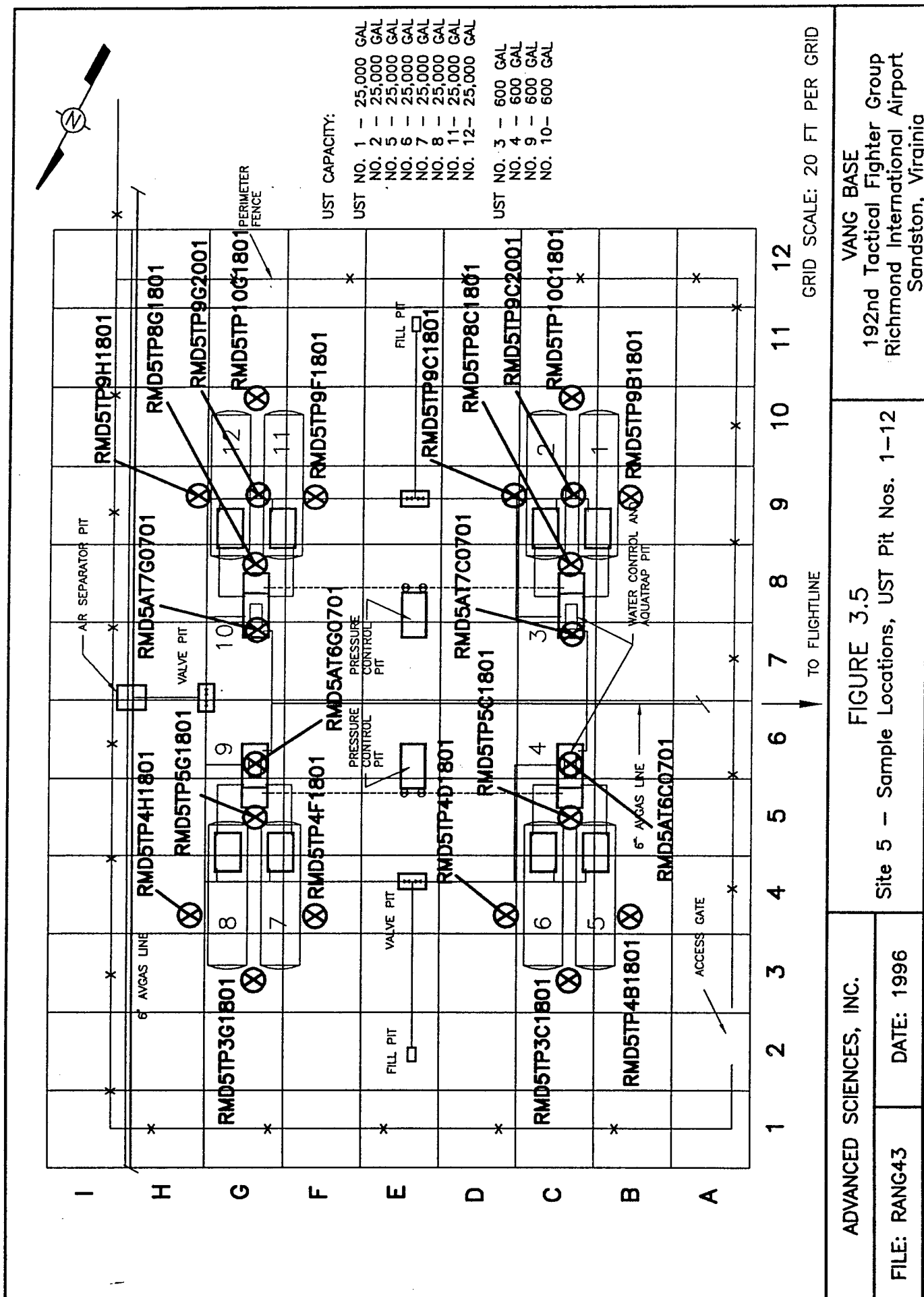
- All USTs and associated piping and equipment were decontaminated, transported, and disposed of off-site by D&S Salvage Company. Dry ice was placed in the USTs to displace any potential explosive vapors, and the tanks and associated piping and equipment were decontaminated using SUPERCLEAN. A tar coating was removed from the outside of each of the 25,000gal USTs. The tar coating was originally used to protect the steel from corroding, and was easily chipped off the outside of the USTs. The tar coating was transported off-site and properly disposed of by D&S Salvage Company. Each 25,000gal UST was gas-cut into eight sections, and loaded onto a flatbed truck for transportation and disposal off-site. All decontaminated steel was disposed of as scrap metal.
- All reinforced concrete structures were demolished within the excavations and allowed to remain as backfill.
- Excavation activities at Site 5 were completed on February 11, 1994. Backfilling was completed using crushed granite sand. Excavated soil that was determined to be non-contaminated was used as top soil and graded to promote drainage of any precipitation away from the former UST locations.

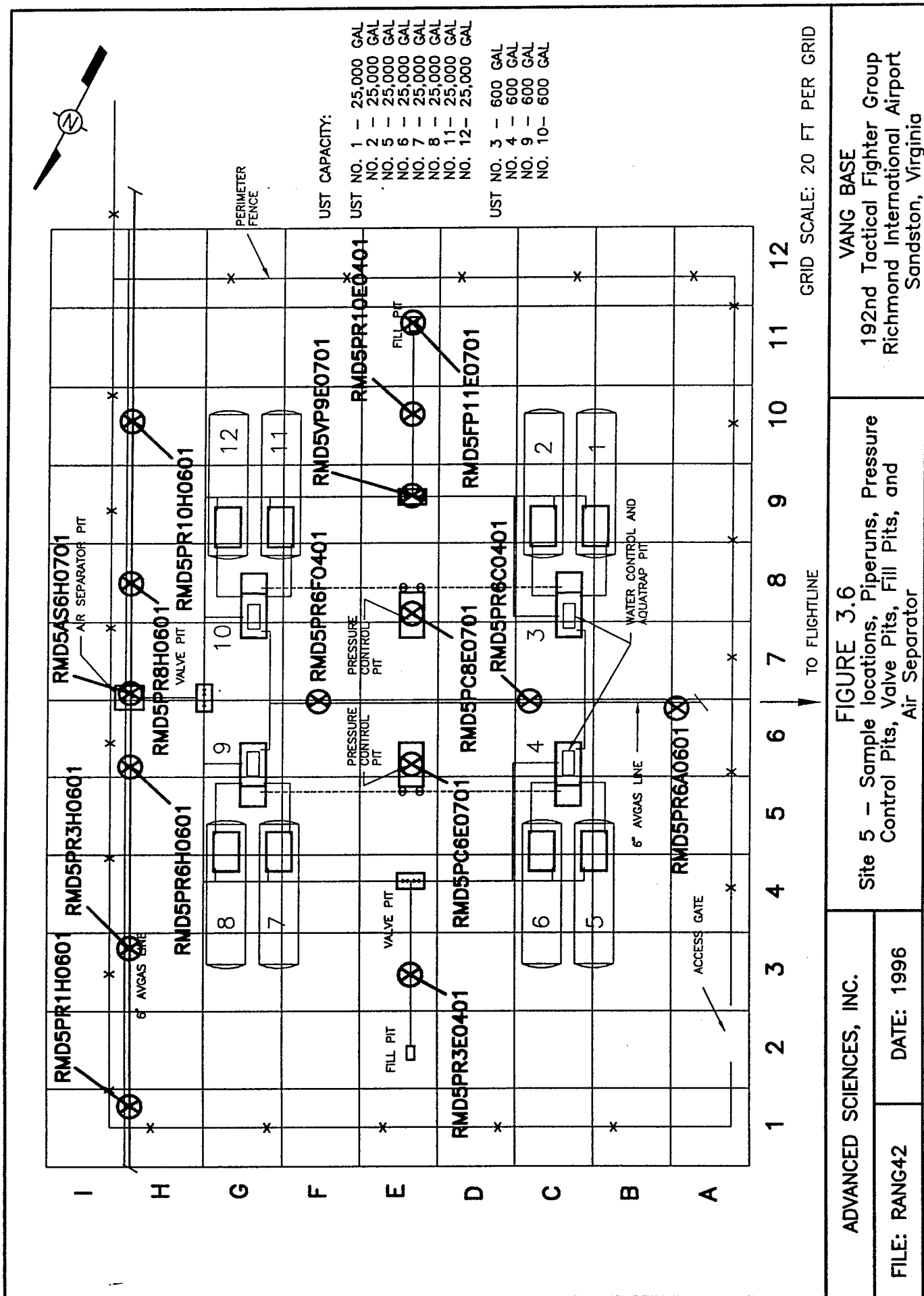
3.4.2 ASI Closure Assessment Sampling Activities

Figure 3.5 reflects the location of the 22 soil samples that were collected from the walls and floors of the excavations associated with the removal of the eight 25,000gal USTs and the four 600gal USTs. The average depth at which these samples were collected in the pits associated with the 25,000gal USTs was 16-18ft below grade. Following the destruction of the aquatrap pits, samples were taken at an average depth of 7ft below grade.

As shown in Figure 3.6, 15 soil samples were taken beneath the fuel transfer piping, fill pits, valve pits, pressure control pits and air separator pit. These samples were taken at depths that ranged from 4 to 7ft below grade.

The grab soil samples were collected from the bucket of the hydraulic excavator and immediately placed into laboratory-provided glass containers. All soil samples were sent to Environmental Laboratories, Inc. for GRO and DRO analysis. Analyses for DRO and GRO were performed in accordance EPA SW-846 Standard Methods 8100 and 8015, respectively. Analytical results are discussed in Section 4.





ADVANCED SCIENCES, INC.

FILE: RANG42 DATE: 1996

FIGURE 3.6
Site 5 - Sample locations, Piperuns, Pressure Control Pits, Valve Pits, Fill Pits, and Air Separator

VANG BASE
192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

4.0 CLOSURE ASSESSMENT FINDINGS

4.1 SITE 4 - CLOSURE SAMPLING RESULTS

Within the excavations associated with the removal of UST Nos. 1, 2, 3 and one 600gal UST, a total of 11 soil samples were collected. Table 4.1 and Figure 4.1 show five of the 11 samples have GRO and/or DRO results above the detection limit of 5 mg/Kg. Except for Sample No. RMD4TP11C1801 collected from the south wall of the excavation for Tank No. 3 (DRO concentration of 448mg/Kg), combined GRO and DRO concentrations were well below the VADEQ Water Division action level of 100ppm. Laboratory analytical results and chain of custody forms for Site No. 4 are in located Appendix E. Associated laboratory quality control data is located in Appendix G.

In the excavation associated with the removal of Tank No. 4, four soil samples were collected. These soil samples were analyzed for RCRA Metals (Table 4.2) and VOCs (Table 4.3).

Cadmium, mercury, selenium and silver were detected at or below the method detection levels. Arsenic was detected at concentrations ranging from 1.3mg/kg to 2.0mg/kg, while barium was detected at concentrations ranging from 10.1mg/kg to 15.6 mg/kg. Background concentrations are not available for these constituents. Chromium and lead concentrations detected were within published background ranges for these constituents. Figures 4.2 through 4.5 depict analytical results for arsenic, barium, chromium, and lead, respectively.

As shown in Table 4.3 and on Figure 4.6, the only VOC to exceed detection limits was methylene chloride. With a analytical limit of quantitation of 5.0µg/Kg, three of the four samples had concentrations of methylene chloride ranging from 5.1µg/Kg to 10.2µg/Kg.

4.2 SITE 5 - CLOSURE SAMPLING RESULTS

A total of 37 soil samples were collected at Site 5. Twenty-two of these samples were collected in excavations associated with UST Nos. 1 through 12. Table 4.4 and Figure 4.7 show 9 of the 22 samples having GRO and/or DRO concentrations above the detection limit of 5mg/kg. Combined GRO and DRO concentrations detected at these sample locations are below the VADEQ Water Division action level of 100ppm, except for concentrations associated with 2 samples collected from the excavation associated with Tank Nos. 1 and 2 (Sample Nos. RMD5TP9C2001 and RMD5TP10C1801). A maximum concentration of 375.5ppm was detected on the south wall of the excavation. Laboratory analytical results and chain of custody forms for Site 5 are in located in Appendix F. Associated laboratory quality control data is located in Appendix G.

15 soil samples were collected from excavations associated with the removal of the pipe runs, pressure control pits, valve pits, fill pits and air separator pits (Table 4.5). Laboratory analytical data indicate that none of these samples had concentrations that exceeded the detection limits.

TABLE 4.1
SITE 4 -- GRO/DRO LABORATORY ANALYTICAL RESULTS FOR
SOIL SAMPLES FROM PITS FOR UST Nos. 1, 2, 3, and AQUATRA
ADVANCED SCIENCES, INC., DECEMBER 1993-FEBRUARY 1994
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VIRGINIA

UST PIT SAMPLE ID	GRO (1) RESULTS (mg/Kg)	GRO (1) DL (mg/Kg)	DRO (2) RESULTS (mg/Kg)	DRO (2) DL (mg/Kg)
------------------------------	--	-----------------------------------	--	-----------------------------------

UST No. 1/2 & AQUATRAP PIT

1. RMD4TP5D1801	<5	5	<5	5
2. RMD4TP6C1801	<5	5	<5	5
3. RMD4TP3C1801	<5	5	<5	5
4. RMD4TP5C1801	<5	5	14.8	5
5. RMD4TP5B1801	<5	5	<5	5
6. RMD4TP6B1801	12	5	<5	5
7. RMD4AT6C1001	<5	5	<5	5

UST No. 3 & AQUATRAP PIT

8. RMD4AT8C1001	9.9	5	8.2	5
9. RMD4TP9C1801	<5	5	<5	5
10. RMD4TP10B1801	<5	5	5.7	5
11. RMD4TP11C1801	<5	5	448	5

NOTES:

DL = DETECTION LIMIT

mg/Kg = milligrams/Kilograms = parts per million

(1) GRO = GASOLINE RANGE ORGANICS BY EPA METHOD 8015

(2) DRO = DIESEL RANGE ORGANICS BY EPA METHOD 8100



UST CAPACITY:

UST NO. 1 - 25,000 GAL
UST NO. 2 - 25,000 GAL
UST NO. 3 - 25,000 GAL
UST NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

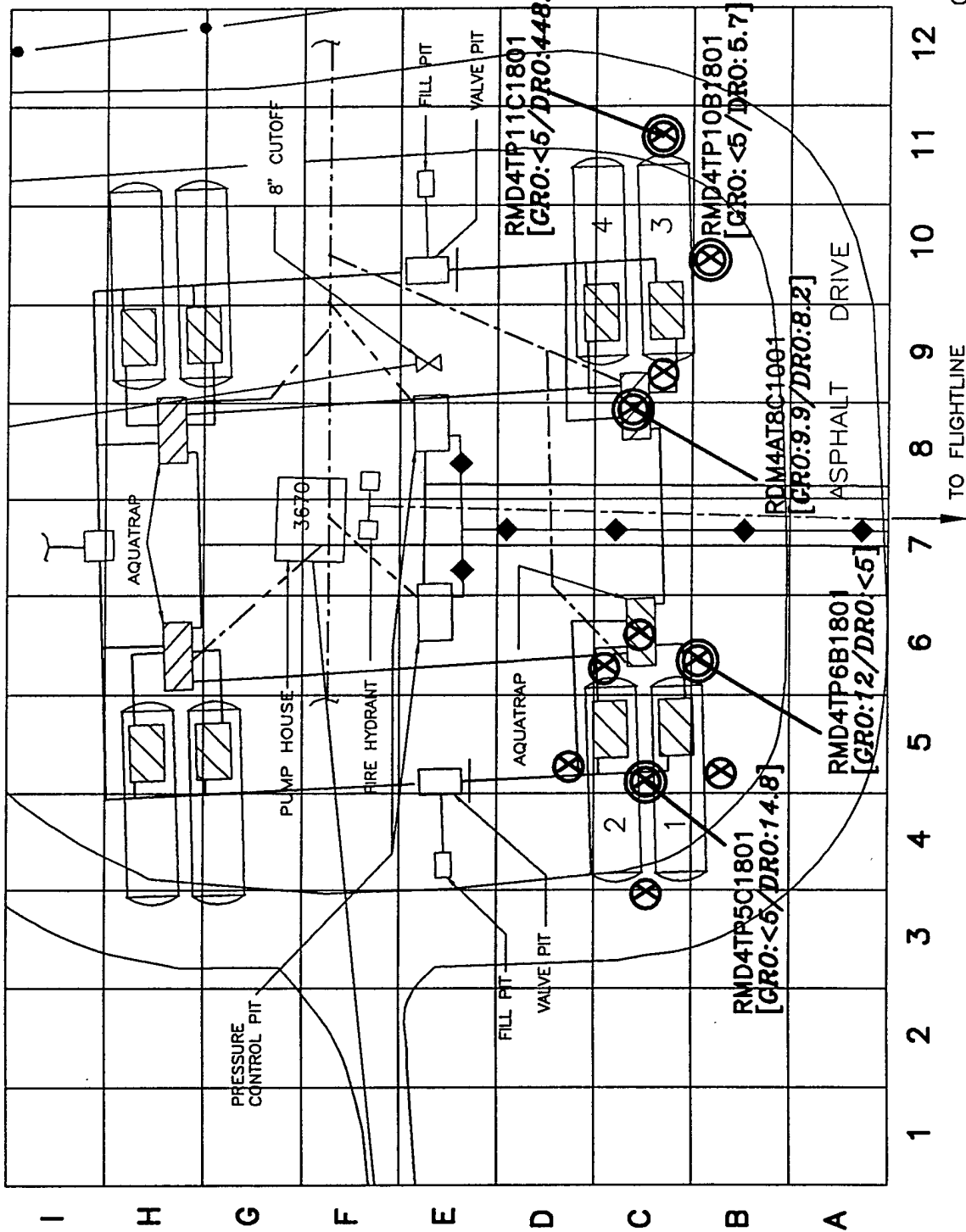
--- STORM DRAIN AND SANITARY SEWAGE
--- WATER
--- FIRE WATER LINES
--- ABANDONED 6" AIRCRAFT FUEL LINE
--- SPRINKLER SUPPLY LINE
--- 3 UNDERGROUND STORAGE TANK MANHEAD PITS
--- WATER CONTROL VALVES/PIT
--- ELECTRIC FOR REMOTE CONTROL
--- GASOLINE LINE
--- DRAIN
--- 6" WATER SUPPLY
--- DENOTES LINE DISCONTINUITY
3635 BUILDING

NOTE:

SAMPLE LOCATIONS SHOWN WITHOUT RESULTS REPRESENT LOCATIONS WHERE GRO AND DRO CONCENTRATIONS WERE BELOW DETECTION LEVELS

(ALL RESULTS IN mg/kg)

GRID SCALE: 20 FT PER GRID



ADVANCED SCIENCES, INC.

FILE: RANG52

DATE: 1996

FIGURE 4.1

Site 4 - GRO/DR0 Analytical Results from
UST Pits 1,2,3 and Aquatrap Pits

VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

SITE 4 - TOTAL METALS LABORATORY ANALYTICAL RESULTS FOR SOIL

UST No.4 PIT

ADVANCED SCIENCES, INC., DECEMBER 1993-FEBRUARY 1994
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VIRGINIA

SAMPLE ID	TOTAL METALS ARSENIC (1)		TOTAL METALS BARIUM (2)		TOTAL METALS CADMIUM (3)		TOTAL METALS CHROMIUM (4)		TOTAL METALS LEAD (5)		TOTAL METALS MERCURY (6)		TOTAL METALS SELENIUM (7)		TOTAL METALS SILVER (8)	
	RESULTS DL	(mg/Kg)	RESULTS DL	(mg/Kg)	RESULTS DL	(mg/Kg)	RESULTS DL	(mg/Kg)	RESULTS DL	(mg/Kg)	RESULTS DL	(mg/Kg)	RESULTS DL	(mg/Kg)	RESULTS DL	(mg/Kg)
RMD4TP9C1801	1.7	0.5	15.6	1.0	<0.1	0.1	4.9	0.8	6.8	0.5	<0.10	0.1C	<5.0	5.0	<0.2	0.2
RMD4TP10C1801	1.3	0.5	10.1	1.0	<0.1	0.1	7.0	0.8	6.5	0.5	<0.10	0.1C	<5.0	5.0	<0.2	0.2
RMD4TP10D1801	1.7	0.5	13.5	1.0	0.1	0.1	6.0	0.8	7.2	0.5	<0.10	0.1C	<5.0	5.0	<0.2	0.2
RDM4TP11C1801	2.0	0.5	12.8	1.0	<0.1	0.1	6.1	0.8	8.2	0.5	<0.10	0.1C	<5.0	5.0	<0.2	0.2
BACKGROUND RANGE (9)	NA	NA	NA	1.8 - 8.5	9.3 - 24.7	6.5 - 16.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:

DL = DETECTION LIMIT

NA=NOT AVAILABLE

mg/Kg = milligrams/Kilogram = parts per million

- (1) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7060
- (2) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7081
- (3) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7131
- (4) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7191
- (5) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7421
- (6) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7471
- (7) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7740
- (8) ANALYSIS PERFORMED ACCORDING TO EPA SW-846 METHOD 7761

(9) BACKGROUND VALUES HAVE BEEN TAKEN FROM INFORMATION INCLUDED IN THE FINAL SITE INVESTIGATION REPORT, PREPARED BY METCALF AND EDDY

RMD4SA2.WQ1/24-Jan-96

TABLE 4.3
SITE 4 – VOLATILE ORGANIC LABORATORY ANALYTICAL RESULTS FOR SOIL
UST No. 4 PIT
ADVANCED SCIENCE, INC., DECEMBER 1993-FEBRUARY 1994
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VIRGINIA

ANALYTE	SAMPLE ID RMD4TP9C1801		SAMPLE ID RMD4TP10C1801		SAMPLE ID RMD4TP10D1801		SAMPLE ID RMD4TP11C1801	
	RESULTS	LOQ	RESULTS	LOQ	RESULTS	LOQ	RESULTS	LOQ
	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)	(ug/Kg)
Chloromethane	BDL	10	BDL	10	BDL	10	BDL	10
Bromomethane	BDL	10	BDL	10	BDL	10	BDL	10
Vinyl Chloride	BDL	10	BDL	10	BDL	10	BDL	10
Chloroethane	BDL	10	BDL	10	BDL	10	BDL	10
Methylene Chloride	10.2	5.0	BDL	5.0	9.2	5.0	5.1	5.0
Acetone	BDL	100	BDL	100	BDL	100	BDL	100
Carbon Disulfide	BDL	100	BDL	100	BDL	100	BDL	100
1,1-Dichloroethene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
1,1-Dichloroethane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
trans-1,2-Dichloroethene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Chloroform	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
1,2-Dichloroethane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
2-Butanone	BDL	50	BDL	50	BDL	50	BDL	50
1,1,1-Trichloroethane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Carbon Tetrachloride	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Vinyl Acetate	BDL	50	BDL	50	BDL	50	BDL	50
Bromodichloromethane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
1,1,2,2-Tetrachloroethane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
1,2-Dichloropropane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
trans-1,3-Dichloropropene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Trichloroethene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Dibromochloromethane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
1,1,2-Trichloroethane	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Benzene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
cis-1,3-Dichloropropene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
2-Chloroethyl Vinyl ether	BDL	10	BDL	10	BDL	10	BDL	10
Bromoform	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
2-Hexanone	BDL	50	BDL	50	BDL	50	BDL	50
4-Methyl-2-Pentanone	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Tetrachloroethene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Toluene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Chlorobenzene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Ethyl Benzene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Styrene	BDL	5.0	BDL	5.0	BDL	5.0	BDL	5.0
Total Zylenes	BDL	15	BDL	15	BDL	15	BDL	15

NOTES:
VOLATILE ORGANICS IN SOIL BY EPA SW-846 METHOD 8240
ug/Kg = MICROGRAMS/KILOGRAM = parts per billion
BDL = BELOW SPECIFIED DETECTION LIMIT.
LOQ = ANALYTICAL LIMIT OF QUANTITATION.



UST CAPACITY:

UST NO. 1 - 25,000 GAL
 NO. 2 - 25,000 GAL
 NO. 3 - 25,000 GAL
 NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- UNDERGROUND STORAGE TANK
- MANHEAD PITS
- 3 [Z] WATER CONTROL VALVES/PIT
- [X] ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- └ DENOTES LINE DISCONTINUITY
- 3835 BUILDING

(RESULTS IN mg/kg)

GRID SCALE: 20 FT PER GRID

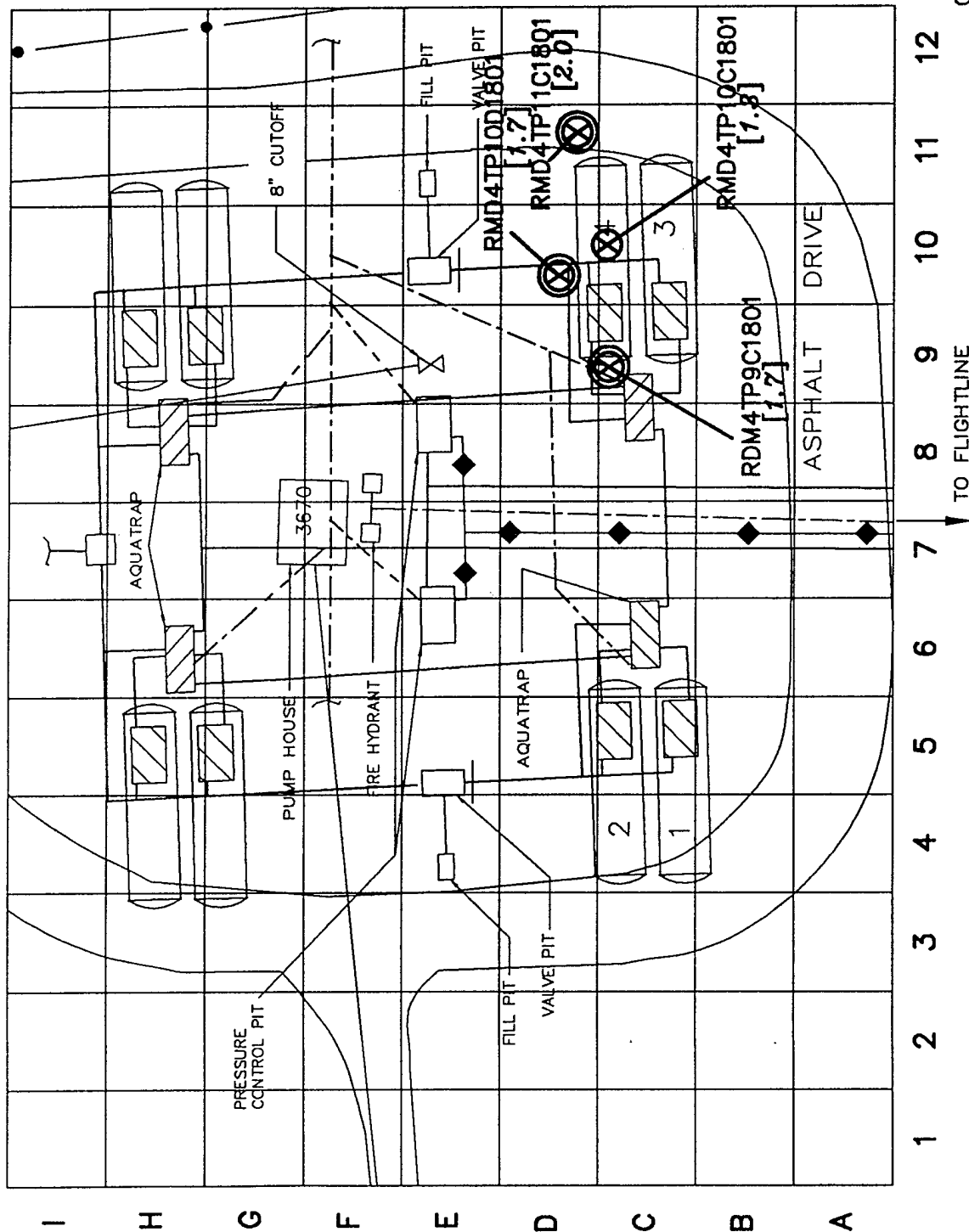


FIGURE 4.2

Site 4 - Total Metals, Arsenic Analytical Results,
 UST Pit No. 4

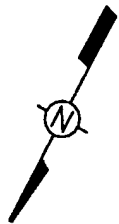
ADVANCED SCIENCES, INC.

DATE: 1996

FILE: RANG48

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia



UST CAPACITY:

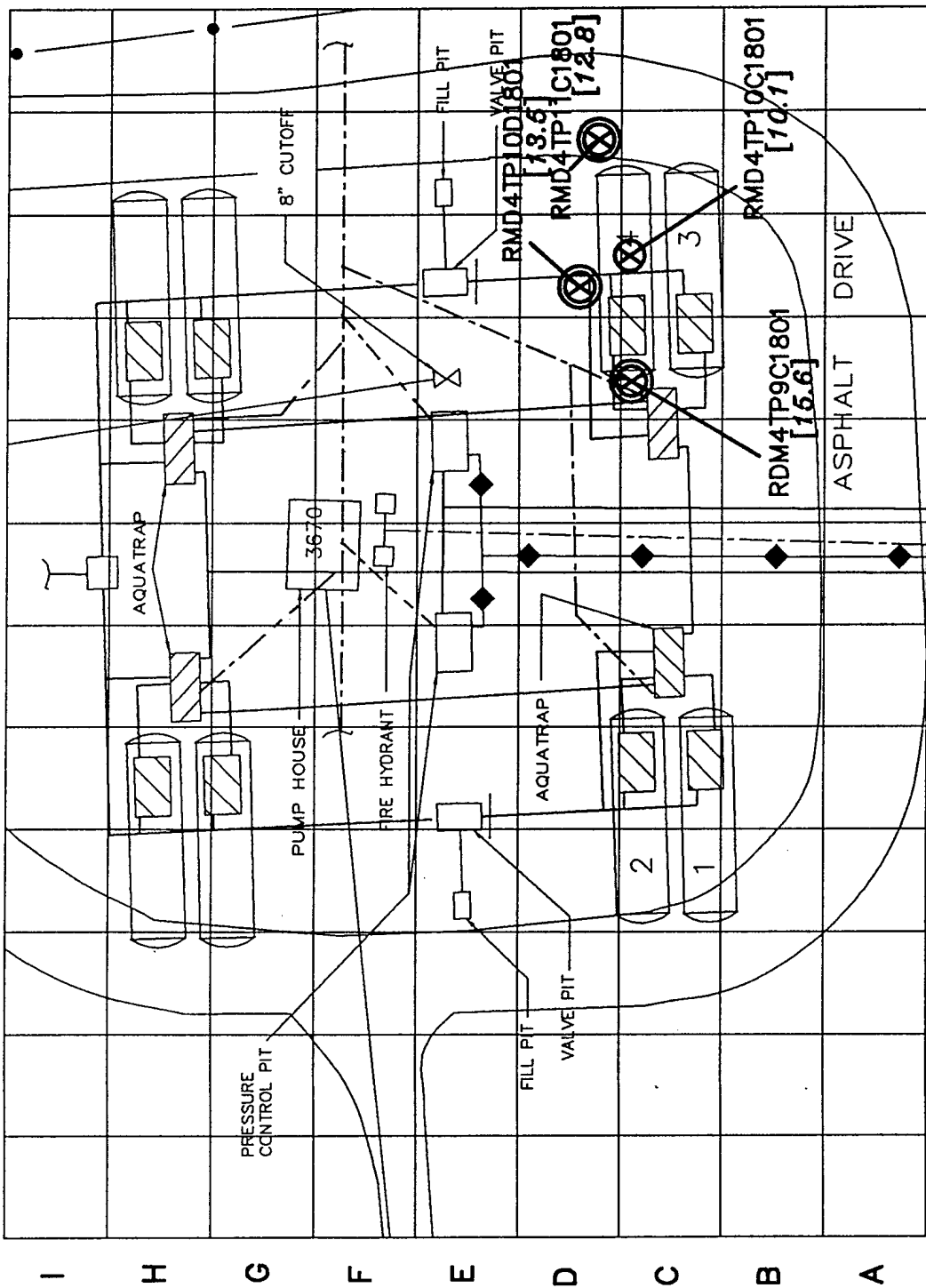
UST NO. 1 - 25,000 GAL
 UST NO. 2 - 25,000 GAL
 UST NO. 3 - 25,000 GAL
 UST NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- 3 UNDERGROUND STORAGE TANK MANHEAD PITS
- 3 WATER CONTROL VALVES/PIT
- ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- J DENOTES LINE DISCONTINUITY
- 3635 BUILDING

(RESULTS IN mg/kg)



GRID SCALE: 20 FT PER GRID

FIGURE 4.3

Site 4 - Total Metals, Barium Analytical Results,
 UST Pit No. 4

VANG BASE
 192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia

ADVANCED SCIENCES, INC.

FILE: RANG49 DATE: 1996



UST CAPACITY:

UST NO. 1 - 25,000 GAL
UST NO. 2 - 25,000 GAL
UST NO. 3 - 25,000 GAL
UST NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

--- STORM DRAIN AND SANITARY SEWAGE
--- WATER
--- FIRE WATER LINES
--- ABANDONED 6" AIRCRAFT FUEL LINE
--- SPRINKLER SUPPLY LINE
--- UNDERGROUND STORAGE TANK
--- MANHOLE PITS
3 [Z] WATER CONTROL VALVES/PIT
[X] ELECTRIC FOR REMOTE CONTROL
--- GASOLINE LINE
--- DRAIN
--- 6" WATER SUPPLY
--- DENOTES LINE DISCONTINUITY
3635 BUILDING

(RESULTS IN mg/kg)

GRID SCALE: 20 FT PER GRID

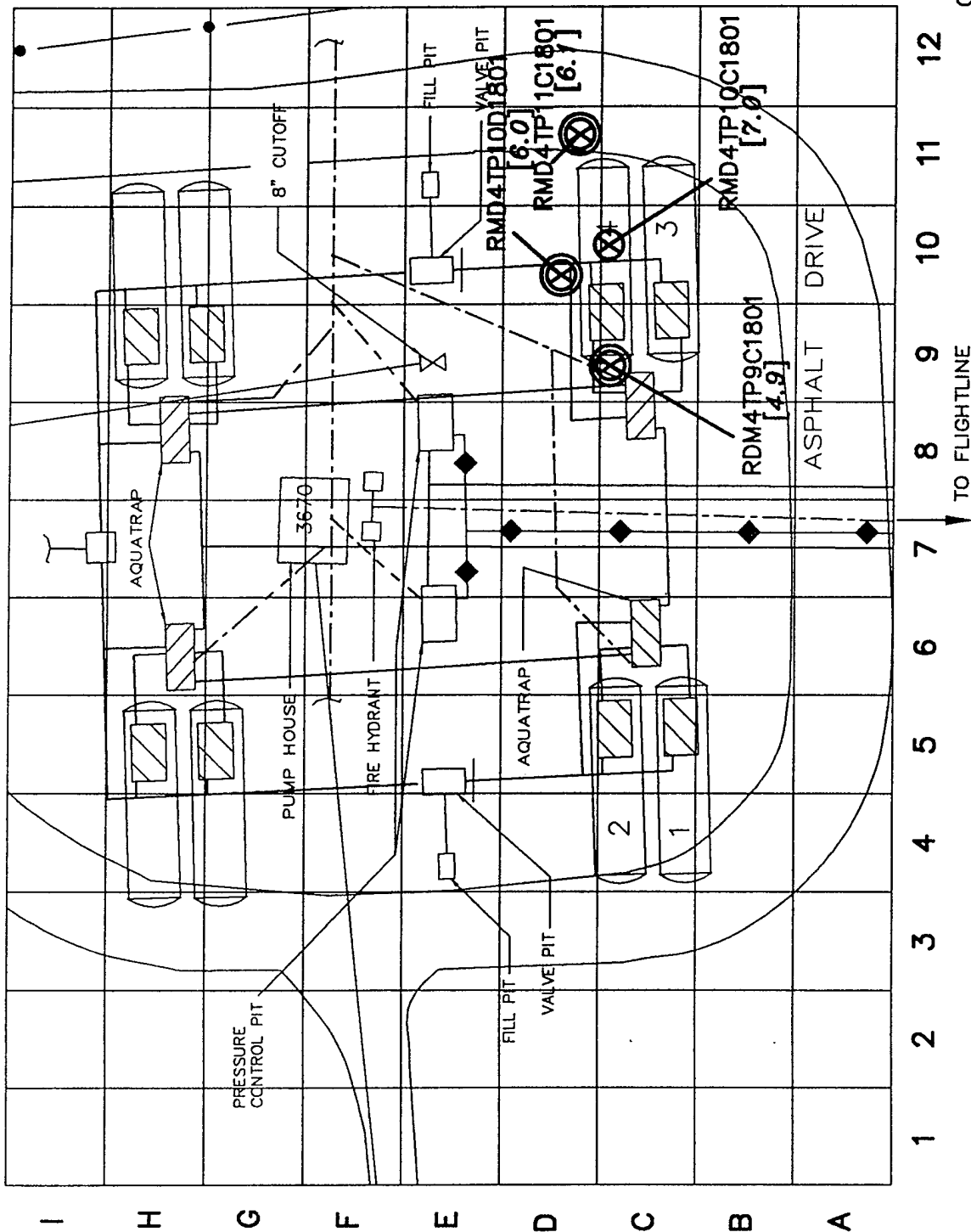


FIGURE 4.4

Site 4 - Total Metals, Chromium Analytical
Results, UST Pit No. 4

ADVANCED SCIENCES, INC.

FILE: RANG50 DATE: 1996

VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia



UST CAPACITY:

UST NO. 1 - 25,000 GAL
 NO. 2 - 25,000 GAL
 NO. 3 - 25,000 GAL
 NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- UNDERGROUND STORAGE TANK MANHEAD PITS
- 3 ☒ WATER CONTROL VALVES/PIT
- ☒ ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- DENOTES LINE DISCONTINUITY
- 3835 BUILDING

(RESULTS IN mg/kg)

GRID SCALE: 20 FT PER GRID;

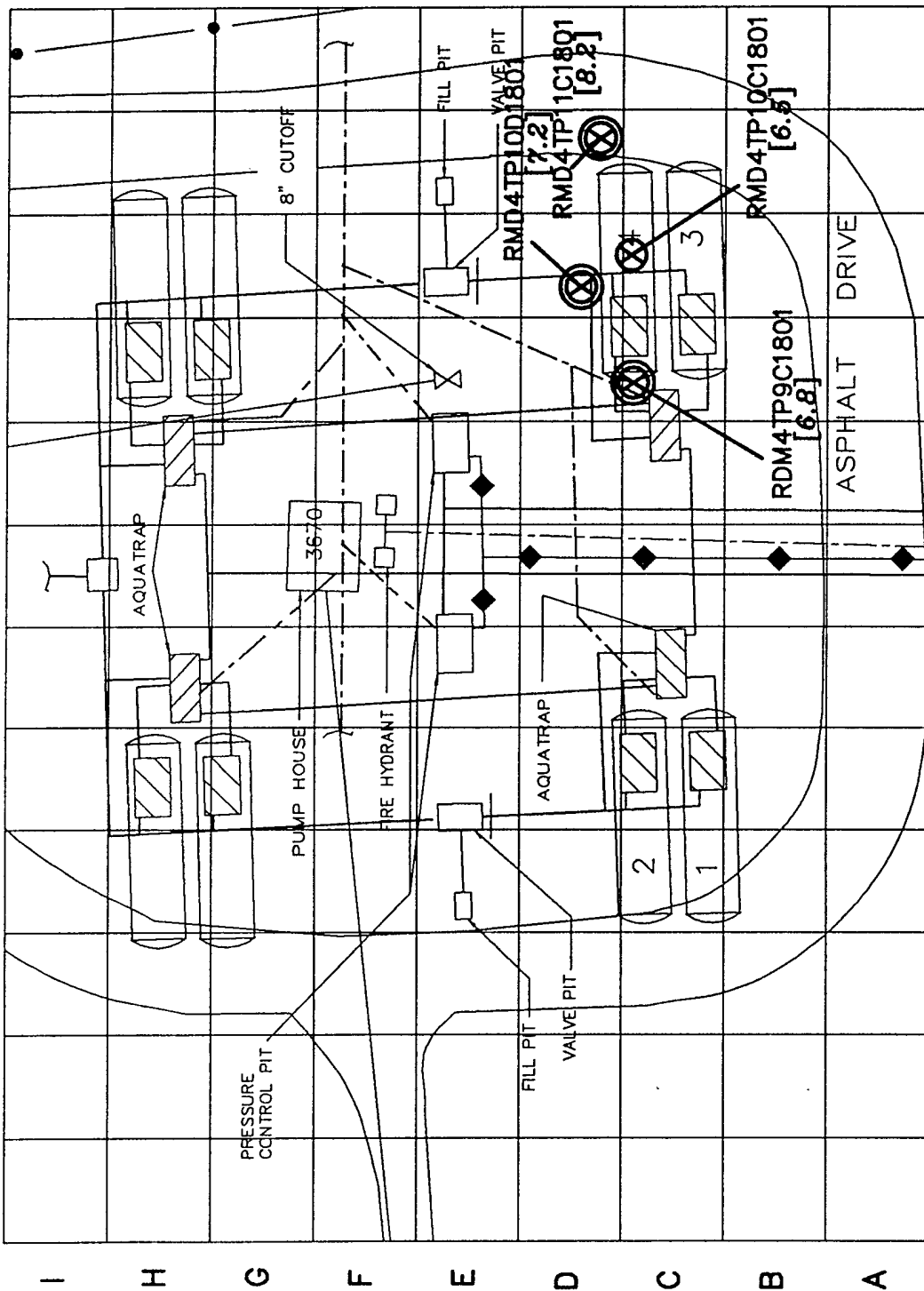


FIGURE 4.5

Site 4 - Total Metals, Lead Analytical Results,
 UST Pit No. 4

ADVANCED SCIENCES, INC.

FILE: RANG51

DATE: 1996

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia



UST CAPACITY:

UST NO. 1 - 25,000 GAL
 UST NO. 2 - 25,000 GAL
 UST NO. 3 - 25,000 GAL
 UST NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- 3 ☒ UNDERGROUND STORAGE TANK
- ☒ MANHOLE PITS
- ☒ WATER CONTROL VALVES/PIT
- ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- ⊥ DENOTES LINE DISCONTINUITY
- 3635 BUILDING
- BDL BELOW DETECTION LEVEL

(RESULTS IN $\mu\text{g}/\text{kg}$)

GRID SCALE: 20 FT PER GRID

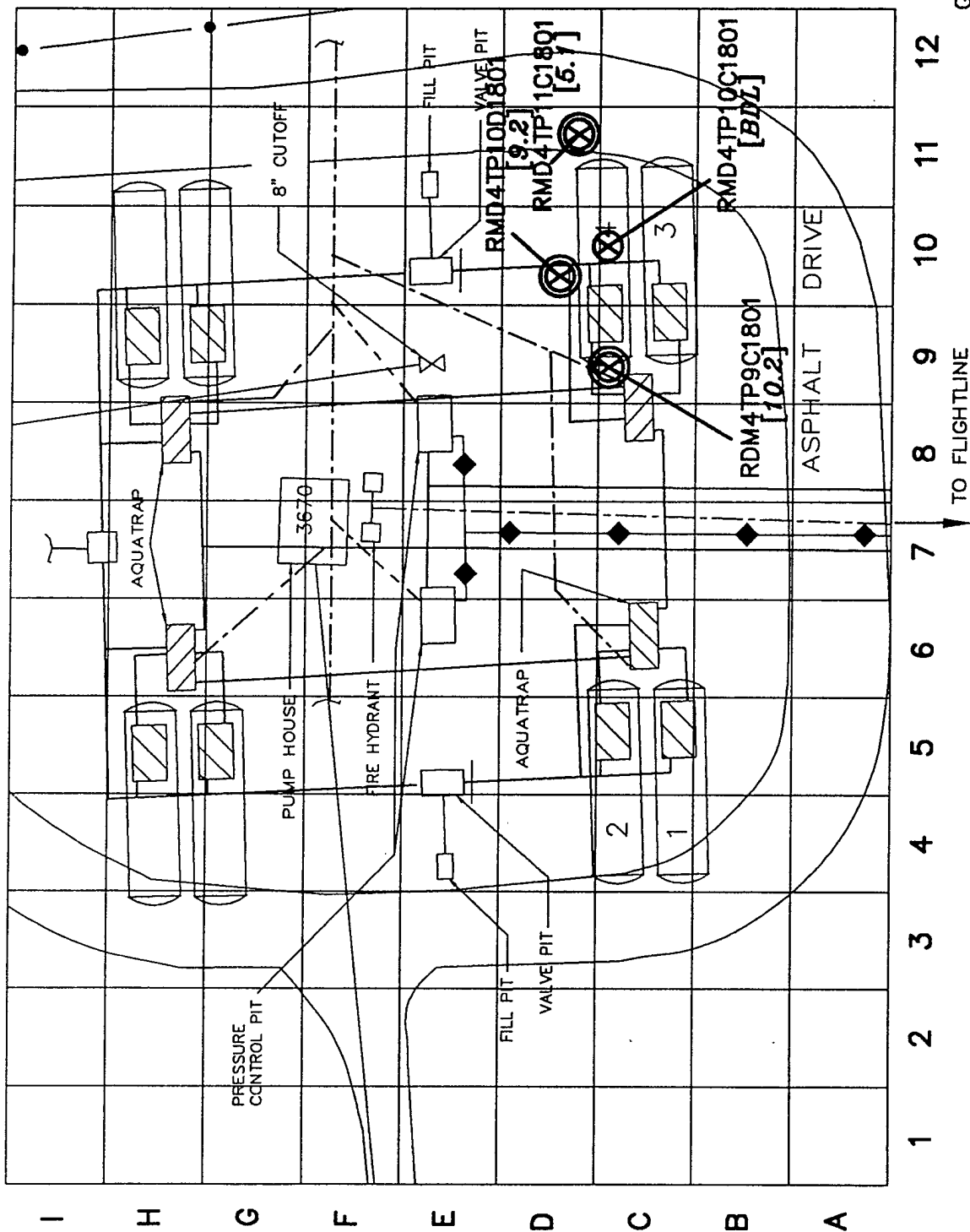


FIGURE 4.6

Site 4 - Methylene Chloride Results,
 UST Pit No. 4

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia

ADVANCED SCIENCES, INC.

FILE: RANG47

DATE: 1996

TABLE 4.4
SITE 5 – GRO/DRO LABORATORY ANALYTICAL RESULTS FOR
SOIL FROM UST PIT Nos. 1 THROUGH 12
ADVANCED SCIENCES, INC., DECEMBER 1993-FEBRUARY 1994
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VIRGINIA

UST PIT SAMPLE ID	GRO (1) RESULTS (mg/Kg)	GRO (1) DL (mg/Kg)	DRO (2) RESULTS (mg/Kg)	DRO (2) DL (mg/Kg)
<i>UST No. 1/2/3 PIT</i>				
1. RMD5TP9B1801	<5.0	5.0	<5.0	5.0
2. RMD5TP10C1801	145.0	5.0	230.5	50.0
3. RMD5TP9C2001	9.9	5.0	92.2	50.0
4. RMD5TP8C1801	<5.0	5.0	<5.0	5.0
5. RMD5TP9D1801	<5.0	5.0	<5.0	5.0
6. RMD5AT7C0701	<5.0	5.0	<5.0	5.0
<i>UST No. 4/5/6 PIT</i>				
7. RMD5AT6C0701	<5.0	5.0	<5.0	5.0
8. RMD5TP4B1801	23.7	5.0	32.56	5.0
9. RMD5TP3C1801	BDL	5.0	14.7	5.0
10. RMD5TP4D1801	31.5	5.0	57.5	50.0
11. RMD5TP5C1801	BDL	5.0	5.3	5.0
<i>UST No. 7/8/9 PIT</i>				
12. RMD5TP4F1801	BDL	5.0	64.8	50.0
13. RMD5TP3G1801	BDL	5.0	<5.0	5.0
14. RMD5TP4H1801	<5.0	5.0	<5.0	5.0
15. RMD5TP5G1801	<5.0	5.0	<5.0	5.0
16. RMD5AT6G0701	<5.0	5.0	<5.0	5.0
<i>UST No. 10/11/12 PIT</i>				
17. RMD5AT7G0701	<5.0	5.0	<5.0	5.0
18. RMD5TP9F1801	<5.0	5.0	7.1	5.0
19. RMD5TP10G1801	<5.0	5.0	<5.0	5.0
20. RMD5TP9G2001	<5.0	5.0	33.87	5.0
21. RMD5TP8G1801	<5.0	5.0	<5.0	5.0
22. RMD5TP9H1801	<5.0	5.0	<5.0	5.0

NOTES:

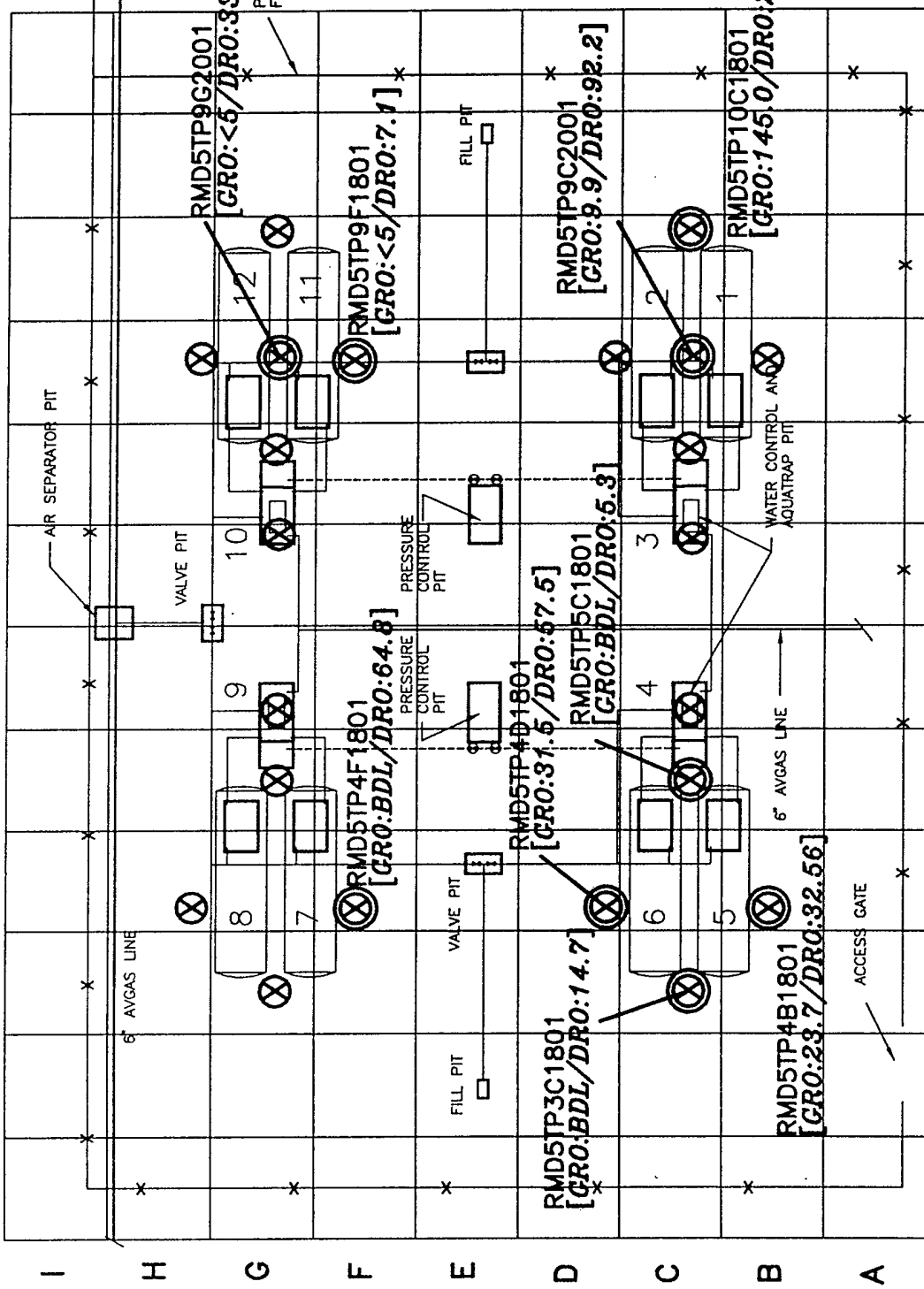
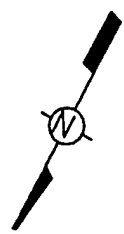
BDL = BELOW DETECTION LIMIT

DL = DETECTION LIMIT

mg/Kg = milligrams/Kilogram = parts per million

(1) GRO = GASOLINE RANGE ORGANICS BY EPA METHOD 8015

(2) DRO = DIESEL RANGE ORGANICS BY EPA SW-846 METHOD 8100



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 5 - 25,000 GAL
- UST NO. 6 - 25,000 GAL
- UST NO. 7 - 25,000 GAL
- UST NO. 8 - 25,000 GAL
- UST NO. 11 - 25,000 GAL
- UST NO. 12 - 25,000 GAL

- UST NO. 3 - 600 GAL
- UST NO. 4 - 600 GAL
- UST NO. 9 - 600 GAL
- UST NO. 10 - 600 GAL

LEGEND:

BDL BELOW DETECTION LEVEL

[GRO:230.5]

NOTE:

SAMPLE LOCATIONS SHOWN WITHOUT RESULTS REPRESENT LOCATIONS WHERE GRO AND DRO CONCENTRATIONS WERE BELOW DETECTION LEVELS

(ALL RESULTS IN mg/kg)

GRID SCALE: 20 FT PER GRID.

FIGURE 4.7

Site 5 - GRO/DRO Analytical Results, UST Pit Nos. 1-12

VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

ADVANCED SCIENCES, INC.

FILE: RANG46 DATE: 1996

TABLE 4.5
SITE 5 -- GRO/DRO LABORATORY ANALYTICAL RESULTS FOR
SOILS FROM PIPE RUNS, PRESSURE CONTROL PITS,
VALVE PIT, FILL PIT AND AIR SEPARATOR PIT
ADVANCED SCIENCES INC., DECEMBER 1993-FEBRUARY 1994
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VIRGINIA

PIPE RUN/PIT SAMPLE ID	GRO RESULTS (mg/Kg)	GRO (1) DL (mg/Kg)	DRO RESULTS (mg/Kg)	DRO (2) DL (mg/Kg)
-----------------------------------	------------------------------------	-----------------------------------	------------------------------------	-----------------------------------

TABLE 4.5
SITE 5 -- GRO/DRO LABORATORY ANALYTICAL RESULTS FOR
SOILS FROM PIPE RUNS, PRESSURE CONTROL PITS,
VALVE PIT, FILL PIT AND AIR SEPARATOR PIT
ADVANCED SCIENCES INC., DECEMBER 1993-FEBRUARY 1994
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VIRGINIA

PIPE RUN/PIT SAMPLE ID	GRO RESULTS (mg/Kg)	GRO (1) DL (mg/Kg)	DRO RESULTS (mg/Kg)	DRO (2) DL (mg/Kg)
-----------------------------------	------------------------------------	-----------------------------------	------------------------------------	-----------------------------------

PIPE RUNS

1. RMD5PR6A0601	<5.0	5.0	<5.0	5.0
2. RMD5PR6C0401	BDL	5.0	BDL	5.0
3. RMD5PR6F0401	BDL	5.0	BDL	5.0
4. RMD5PR10E0401	BDL	5.0	BDL	5.0
5. RMD5PR3E0401	BDL	5.0	BDL	5.0
6. RMD5PR1H0601	<5.0	5.0	<5.0	5.0
7. RMD5PR3H0601	<5.0	5.0	<5.0	5.0
8. RMD5PR6H0601	<5.0	5.0	<5.0	5.0
9. RMD5PR8H0601	<5.0	5.0	<5.0	5.0
10. RMD5PR10H0601	<5.0	5.0	<5.0	5.0

PRESSURE CONTROL PITS

11. RMD5PC6E0701	BDL	5.0	BDL	5.0
12. RMD5PC830701	BDL	5.0	BDL	5.0

VALVE PIT

13. RMD5VP9E0701	BDL	5.0	BDL	5.0
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FILL PIT

14. RMD5FP11E0701	BDL	5.0	BDL	5.0
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AIR SEPARATOR PIT

15. RMD5AS6H0701	BDL	5.0	BDL	5.0
------------------	-----	-----	-----	-----

NOTES:

DL = DETECTION LIMIT

mg/Kg = milligrams/Kilogram = parts per million

(1) GRO = GASOLINE RANGE ORGANICS BY EPA METHOD 8015

(2) DRO = DIESEL RANGE ORGANICS BY EPA METHOD 8100

5.0 QUALITATIVE RISK EVALUATION FOR SITES 4 AND 5

Primary exposure scenarios include exposure of on-site workers to subsurface soil and exposure of downgradient receptors to groundwater. Since the POL facilities are secured, fenced areas with controlled access, worker exposure to localized, contaminated subsurface soil could occur during authorized excavation activities; however, localized subsurface soil contamination was detected at approximate depths of 16-18ft below grade.

Groundwater users who draw water from the shallow depths of the uppermost Yorktown/Columbia Aquifer could potentially be exposed to contaminated groundwater originating from Sites 4 and 5; however, the nearest residential/municipal water supply well in the vicinity of Site 4 that is screened in the Yorktown/Columbia aquifer is located approximately 3000ft upgradient of the Base to the north/northeast. The nearest downgradient residential drinking water supply is 3000ft south of the southern boundary of the Base. With an average groundwater velocity of 16 to 22ft/year across Sites 4 and 5, contaminant transport time to the nearest residential drinking water supply, assuming no retardation, would exceed 180 years. This indicates there is no current threat to downgradient groundwater users.

No critical ecological habitats or rare plant and animal species exist in the immediate vicinity of the Base. The White Oak Swamp Natural Area is located approximately four miles to the southeast of the Base. Assuming groundwater from the Yorktown/Columbia aquifer discharges to the White Oak Swamp Natural Area, groundwater velocity calculations indicate there is no current threat to downgradient groundwater users.

6.0 CONCLUSIONS

6.1 SITE 4 - UST NOS. 1, 2, 3, AND 600GAL UST AND RELATED FACILITIES

Except for Sample No. RMD4TP11C1801 collected from the south wall of the excavation for Tank No. 3 (DRO concentration of 448mg/Kg), combined GRO and DRO concentrations were well below the VADEQ Water Division action level of 100ppm. Since this sample was collected approximately 16-18ft below grade, this localized petroleum contamination does not appear to pose significant human health or ecological risks.

6.2 SITE 4 - UST NO. 4 AND RELATED FACILITIES

Methylene chloride was the only VOC detected in the samples collected from the excavation associated with Tank No. 4. Methylene chloride was detected in three samples at concentrations ranging from 5.1µg/Kg to 10.2µg/Kg. The maximum concentration detected was approximately two times greater than the analytical limit of quantitation of 5.0µg/Kg. All samples from this excavation were collected approximately 16-18ft below grade, indicating these levels of contamination do not appear to pose significant human health or ecological risks. Please be aware that closure activities associated with Tank No. 4 were not conducted in exactly the same sequence specified in the typical closure schedule contained in the approved closure plan (ASI 1996).

6.3 SITE 5 - USTS AND REPLACED FACILITIES

Except for Sample Nos. RMD5TP9C2001 (GRO/DRO concentration of 102.1 mg/Kg) and RMD5TP10C1801 (GRO/DRO concentration of 375.5 mg/Kg) collected from the excavation associated with Tank Nos. 1 and 2, combined GRO and DRO concentrations were below the VADEQ action level of 100ppm. Since these samples were collected approximately 16-18ft below grade, this localized petroleum contamination does not appear to pose significant human health or ecological risks.

6.4 RECOMMENDATIONS - SITES 4 AND 5

Based on minimal human health and ecological risks associated with soil and groundwater contamination detected during UST closure activities and previous site investigations, the VANG requests clean closure of Sites 4 and 5 with the following condition:

- If future excavation activities are authorized at Sites 4 and 5, appropriate health and safety procedures will be implemented to protect workers from localized contamination.

7.0 REFERENCES

ASI (Advanced Sciences, Inc.) May 1991. "Supplemental Site Characterization Report, Virginia Air National Guard, Richmond International Airport, Sandston, Virginia," prepared for the National Guard Bureau NGB/CEVR, Andrew AFB, MD.

ASI (Advanced Sciences, Inc.) December 1991. "Site Assessment Report, Site 4 - Petroleum, Oils, and Lubricants Facility, Virginia Air National Guard, Richmond International Airport, Sandston, Virginia," prepared for the National Guard Bureau ANGRC/CEVR, Andrews AFB, MD.

ASI (Advanced Sciences, Inc.) September 1992. "Site Assessment Report, Site 5 - Petroleum, Oils, and Lubricants Facility, Virginia Air National Guard, Richmond International Airport, Sandston, Virginia," prepared for the National Guard Bureau ANGRC/CEVR, Andrews AFB, MD.

ASI (Advanced Sciences, Inc.) April 1996. "Closure Plan for Tank No. 4 at Site 4 - Petroleum, Oils, and Lubricants Facility, Virginia Air National Guard, Richmond International Airport, Sandston, Virginia," prepared for the National Guard Bureau ANGRC/CEVR, Andrews AFB, MD.

Clay, John W. 1975. "Soil Survey of Henrico County, Virginia," United States Department of Agriculture, Soil Conservation Service, and Virginia Polytechnic Institute.

Commonwealth of Virginia/Department of Waste Management, Hazardous Waste Management Regulation, VR 672-10-1, dated January 4, 1993.

Commonwealth of Virginia State Water Control Board, Underground Storage Tanks; Technical Standards and Corrective Action Requirements, VR 680-13-02, Adopted: August 1, 1989 - Effective: October 25, 1989.

Metcalf & Eddy, Inc., February 1991. "Site 4 Site Characterization, Virginia Air National Guard, Richmond International Airport, Sandston, Virginia," prepared for the National Guard Bureau NGB/CEVR, Andrew AFB, MD.

Metcalf & Eddy, Inc., January 1991. "Sampling Approach, Analytical Results, and Disposal Options for the Contents of Three Underground Storage Tanks at Site 4, Virginia Air National

Guard, Byrd Field, Sandstone, Virginia," prepared for the National Guard Bureau, Andrew AFB, MD.

Metcalf & Eddy, Inc., 1995. Final Site Investigation Report.

**SELECTED PHOTOGRAPHS OF SITE 4
CLOSURE ACTIVITIES**

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	1	94/01/14	5	23	22	REFUELING OPERATIONS IN ACTIVE PORTION OF POL; VIEW TO THE NE.
4	1	94/01/14	5	22	21	EXCAVATION OF UST No. 2; VIEW TO THE SW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

UST NO. 1 - 25,000 GAL
NO. 2 - 25,000 GAL
NO. 3 - 25,000 GAL
NO. 4 - 25,000 GAL

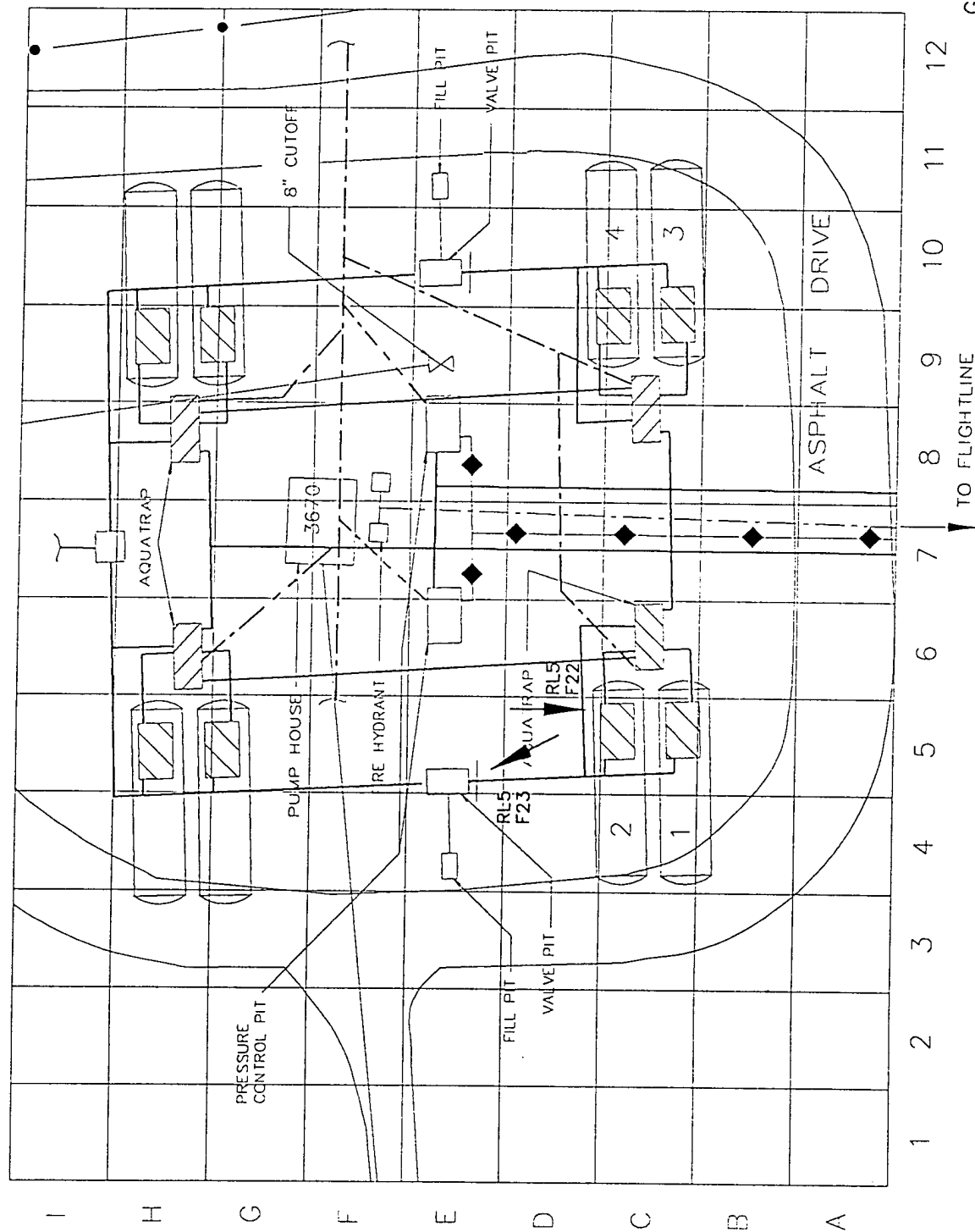
AQUATRAP - 600 GAL

LEGEND:

--- STORM DRAIN AND SANITARY SEWAGE
--- WATER
--- FIRE WATER LINES
--- ABANDONED 6" AIRCRAFT FUEL LINE
--- SPRINKLER SUPPLY LINE
--- 3 UNDERGROUND STORAGE TANK MANHEAD PITS
--- WATER CONTROL VALVES/PIT
--- ELECTRIC FOR REMOTE CONTROL
--- GASOLINE LINE
--- DRAIN
--- 6" WATER SUPPLY
--- J DENOTES LINE DISCONTINUITY
3635 BUILDING

DIRECTION OF
PICTURE AND ROLL
RL1
F5

GRID SCALE: 20 FT PER GRID



ADVANCED SCIENCES, INC.

FILE: RANG65

DATE: 1994

SITE 4 - Photo Log No. 1

Photo Grid Location/Orientation
January 14, 1994

VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	2	94/01/25	5	19	18	VIEW INTO PIT AROUND CONCRETE MANWAY FOR UST No. 2;
4	2	94/01/25	5	18	17	UST No. 2 REMOVAL; VIEW TO THE NW.
4	2	94/01/25	5	17	16	UST No. 2 REMOVAL; VIEW TO THE WEST.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

UST NO. 1 - 25,000 GAL
 UST NO. 2 - 25,000 GAL
 UST NO. 3 - 25,000 GAL
 UST NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

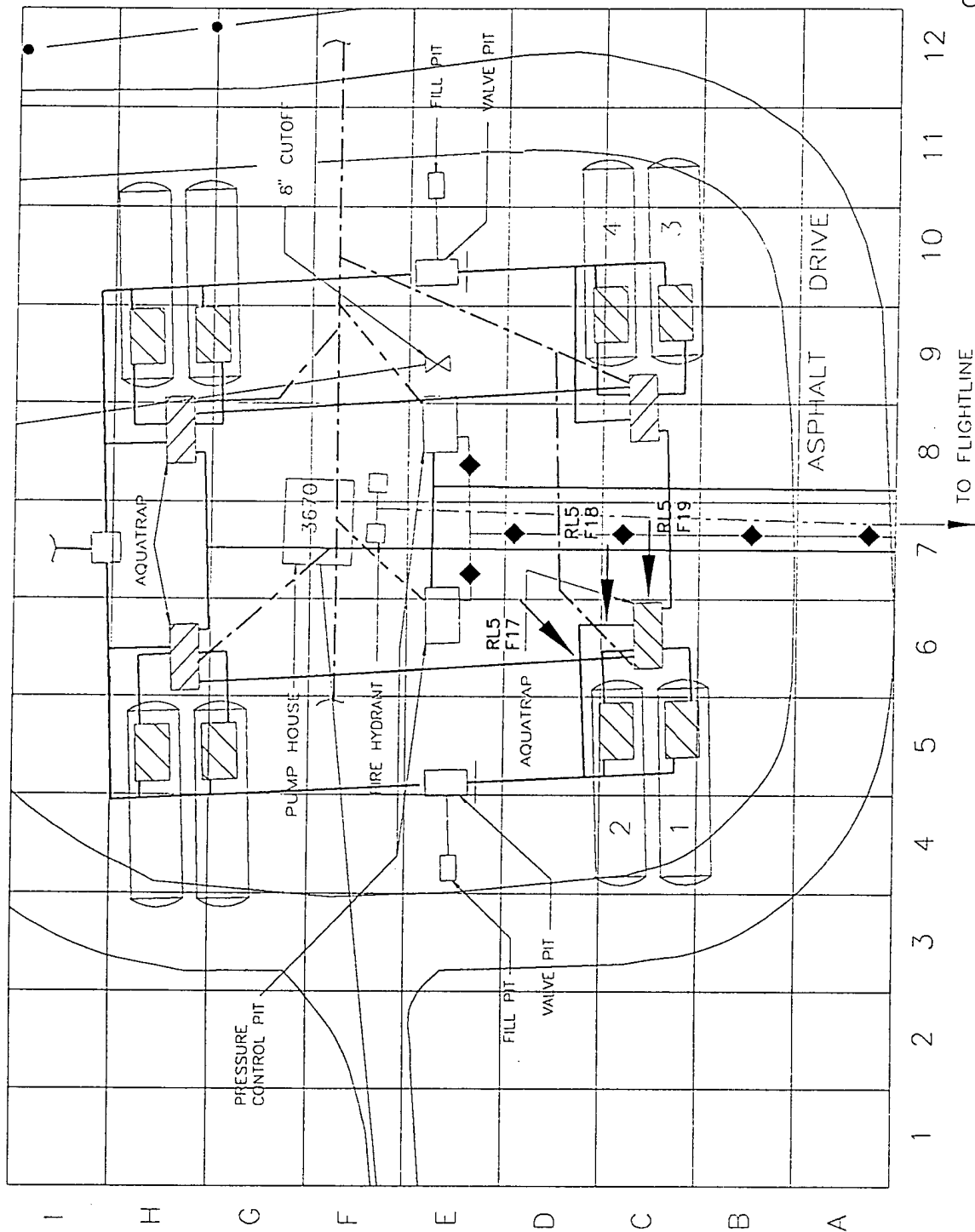
--- STORM DRAIN AND SANITARY SEWAGE
 --- WATER
 --- FIRE WATER LINES
 --- ABANDONED 6" AIRCRAFT FUEL LINE
 --- SPRINKLER SUPPLY LINE
 --- UNDERGROUND STORAGE TANK MANHEAD PITS
 3 [X] WATER CONTROL VALVES/PIT
 [X] ELECTRIC FOR REMOTE CONTROL
 --- GASOLINE LINE
 --- DRAIN
 --- 6" WATER SUPPLY
 J DENOTES LINE DISCONTINUITY
 3635 BUILDING

DIRECTION OF
 PICTURE AND ROLL
 AND FRAME NUMBER
 RL1
 F5

NOTE:

RL5.F19 IS A PHOTO LOOKING
 DOWN AT RECENTLY REPAIRED
 WATER MAIN

GRID SCALE: 20 FT PER GRID



ADVANCED SCIENCES, INC.

FILE: RANG66

DATE: 1994

SITE 4 - Photo Log No. 2

Photo Grid Location/Orientation
 January 25, 1994

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	3	94/01/26	5	16	15	EXCAVATION OF UST No. 2; VIEW TO THE SW.
4	3	94/01/26	5	15	14	EXCAVATION OF UST No. 2; VIEW TO THE NW.
4	3	94/01/26	5	14	13	EXCAVATION OF UST No. 3; VIEW TO THE NW.
4	3	94/01/26	5	13	12	EXCAVATION OF UST No. 3; VIEW TO THE SE.
4	3	94/01/26	5	12	11	EXCAVATION OF UST No. 3; VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

UST NO. 1 - 25,000 GAL
UST NO. 2 - 25,000 GAL
UST NO. 3 - 25,000 GAL
UST NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

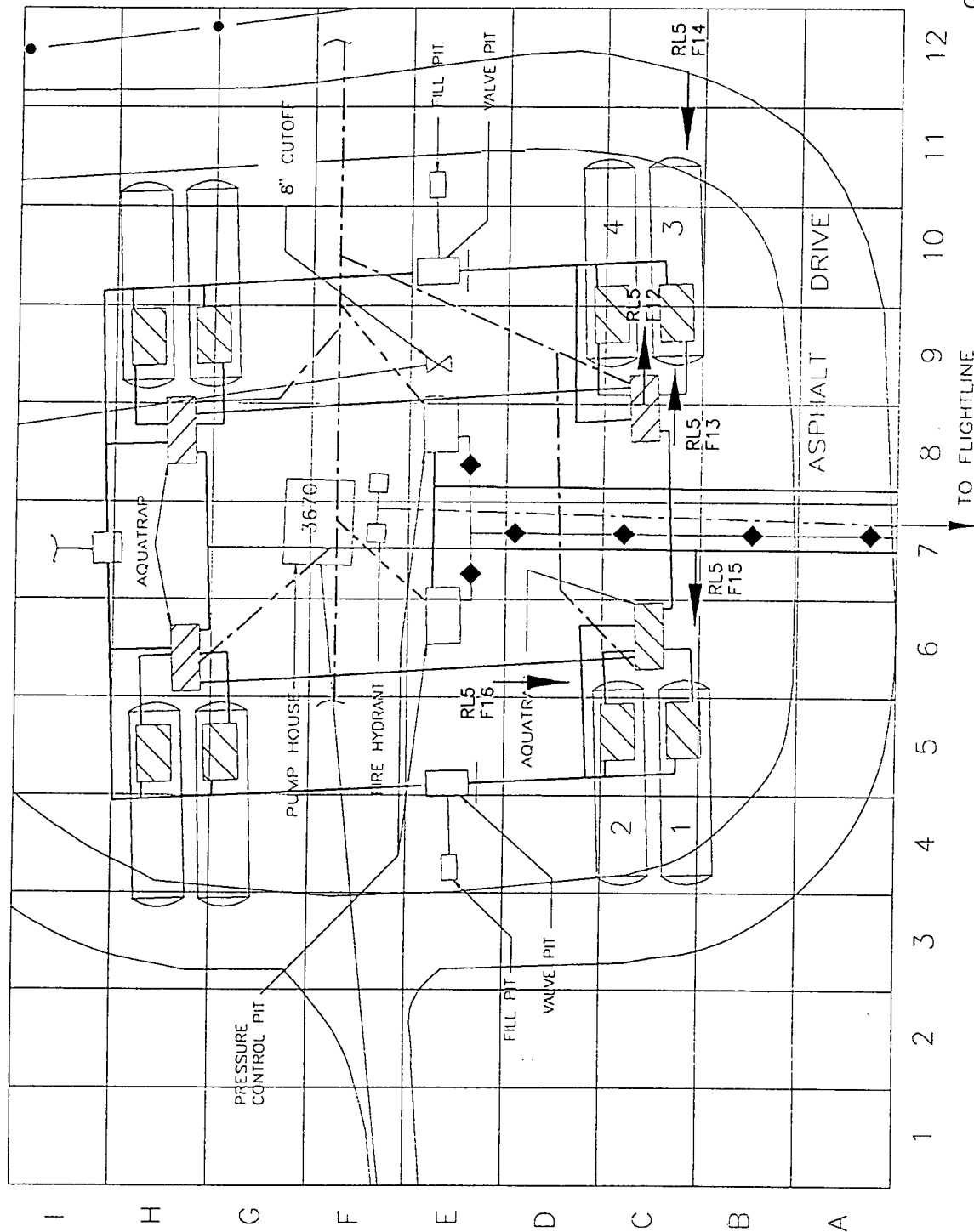
- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- 3 UNDERGROUND STORAGE TANK MANHEAD PITS
- WATER CONTROL VALVES/PIT
- ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- DENOTES LINE DISCONTINUITY
- 3635 BUILDING

DIRECTION OF
PICTURE AND ROLL
RL1 AND FRAME NUMBER
F5

NOTE:

RL5,F16 SHOWS EXCAVATOR
MANEUVERING IN SOFT SOIL

GRID SCALE: 20 FT PER GRID



ADVANCED SCIENCES, INC.

FILE: RANG67

DATE: 1994

SITE 4 - Photo Log No. 3

Photo Grid Location/Orientation
January 26, 1994

VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
 UST REMOVAL
 VIRGINIA AIR NATIONAL GUARD
 SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	4	94/01/27	5	10	9	UST No. 2 REMOVAL; VIEW TO THE SW.

NOTE:
 PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- NO. 2 - 25,000 GAL
- NO. 3 - 25,000 GAL
- NO. 4 - 25,000 GAL

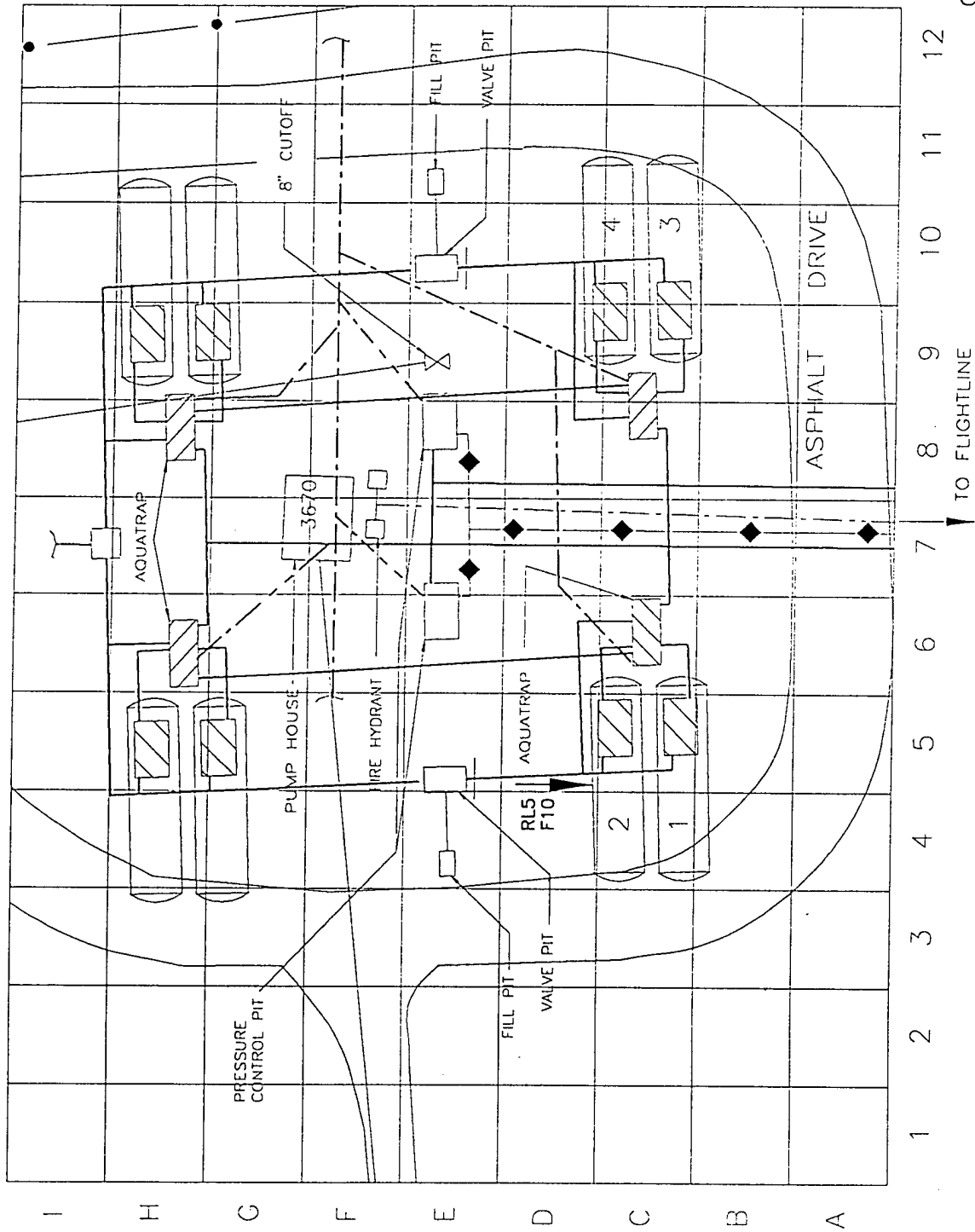
AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- 3 [] UNDERGROUND STORAGE TANK
- [] MANHEAD PITS
- [] WATER CONTROL VALVES/PIT
- ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- DENOTES LINE DISCONTINUITY
- 3635 BUILDING

DIRECTION OF
PICTURE AND ROLL
RL1
F5

GRID SCALE: 20 FT PER GRID



ADVANCED SCIENCES, INC.

FILE: RANG68

DATE: 1994

SITE 4 - Photo Log No. 4

Photo Grid Location/Orientation

January 27, 1994

VANG BASE

192nd Tactical Fighter Group

Richmond International Airport

Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
 UST REMOVAL
 VIRGINIA AIR NATIONAL GUARD
 SANDSTON, VA

SUBJECT/DESCRIPTION

FRAME NEGATIVE

ROLL

DATE

PHOTO
LOG No.

No.

No.

No.

No.

UST No. 3 IN TEMPORARY STORAGE AREA: VIEW OF THE SW.

UST Nos. 1 & 2 IN TEMPORARY STORAGE AREA: VIEW TO THE WEST.

NOTE:

PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 3 - 25,000 GAL
- UST NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

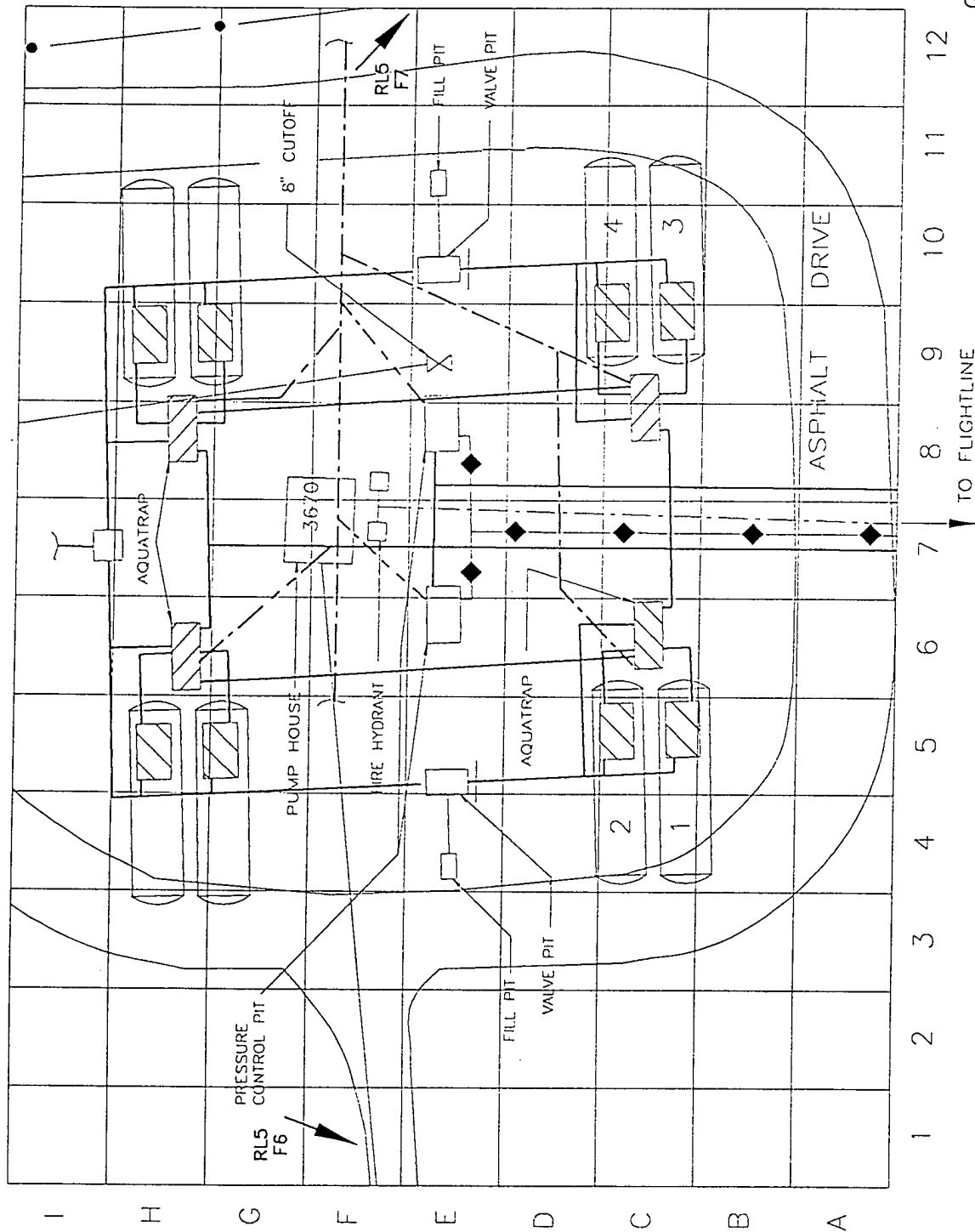
- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- UNDERGROUND STORAGE TANK
- MANHEAD PITS
- WATER CONTROL VALVES/PIT
- ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- DENOTES LINE DISCONTINUITY
- 3635 BUILDING

DIRECTION OF
PICTURE AND ROLL
RL1 AND FRAME NUMBER
F5

NOTES:

1. RL5,F6-TANK NO. 2 (LEFT)
TANK NO. 1 (RIGHT)
2. RL5,F7-LOOKING AT REMOVED
TANK NO. 3

GRID SCALE: 20 FT PER GRID



ADVANCED SCIENCES, INC.

FILE: RANG69

DATE: 1994

SITE 4 - Photo Log No. 5

Photo Grid Location/Orientation
January 28, 1994

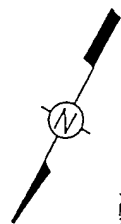
VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
 UST REMOVAL
 VIRGINIA AIR NATIONAL GUARD
 SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	6	94/01/29	5	5	4	UST No. 4 REMOVAL, DELIVERY OF ROLL-OFF CONTAINERS FOR EXCAVATED SOIL VIEW TO THE NW.
4	6	94/01/29	5	4	3	UST No. 4 REMOVAL, PLASTIC LINED ROLL-OFF CONTAINERS PRIOR TO LOADING WITH SOIL, VIEW TO THE NW.

NOTE:
 PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

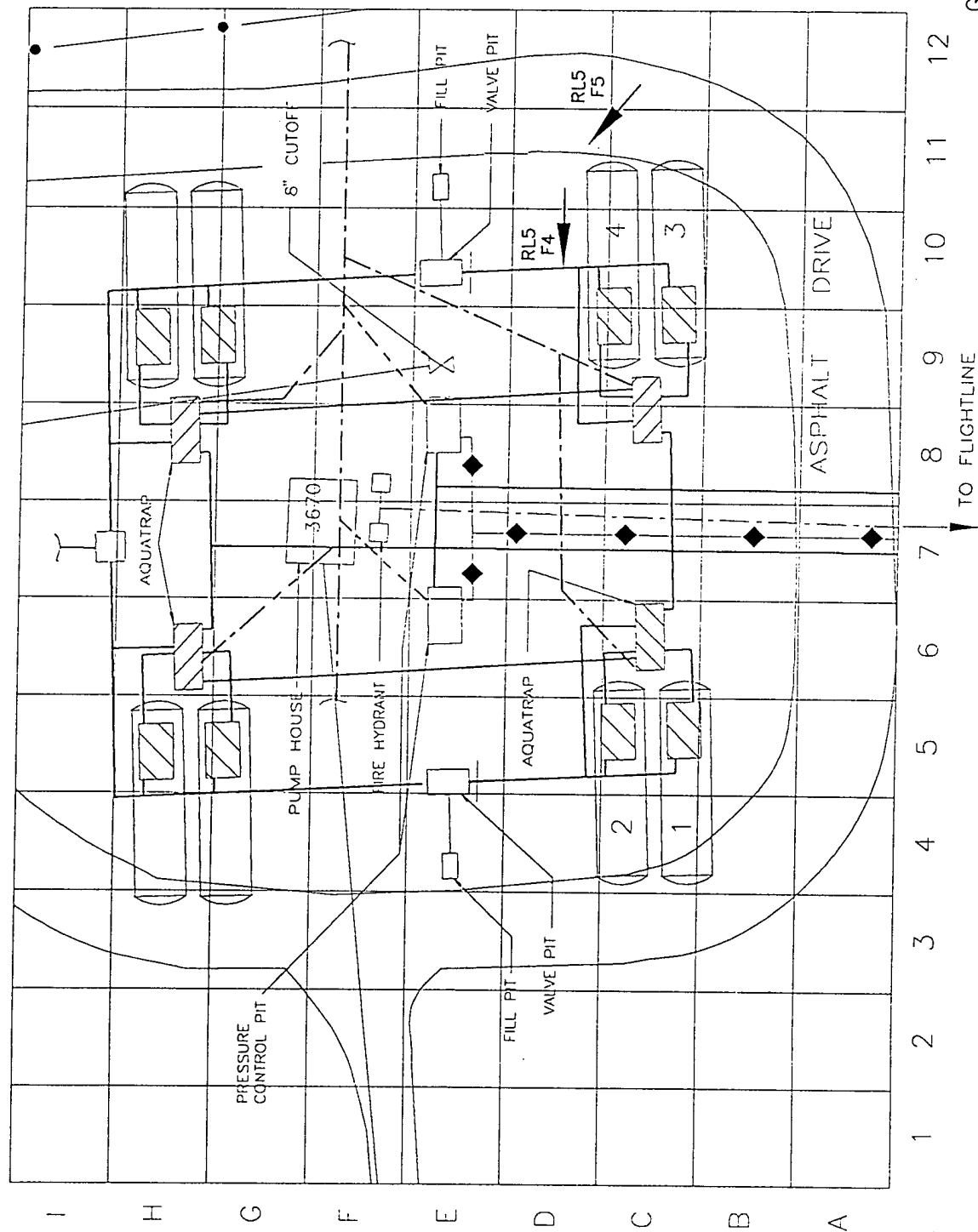
UST NO. 1 - 25,000 GAL
 NO. 2 - 25,000 GAL
 NO. 3 - 25,000 GAL
 NO. 4 - 25,000 GAL

AQUATRAP - 600 GAL

LEGEND:

--- STORM DRAIN AND SANITARY SEWAGE
 --- WATER
 --- FIRE WATER LINES
 --- ABANDONED 6" AIRCRAFT FUEL LINE
 --- SPRINKLER SUPPLY LINE
 --- UNDERGROUND STORAGE TANK
 --- MANHOLE PITS
 --- WATER CONTROL VALVES/PIT
 --- ELECTRIC FOR REMOTE CONTROL
 --- GASOLINE LINE
 --- DRAIN
 --- 6" WATER SUPPLY
 J. DENOTES LINE DISCONTINUITY
 3635 BUILDING

DIRECTION OF
 PICTURE AND ROLL
 AND FRAME NUMBER
 RL1
 F5



GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

FILE: RANG70

DATE: 1994

SITE 4 - Photo Log No. 6

Photo Grid Location/Orientation
 January 29, 1994

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	7	94/02/09	6	1	2	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NW.
4	7	94/02/09	6	2	3	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NW.
4	7	94/02/09	6	3	4	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NW.
4	7	94/02/09	6	4	5	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE SW.
4	7	94/02/09	6	5	6	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	6	7	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NE.
4	7	94/02/09	6	7	8	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NW.
4	7	94/02/09	6	8	9	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NW.
4	7	94/02/09	6	9	10	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

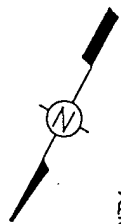
SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	7	94/02/09	6	10	11	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NW.
4	7	94/02/09	6	11	12	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE NE.
4	7	94/02/09	6	12	13	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE SW.
4	7	94/02/09	6	13	14	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE SW.
4	7	94/02/09	6	14	15	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE SW.
4	7	94/02/09	6	15	16	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	16	17	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	17	18	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE SW.
4	7	94/02/09	6	18	19	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
4	7	94/02/09	6	19	20	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	20	21	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	21	22	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	22	23	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	23	24	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE S.
4	7	94/02/09	6	24	END	UST No. 4 REMOVAL OPERATIONS; VIEW TO THE SW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

UST NO. 1 - 25,000 GAL
 NO. 2 - 25,000 GAL
 NO. 3 - 25,000 GAL
 NO. 4 - 25,000 GAL

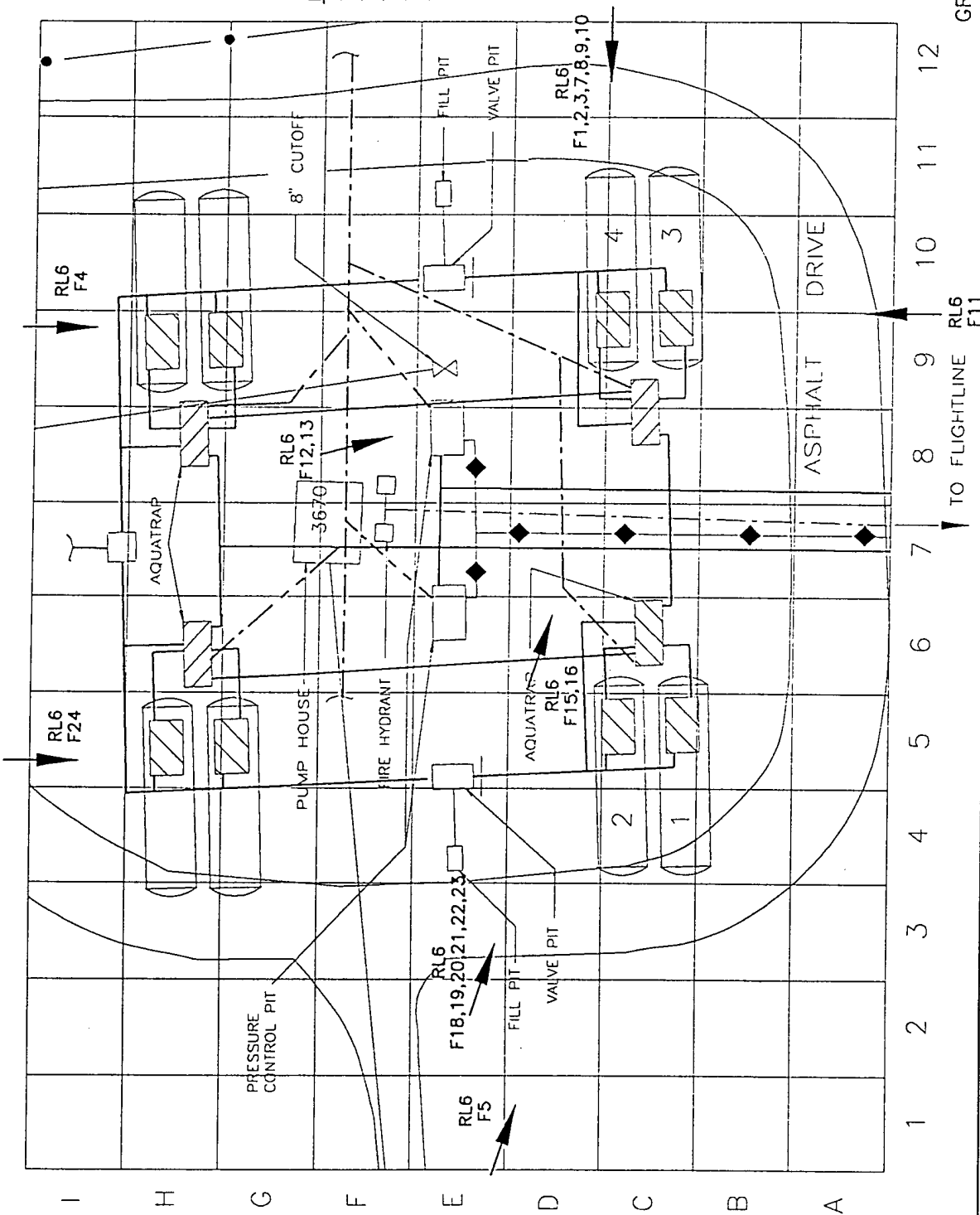
AQUATRAP - 600 GAL

LEGEND:

- STORM DRAIN AND SANITARY SEWAGE
- WATER
- FIRE WATER LINES
- ABANDONED 6" AIRCRAFT FUEL LINE
- SPRINKLER SUPPLY LINE
- 3 [Hatched Box] UNDERGROUND STORAGE TANK
- [Hatched Box] MANHOLE PITS
- [Hatched Box] WATER CONTROL VALVES/HI
- [Hatched Box] ELECTRIC FOR REMOTE CONTROL
- GASOLINE LINE
- DRAIN
- 6" WATER SUPPLY
- J. DENOTES LINE DISCONTINUITY
- 3635 BUILDING

DIRECTION OF
 PICTURE AND ROLL
 AND FRAME NUMBER

RL1
 F5



GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

FILE: RANG71

DATE: 1994

SITE 4 - Photo Log No. 7

Photo Grid Location/Orientation
 February 9, 1994

VANG BASE

192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia



Site 4 - UST No. 2 Removal. View to the Northwest.
(Photo Log No. 2; Roll No. 5/Frame No. 18)



Site 4 - UST No. 2 Removal. View to the West.
(Photo Log No. 2; Roll No. 5/Frame No. 17)



Site 4 - UST No. 1 & UST No. 2. View to the West.
(Photo Log No. 5; Roll No. 5/Frame No. 6)



Site 4 - UST No. 3. View to the Southwest.
(Photo Log No. 5; Roll No. 5/Frame No. 7)



Site 4 - UST No. 4 Removal. View to the North.
(Photo Log No. 7; Roll No. 6/Frame No. 1)



Site 4 - UST No. 4 Removal. View to the North.
(Photo Log No. 7; Roll No. 6/Frame No. 3)



Site 4 - UST No. 4 Removal. Delivery of Roll-off Containers
for Excavated Soil. View to the Northwest.
(Photo Log No. 6; Roll No. 5/Frame No. 5)



Site 4 - UST No. 4 Removal. Plastic Lined Roll-off Containers
Prior to Loading with Soil. View to the Northwest.
(Photo Log No. 6; Roll No. 5/Frame No. 4)



Site 4 - UST No. 4 Removal. View to the South.
(Photo Log No. 7; Roll No. 6/Frame No. 20)



Site 4 - UST No. 4 Removal. View to the South.
(Photo Log No. 7; Roll No. 6/Frame No. 23)

MSDS FOR TANK CLEANING FLUID



MATERIAL SAFETY DATA SHEET

MANUFACTURER----- BULTJE SALES AND SERVICE, INC.
Route 2 Box 141
Liberty, S.C. 29657
(803) 843-6278

MSDS PREPARED BY----- Winifred G. Palmer, Ph.D.
Biomedical Toxicology Associates
P.O. Box 3568
Frederick, MD 21701

PREPARATION DATE----- May 4, 1988

PRODUCT NAME----- SUPER CLEAN

PRODUCT DESCRIPTION----- An alkaline mixture containing detergents, phosphates,
butoxyethanol and water.

.. SECTION I - HAZARDOUS INGREDIENTS

<u>Ingredients</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>CAS NUMBER</u>
2-Butoxyethanol	25 ppm (skin)	50 ppm (skin)	111-76-2
Sodium hydroxide	2 mg/m ³ (ceiling)	2 mg/m ³	1310-73-2

. SECTION II - PHYSICAL DATA

pH-----	12.5 to 13	BOILING POINT-----	N/D
VAPOR PRESSURE-----	N/D	MELTING POINT-----	N/A
SOLUBILITY IN WATER-----	Complete	EVAP. RATE (Ether = 1)---	< 1
APPEARANCE AND ODOR-----	Clear purple liquid with mild odor.		

. SECTION III - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT----- None

FLAMMABLE LIMITS----- LFL--- N/A UFL--- N/A

EXTINGUISHING MEDIA----- This material is not flammable. Use extinguishers
suitable for surrounding fire, e.g., water fog, CO₂,
dry chemical, foam.

SPECIAL FIRE FIGHTING PROCEDURES--- Fire fighters should wear full protective
clothing and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS--- None known

. SECTION IV - REACTIVITY DATA

STABILITY----- Stable at ambient temperatures and pressures

CONDITIONS TO AVOID----- None known

INCOMPATIBILITY (Materials to avoid)--- Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS--- Thermal-oxidative degradation products include
carbon monoxide and carbon dioxide.

HAZARDOUS POLYMERIZATION-- Will not occur

. SECTION V - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY----- Inhalation, ingestion, skin and eye contact

N/D = Not determined

N/A = Not Applicable

SUPER CLEAN

HEALTH HAZARDS (ACUTE)

EYES-----

Contact can cause severe irritation and, with greater exposures, burns with possible blindness.

SKIN-----

Contact can irritate the skin. Prolonged contact can cause severe skin irritation or burns.

INHALATION-----

Exposure to mists can cause irritation and damage to mucous membranes and the respiratory passages.

Pneumonitis may occur.

INGESTION-----

Can cause irritation and burns of the digestive tract

SKIN ABSORPTION-----

Butoxyethanol is readily absorbed through the skin and may cause systemic effects such as headache, dizziness and nausea.

HEALTH HAZARDS (CHRONIC)---- Frequent and prolonged inhalation may cause lung damage

CARCINOGENICITY: NTP?--- No IARC Monographs?--- No OSHA Regulated?--- No

Components of this product are not known to cause cancer.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE---- Persons with impaired pulmonary function may be at increased risk from exposure.

SECTION VI - EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT---- Immediately rinse with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Obtain medical attention immediately.

SKIN CONTACT---- Remove contaminated clothing. Immediately flush contaminated skin with large quantities of water. Obtain medical attention if irritation persists. Launder contaminated clothing before re-use.

INHALATION---- Remove to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm and quiet. Obtain medical attention immediately.

INGESTION---- Obtain medical attention immediately. Do not induce vomiting.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED--- Absorb with sand, vermiculite, or other suitable inert absorbent. Transfer to secure containers for proper disposal. Do not flush to sewer.

WASTE DISPOSAL METHOD--- Neutralize with dilute acid. Landfill wastes at approved sites. Dispose in accordance with Federal, State, and Local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE--- Use with adequate ventilation; do not inhale mist or spray. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Do not smoke or eat when working with this material.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION---- NIOSH/MSHA approved respirator is necessary if TLV is exceeded or if mists or sprays are generated which are not fully controlled by ventilation.

VENTILATION----- Provide sufficient ventilation (general and/or local exhaust) to maintain exposure below the TLV

PROTECTIVE GLOVES- Required

EYE PROTECTION---- Safety glasses with side shields or chemical safety goggles

SKIN PROTECTION--- Chemical resistant apron. Impervious clothing.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT--- Safety shower and eye wash station.

.....
This information is provided as a customer service and to the best of our knowledge is current and accurate. It is the user's obligation to determine the conditions of use of the product.

ANALYTICAL RESULTS OF TANK NO. 4 CONTENTS

SOLUTIONS LABORATORIES, INC.

214-B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

REPORT OF ANALYSIS

DATE: JANUARY 14, 1994

RICHMOND ENVIRONMENTAL
1643-A MERRIMAC TRAIL
WILLIAMSBURG, VA 23185
ATTN: JOHN KARAFIA
PHONE #: 1-220-1607
FAX #: 1-229-4683

PROJECT NAME: TANK REMOVAL
PROJECT NUMBER: VA ANG BASE-SANDSTON, VA

SOLUTIONS LOG: 01101994-002-01
MATRIX: LIQUID
DATE/TIME SAMPLED: 01/10/94; 1130

<u>SOL LOG #</u>	<u>FIELD ID</u>	<u>ANALYSIS</u>	<u>RESULTS</u>	<u>UNITS</u>	<u>D.F.</u>	<u>DET LT.</u>	<u>METHOD/DATE/TIME/ANALYST</u>
01A1 (A)	RE4-2	TPH 418.1	207	mg/L	2.5	5.45	418.1/01-13-94/1300/LP
01A1 (A)	RE4-2	TOX	1.28	mg/L	5	0.5	9020/01-13-94/1000/LP
01A1 (HA)	RE4-2	TPH 418.1	102100	mg/L	1040	2270	418.1/01-13-94/1300/LP
01A1 (HA)	RE4-2	TOX	11.8	mg/L	5	0.5	9020/01-13-94/1000/LP

SOLUTIONS LABORATORIES, INC.

B14-B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

REPORT OF ANALYSIS

DATE: JANUARY 14, 1994

RICHMOND ENVIRONMENTAL
1643-A MERRIMAC TRAIL
WILLIAMSBURG, VA 23185
ATTN: JOHN KARAFI
PHONE #: 1-220-1607
FAX #: 1-229-4683

PROJECT NAME: TANK REMOVAL
PROJECT NUMBER: VA ANG BASE-SANDSTON, VA

SOLUTIONS LOG: 01101994-002-01
MATRIX: LIQUID
DATE/TIME SAMPLED: 01/10/94; 1130

METHOD 8080-PCB

CLIENT NO:	RE4-2 (A)	RE4-2 (NA)	MDL*
LAB NO:	01A1	01A1	N/A
SAMPLE DATE:	01/10/94	01/10/94	N/A
RECEIVED DATE:	01/10/94	01/10/94	N/A
EXTRACTION DATE:	01/12/94	01/12/94	N/A
ANALYSIS DATE:	01/13/94	01/13/94	N/A
INSTRUMENT ID:	HP ECD	HP ECD	HP ECD
DILUTION FACTOR:	0.02	20	1
UNITS:	mg/L	mg/Kg	mg/L

COMPOUNDS

ALL AROCLORS	< 0.02	< 10	7.5
--------------	--------	------	-----

*MDL IS THE METHOD DETECTION LIMIT. THE MDL IS USED TO DETERMINE THE PRACTICAL QUANTITATIVE LIMIT FOR EACH MATRIX TYPE. THE MATRIX FACTOR IS TABLED ON PAGE 8080-3 OF SW-846.

REVIEWED BY:

Dorothy S. Small, Jr.
DOROTHY S. SMALL

SOLUTIONS LABORATORIES, INC.

414-B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

REPORT OF ANALYSIS

DATE: JANUARY 13, 1994

RICKMOND ENVIRONMENTAL
1643-A MERRIMAC TRAIL
WILLIAMSBURG, VA 23185
ATTN: JOHN KARAFI
PHONE #: 1-220-1607
FAX #: 1-229-4683

PROJECT NAME: UST REMOVAL
PROJECT NUMBER: VA ANG BASE-SANDSTON, VA

SOLUTIONS LOG: 01071994-005-01
MATRIX: LIQUID
DATE/TIME SAMPLED: 01/07/94; 1600

<u>SOL LOC #</u>	<u>FIELD ID</u>	<u>ANALYSIS</u>	<u>RESULTS</u>	<u>UNITS</u>	<u>D.F.</u>	<u>DET LT.</u>	<u>METHOD/DATE/TIME/ANALYST</u>
01A1 (A)	RE43-1	TCLP ARSENIC	0.276	mg/L	10	0.002	1311/7060/01-13-94/1000/ LP
01A1 (A)	RE43-1	TCLP BARIUM	<1.50	mg/L	10	0.150	1311/7080/01-13-94/1100/ LP
01A1 (A)	RE43-1	TCLP CADMIUM	7.1	mg/L	10	0.010	1311/7130/01-12-94/1730/DMF
01A1 (A)	RE43-1	TCLP CHROMIUM	12.5	mg/L	10	0.033	1311/7190/01-12-94/1800/DMF
01A1 (A)	RE43-1	TCLP LEAD	64.4	mg/L	10	0.099	1311/7420/01-12-94/1700/DMF
01A1 (A)	RE43-1	TCLP MERCURY	0.0125	mg/L	1	0.0002	1311/7470/01-13-94/1700/MRG
01A1 (A)	RE43-1	TCLP SELENIUM	5.41	mg/L	10	0.002	1311/7740/01-13-94/0900/ LP
01A1 (A)	RE43-1	TCLP SILVER	0.50	mg/L	1	0.016	1311/7760/01-12-94/1830/DMF
01A1 (A)	RE43-1	REACTIVITY	NEG.	N/A	N/A	N/A	SW846.CH7.3/01-10-94/2300/ LP
01A1 (A)	RE43-1	IGNITABILITY	>100oC	N/A	N/A	N/A	SW846.CH7.7.1/01-10-94/1710/MRG
01A1 (A)	RE43-1	CORROSIVITY	3.22	N/A	N/A	N/A	S2846.1110/01-10-94/1700/MRG
01A1 (NA)	RE43-1	TCLP ARSENIC	3.67	mg/L	10	0.002	1311/7060/01-13-94/1000/ LP
01A1 (NA)	RE43-1	TCLP BARIUM	15.0	mg/L	10	0.150	1311/7080/01-13-94/1100/ LP
01A1 (NA)	RE43-1	TCLP CADMIUM	0.93	mg/L	10	0.010	1311/7130/01-12-94/1730/DMF
01A1 (NA)	RE43-1	TCLP CHROMIUM	8.00	mg/L	10	0.033	1311/7190/01-12-94/1800/DMF
01A1 (NA)	RE43-1	TCLP LEAD	24.0	mg/L	10	0.099	1311/7420/01-12-94/1700/DMF
01A1 (NA)	RE43-1	TCLP MERCURY	0.0075	mg/L	10	0.0002	1311/7470/01-13-94/1700/MRG
01A1 (NA)	RE43-1	TCLP SELENIUM	4.73	mg/L	10	0.002	1311/7740/01-13-94/0900/ LP
01A1 (NA)	RE43-1	TCLP SILVER	2.42	mg/L	10	0.016	1311/7760/01-12-94/1830/DMF
01A1 (NA)	RE43-1	REACTIVITY	NEG	N/A	N/A	N/A	SW846.CH7.3/01-10-94/2300/ LP
01A1 (NA)	RE43-1	IGNITABILITY	<100oC	N/A	N/A	N/A	SW846.CH7.7.1/01-10-94/1710/MRG
01A1 (NA)	RE43-1	CORROSIVITY	3.37	N/A	N/A	N/A	S2846.1110/01-10-94/1715/MRG

SOLUTIONS LABORATORIES, INC.

814-B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

REPORT OF ANALYSIS

DATE: JANUARY 13, 1994

RICKMOND ENVIRONMENTAL
1643-A MERRIMAC TRAIL
WILLIAMSBURG, VA 23185
ATTN: JOHN KARAFI
PHONE #: 1-220-1607
FAX #: 1-229-4683

PROJECT NAME: UST REMOVAL
PROJECT NUMBER: VA ANG BASE-SANDSTON, VA

SOLUTIONS LOG: 01071994-005-01
MATRIX: LIQUID
DATE/TIME SAMPLED: 01/07/94; 1600

METHOD 8240

CLIENT NO:	RE43-1	RE43-1	MDL*
LAB NO:	01A1 (A)	01A1 (NA)	N/A
SAMPLE DATE:	01/07/94	01/07/94	N/A
RECEIVED DATE:	01/07/94	01/07/94	N/A
EXTRACTION DATE:	N/A	N/A	N/A
ANALYSIS DATE:	01/12/94	01/13/94	N/A
INSTRUMENT ID:	MS	MS	MS
DILUTION FACTOR:	1	1	1
UNITS:	ug/L	ug/Kg	ug/L

COMPOUNDS

ACETONE	220000	<500	500
BENZENE	6300	47000	250
BROMODICHLOROMETHANE	<250	<250	250
BROMOFORM	<250	<250	250
BROMOMETHANE	<250	<250	250
2-BUTANONE	18000	<250	250
CARBON DISULFIDE	<250	<12500	12500
CARBON TETRACHLORIDE	<250	<250	250
CHLOROBENZENE	<250	<250	250
CHLOROETHANE	<250	<250	250
2-CHLOROETHYL VINYLETHER	<250	<250	250
CHLOROFORM	<250	<250	250
CHLOROMETHANE	<250	<250	250
DIBROMOCHLOROMETHANE	<250	<250	250
1,2-DICHLOROETHANE	<250	<250	250
1,1-DICHLOROETHANE	<250	<250	250
1,1-DICHLOROETHENE	<250	<250	250
TRANS-1,2-DICHLOROTHENE	<250	<250	250
1,2-DICHLOROPROPANE	<250	<250	250
TRANS-1,3-DICHLOROPROPENE	<250	<250	250
CIS-1,3-DICHLOROPROPENE	<250	<250	250
ETHYLBENZENE	4000	<250	250
2-HEXANONE	<250	150000	250
4-METHYL-2-PENTANONE	<250	<250	250
METHYLENE CHLORIDE	<250	<250	6250
STYRENE	<250	<250	250
1,1,2,2-TETRACHLOROETHANE	<250	<250	250
TETRACHLOROETHENE	<250	<250	250
TOLUENE	14000	<250	250
1,1,1-TRICHLOROETHANE	<250	440000	500
1,1,2-TRICHLOROETHANE	<250	<250	250
TRICHLOROETHENE	490	<250	250
VINYL ACETATE	<6250	21000	250
VINYL CHLORIDE	<250	<6250	6250
XYLENE (TOTAL)	19000	<250	250
		730000	250

814-B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

REPORT OF ANALYSIS

DATE: JANUARY 13, 1994

RICKMOND ENVIRONMENTAL
1643-A MERRIMAC TRAIL
WILLIAMSBURG, VA 23185
ATTN: JOHN KARAFIA
PHONE #: 1-220-1607
FAX #: 1-229-4683

PROJECT NAME: UST REMOVAL
PROJECT NUMBER: VA ANG BASE-SANDSTON, VA

SOLUTIONS LOG: 01071994-005-01
MATRIX: LIQUID
DATE/TIME SAMPLED: 01/07/94; 1600

METHOD BTEX 8020

CLIENT NO:	RE43-1	RE43-1	MDL*
LAB NO:	01A1 (A)	01A1 (NA)	N/A
SAMPLE DATE:	01/07/94	01/07/94	N/A
RECEIVED DATE:	01/07/94	01/07/94	N/A
EXTRACTION DATE:	N/A	N/A	N/A
ANALYSIS DATE:	01/12/94	01/12/94	N/A
INSTRUMENT ID:	HP/P&T	HP/P&T	HP/P&T
DILUTION FACTOR:	2000	500000	1
UNITS:	mg/L	mg/L	mg/L

COMPOUNDS

BENZENE	5.77	1480	0.2
TOLUENE	15.2	11400	0.2
ETHYL BENZENE	1.40	4390	0.2
TOTAL XYLENES	8.51	21600	0.4

*MDL IS THE METHOD DETECTION LIMIT.

REVIEWED BY:

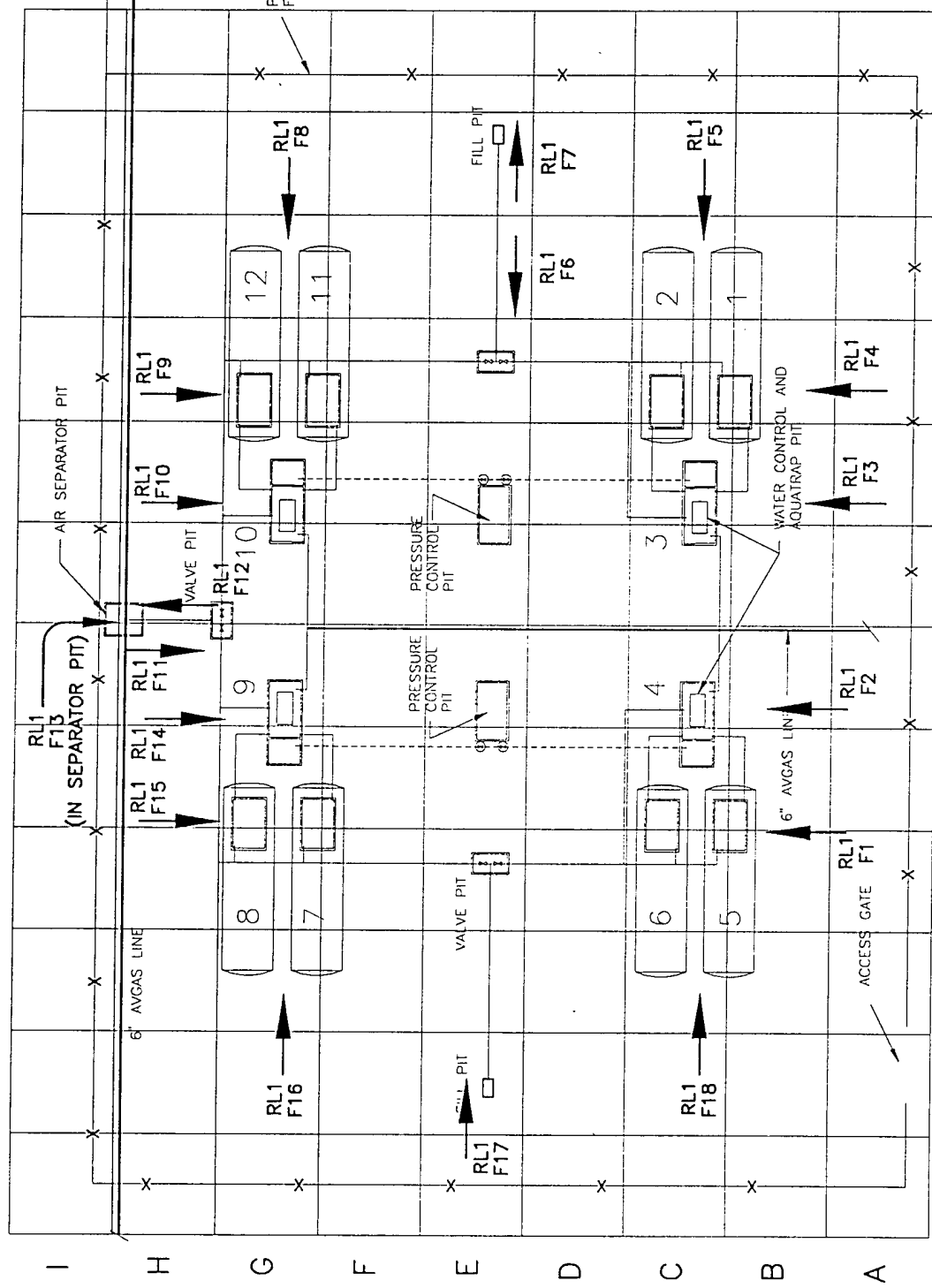
Dorothy S. Small
DOROTHY S. SMALL

**SELECTED PHOTOGRAPHS OF SITE 5
CLOSURE ACTIVITIES**

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME		SUBJECT/DESCRIPTION
				No.	NEGATIVE No.	
5	1	93/12/14	1	1	2/2A	UST No. 5/6 CONCRETE MANWAY; BEFORE/DURING GRUBBING; VIEW TO THE NE.
5	1	93/12/14	1	2	3/3A	UST No. 4 CONCRETE MANWAY; BEFORE/DURING GRUBBING; VIEW TO THE NE.
5	1	93/12/14	1	3	4/4A	UST No. 3 CONCRETE MANWAY; BEFORE/DURING GRUBBING; VIEW TO THE NE.
5	1	93/12/14	1	4	5/5A	UST No. 1/2 CONCRETE MANWAY; BEFORE/DURING GRUBBING; VIEW TO THE NE.
5	1	93/12/14	1	5	6/6A	UST No. 1/2 CONCRETE MANWAY; BEFORE/DURING GRUBBING; VIEW TO THE NW.
5	1	93/12/14	1	6	7/7A	CONCRETE VALVE PIT/PRESSURE CONTROL PIT; BEFORE/DURING GRUBBING; VIEW TO THE NW.
5	1	93/12/14	1	7	8/8A	CONCRETE FILL PIT; BEFORE/DURING GRUBBING; VIEW TO THE SE.
5	1	93/12/14	1	8	9/9A	UST No. 11/12 CONCRETE MANWAY; BEFORE/DURING GRUBBING; VIEW TO THE NW.
5	1	93/12/14	1	9	10/10A	UST No. 11/12 CONCRETE MANWAY; BEFORE/DURING GRUBBING; VIEW TO THE SW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 5 - 25,000 GAL
- UST NO. 6 - 25,000 GAL
- UST NO. 7 - 25,000 GAL
- UST NO. 8 - 25,000 GAL
- UST NO. 11 - 25,000 GAL
- UST NO. 12 - 25,000 GAL
- UST NO. 3 - 600 GAL
- UST NO. 4 - 600 GAL
- UST NO. 9 - 600 GAL
- UST NO. 10 - 600 GAL

LEGEND:

- ▲ DIRECTION OF PICTURE AND ROLL
- RL1 F5 AND FRAME NUMBER

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.		SITE 5 – Photo Log No. 1 Photo Grid Location/Orientation December 14, 1993	VANG BASE 192nd Tactical Fighter Group Richmond International Airport Sandston, Virginia
FILE: RANG53	DATE: 1994		

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME		SUBJECT/DESCRIPTION
				No.	Negative No.	
5	2	93/12/16	1	19	20/20A	UST No. 5/6 CONCRETE MANWAY; AFTER GRUBBING; COMPARE w/PL 1, R1/F1; VIEW TO THE NE.
5	2	93/12/16	1	20	21/21A	UST No. 3 CONCRETE MANWAY; AFTER GRUBBING; COMPARE w/PL 1, R1/F3; VIEW TO THE NE.
5	2	93/12/16	1	21	22/22A	UST No. 1/2 CONCRETE MANWAY; AFTER GRUBBING; COMPARE w/PL 1, R1/F5; VIEW TO THE NW.
5	2	93/12/16	1	22	23/23A	CONCRETE VALVE PIT/PRESSURE CONTROL PIT; COMPARE w/PL 1, R1/F6; VIEW TO THE NW.
5	2	93/12/16	1	23	24/24A	UST No. 11/12 CONCRETE MANWAY; UNCOVERING UST No. 12; COMPARE w/PL 1, R1/F8; VIEW TO THE NW.
5	2	93/12/16	1	24	25/25A	EXCAVATION TRENCH FOR REMOVAL OF PRINCIPAL 6 inch PIPELINE; VIEW TO THE NW.
5	2	93/12/16	1	25	26/26A	FROM WITHIN THE TRENCH; VIEW TO THE NW.
5	2	93/12/16	1	26	27/27A	AIR SEPARATOR PIT w/SIDE WALLS DESTROYED; VIEW TO THE NW.
5	2	93/12/16	1	27	28/28A	EXCAVATION TRENCH FOR REMOVAL OF PRINCIPAL 6 inch PIPELINE; VIEW TO THE NW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.

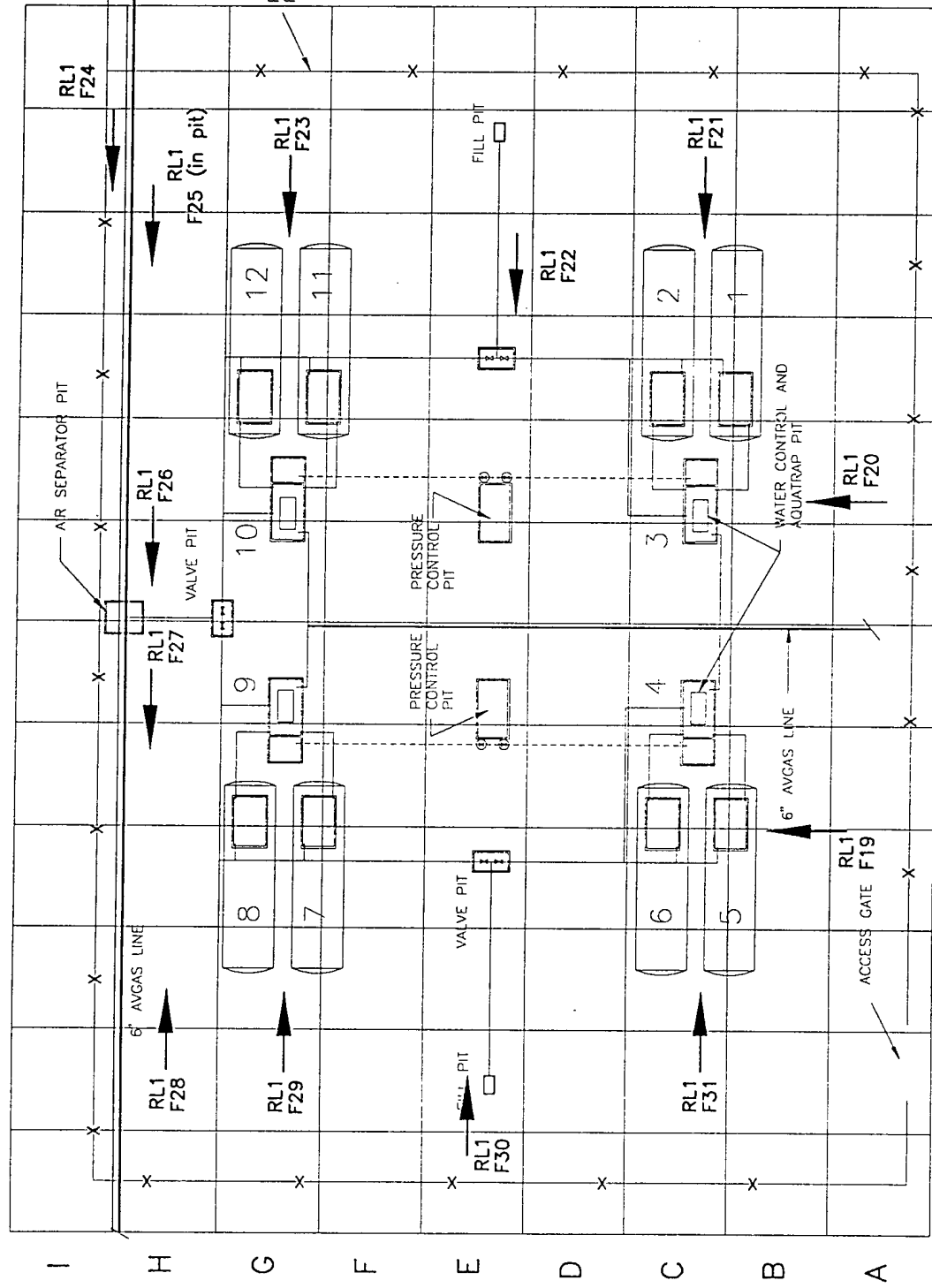
PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SUBJECT/DESCRIPTION

SITE PHOTO DATE ROLL FRAME NEGATIVE
LOG No. No. No. No.

5	2	93/12/16	1	28	29/29A	EXCAVATION TRENCH FOR REMOVAL OF PRINCIPAL 6 INCH PIPELINE. VIEW TO THE SE.
5	2	93/12/16	1	29	30/30A	UST No. 7/8 CONCRETE MANWAY, AFTER GRUBBING. VIEW TO THE SE.
5	2	93/12/16	1	30	31/31A	CONCRETE FILL PIT/VALVE PIT, AFTER GRUBBING. COMPARE W/PL 1, R1/F17, VIEW TO THE SE.
5	2	93/12/16	1	31	32/32A	UST No. 5/6 CONCRETE MANWAY, AFTER GRUBBING. VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 5 - 25,000 GAL
- UST NO. 6 - 25,000 GAL
- UST NO. 7 - 25,000 GAL
- UST NO. 8 - 25,000 GAL
- UST NO. 11 - 25,000 GAL
- UST NO. 12 - 25,000 GAL

- UST NO. 3 - 600 GAL
- UST NO. 4 - 600 GAL
- UST NO. 9 - 600 GAL
- UST NO. 10 - 600 GAL

LEGEND:



DIRECTION OF
PICTURE AND ROLL
RL1
F5
AND FRAME NUMBER

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

FILE: RANG54

DATE: 1994

SITE 5 - Photo Log No. 2

Photo Grid Location/Orientation
December 16, 1993

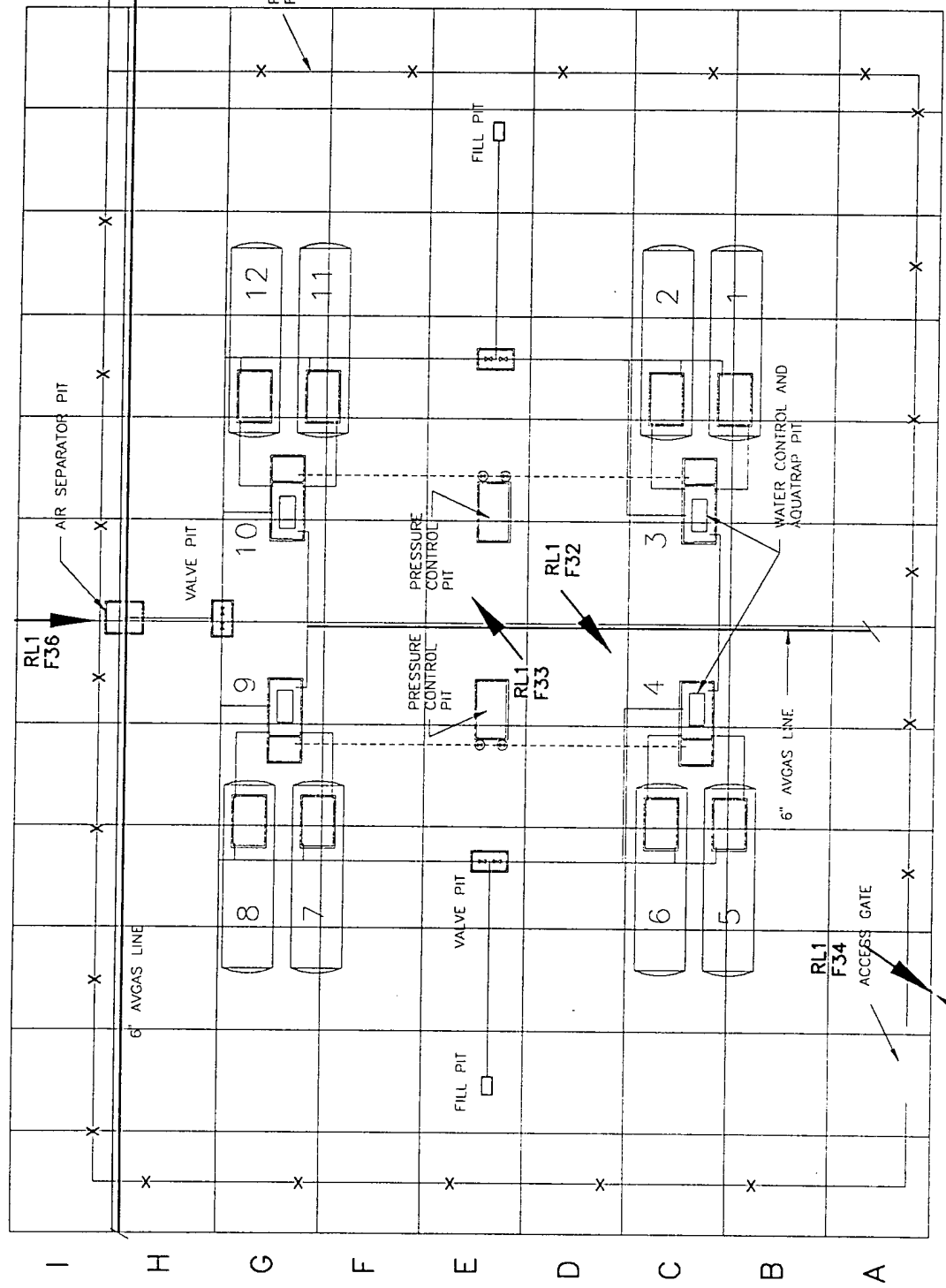
VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME		NEGATIVE No.	SUBJECT/DESCRIPTION
				No.	No.		
5	3	93/12/18	1	32	33/33A		VIEW TO WEST -- ACCESS ROAD COMING INTO POL; INITIAL PUMPING OPERATIONS RELATED TO UST No. 12.
5	3	93/12/18	1	33	34/34A		VIEW TO THE EAST -- ACROSS POL FOR PUMPING FROM UST No. 12.
5	3	93/12/18	1	34	35/35A		VIEW TO THE WEST -- ACCESS ROAD AND TANKER BEING LOADED.
5	3	93/12/18	1	35	36/36A		VIEW TO THE EAST OF GRUBBED POL AND LINES FOR PUMPING.
5	3	93/12/18	1	36	E		AIR SEPARATOR PIT AND GRUBBED SITE; VIEW TO THE SW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 5 - 25,000 GAL
- UST NO. 6 - 25,000 GAL
- UST NO. 7 - 25,000 GAL
- UST NO. 8 - 25,000 GAL
- UST NO. 11 - 25,000 GAL
- UST NO. 12 - 25,000 GAL

- UST NO. 3 - 600 GAL
- UST NO. 4 - 600 GAL
- UST NO. 9 - 600 GAL
- UST NO. 10 - 600 GAL

LEGEND:



DIRECTION OF
PICTURE AND ROLL
RL1
F5

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

FILE: RANG55

DATE: 1994

SITE 5 - Photo Log No. 3

Photo Grid Location/Orientation
December 18, 1993

VANG BASE

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME		NEGATIVE No.	SUBJECT/DESCRIPTION
				No.	No.		
5	4	94/01/06	2	3	4		4-600 gallon AQUATRAP TANKS/UST Nos. 3, 4, 9, 10; TEMPORARY STORAGE IN NW CORNER OF POL; VIEW TO THE WEST.
5	4	94/01/06	2	4	5		4-600 gallon AQUATRAP TANKS/UST Nos. 3, 4, 9, 10; TEMPORARY STORAGE IN NW CORNER OF POL; VIEW TO THE EAST.
5	4	94/01/06	2	5	6		4-600 gallon AQUATRAP TANKS/UST Nos. 3, 4, 9, 10; TEMPORARY STORAGE IN NW CORNER OF POL; VIEW TO THE NORTH.
5	4	94/01/06	2	6	7		EXCAVATING UST No. 11/12; VIEW TO THE NW.
5	4	94/01/06	2	7	8		EXCAVATING UST No. 11/12; VIEW TO THE NW.
5	4	94/01/06	2	8	9		EXCAVATING UST No. 11/12; VIEW TO THE NW.
5	4	94/01/06	2	9	10		EXCAVATING UST No. 11/12; VIEW TO THE NW.
5	4	94/01/06	2	10	11		EXCAVATING UST No. 11/12; VIEW TO THE SE.
5	4	94/01/06	2	11	12		EXCAVATING UST No. 11/12; VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	4	94/01/06	2	12	13	EXCAVATING UST No. 11/12; VIEW TO THE NW.
5	4	94/01/06	2	13	14	EXCAVATING UST No. 11/12; VIEW TO THE NW.
5	4	94/01/06	2	14	15	REMOVAL OF AIR SEPARATOR PIT EQUIPMENT; VIEW TO THE SE.
5	4	94/01/06	2	15	16	REMOVAL OF AIR SEPARATOR PIT EQUIPMENT; VIEW TO THE SE.
5	4	94/01/06	2	16	17	REMOVAL OF UST No. 12; VIEW TO THE NW.
5	4	94/01/06	2	17	18	REMOVAL OF UST No. 12; NOTE MINIMAL WATER IN PIT BOTTOM; VIEW TO THE NW.
5	4	94/01/06	2	18	19	REMOVAL OF UST No. 12; VIEW TO THE NW.
5	4	94/01/06	2	19	20	REMOVAL OF UST No. 12; VIEW TO THE NW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	5	94/01/07	2	20	21	UST No. 12 IN TEMPORARY STORAGE AREA; 600 gallon UST IN FOREGROUND; VIEW TO THE NE.
5	5	94/01/07	2	21	22	UST No. 12 IN TEMPORARY STORAGE AREA; VIEW TO THE NW
5	5	94/01/07	2	22	23	REMOVAL OF UST No. 11; VIEW TO THE NW.
5	5	94/01/07	2	23	24	REMOVAL OF UST No. 11; VIEW TO THE NW.
5	5	94/01/07	2	24	25	REMOVAL OF UST No. 11; VIEW TO THE NW
5	5	94/01/07	2	25	26	REMOVAL OF UST No. 11; VIEW TO THE NW.
5	5	94/01/07	2	26	27	REMOVAL OF UST No. 11; VIEW TO THE SW.
5	5	94/01/07	2	27	28	REMOVAL OF UST No. 11; VIEW TO THE SE
5	5	94/01/07	2	28	29	REMOVAL OF UST No. 11; VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

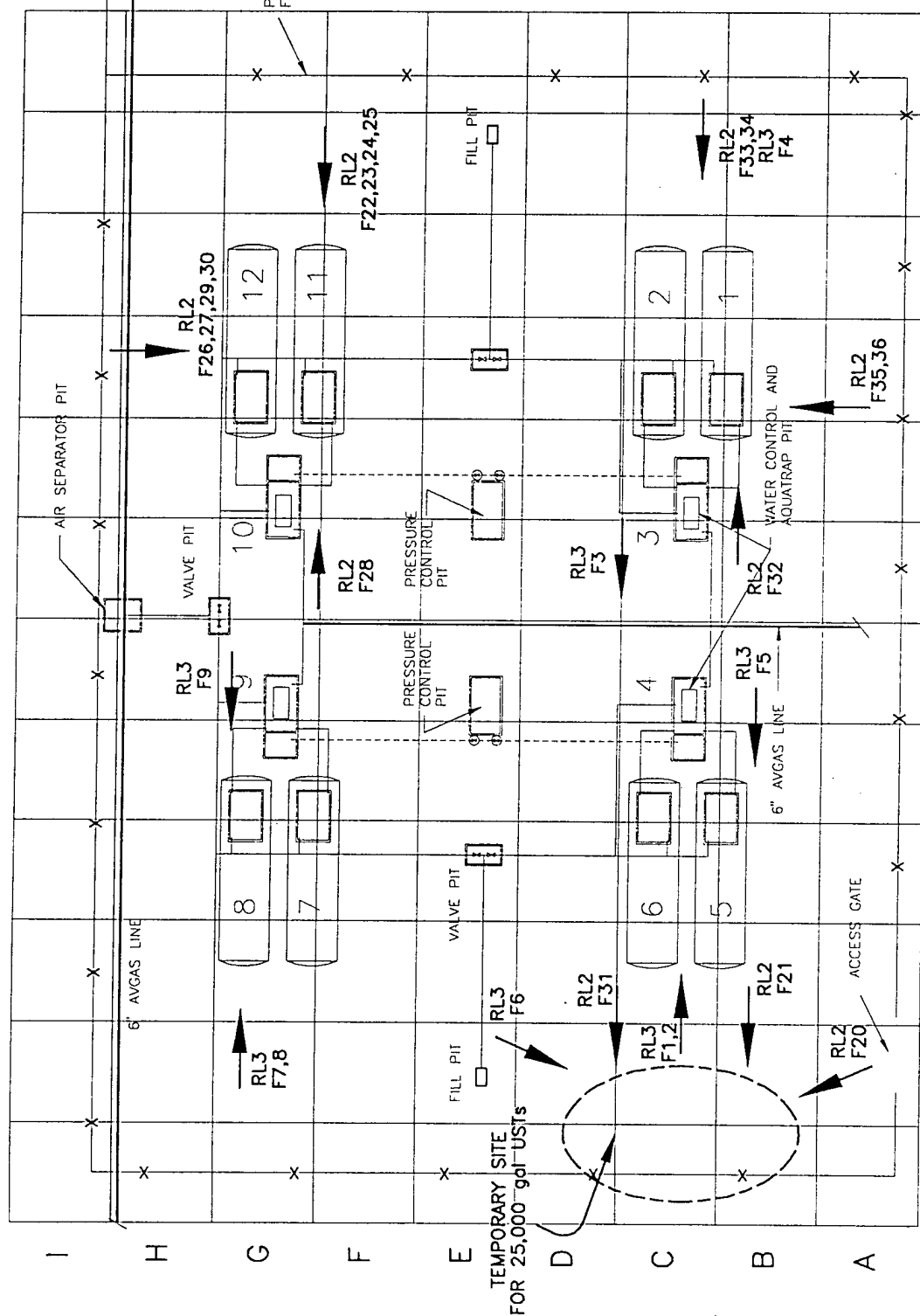
SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	5	94/01/07	2	29	30	REMOVAL OF UST No. 11; VIEW TO THE SW.
5	5	94/01/07	2	30	31	REMOVAL OF UST No. 11; VIEW TO THE SW.
5	5	94/01/07	2	31	32	UST Nos. 11 & 12 IN TEMPORARY STORAGE; VIEW TO THE NW.
5	5	94/01/07	2	32	33	EXCAVATION OF UST No. 1; VIEW TO SE.
5	5	94/01/07	2	33	34	EXCAVATION OF UST No. 1; VIEW TO NW.
5	5	94/01/07	2	34	35	EXCAVATION OF UST No. 1; VIEW TO NW.
5	5	94/01/07	2	35	36	EXCAVATION OF UST No. 1; VIEW TO NE.
5	5	94/01/07	2	36	END	EXCAVATION OF UST No. 1; VIEW TO NE.
5	5	94/01/07	3	1	2	UST No. 1 REMOVAL; VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	5	94/01/07	3	2	3	UST No. 1 REMOVAL; VIEW TO THE SE.
5	5	94/01/07	3	3	4	UST No. 1 BEING TOWED TO TEMPORARY STORAGE;
5	5	94/01/07	3	4	5	VIEW INTO PIT CREATED BY UST No. 1 REMOVAL; NOTE LACK OF PIT FLUIDS; VIEW TO THE NW.
5	5	94/01/07	3	5	6	UST TEMPORARY STORAGE; VIEW TO THE NW.
5	5	94/01/07	3	6	7	UST TEMPORARY STORAGE; VIEW TO THE W.
5	5	94/01/07	3	7	8	EXCAVATION OF UST No. 8; VIEW TO THE SE.
5	5	94/01/07	3	8	9	EXCAVATION OF UST No. 8; VIEW TO THE SE.
5	5	94/01/07	3	9	10	EXCAVATION OF UST No. 8; VIEW TO THE NW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



UST CAPACITY:

UST NO. 1 - 25,000 GAL
UST NO. 2 - 25,000 GAL
UST NO. 5 - 25,000 GAL
UST NO. 6 - 25,000 GAL
UST NO. 7 - 25,000 GAL
UST NO. 8 - 25,000 GAL
UST NO. 11 - 25,000 GAL
UST NO. 12 - 25,000 GAL

UST NO. 3 - 600 GAL
UST NO. 4 - 600 GAL
UST NO. 9 - 600 GAL
UST NO. 10 - 600 GAL

LEGEND:

▲ DIRECTION OF
PICTURE AND ROLL
AND FRAME NUMBER
RL1
F5

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

SITE 5 - Photo Log No. 5

VANG BASE

FILE: RANG57

Photo Grid Location/Orientation
January 07, 1994

192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

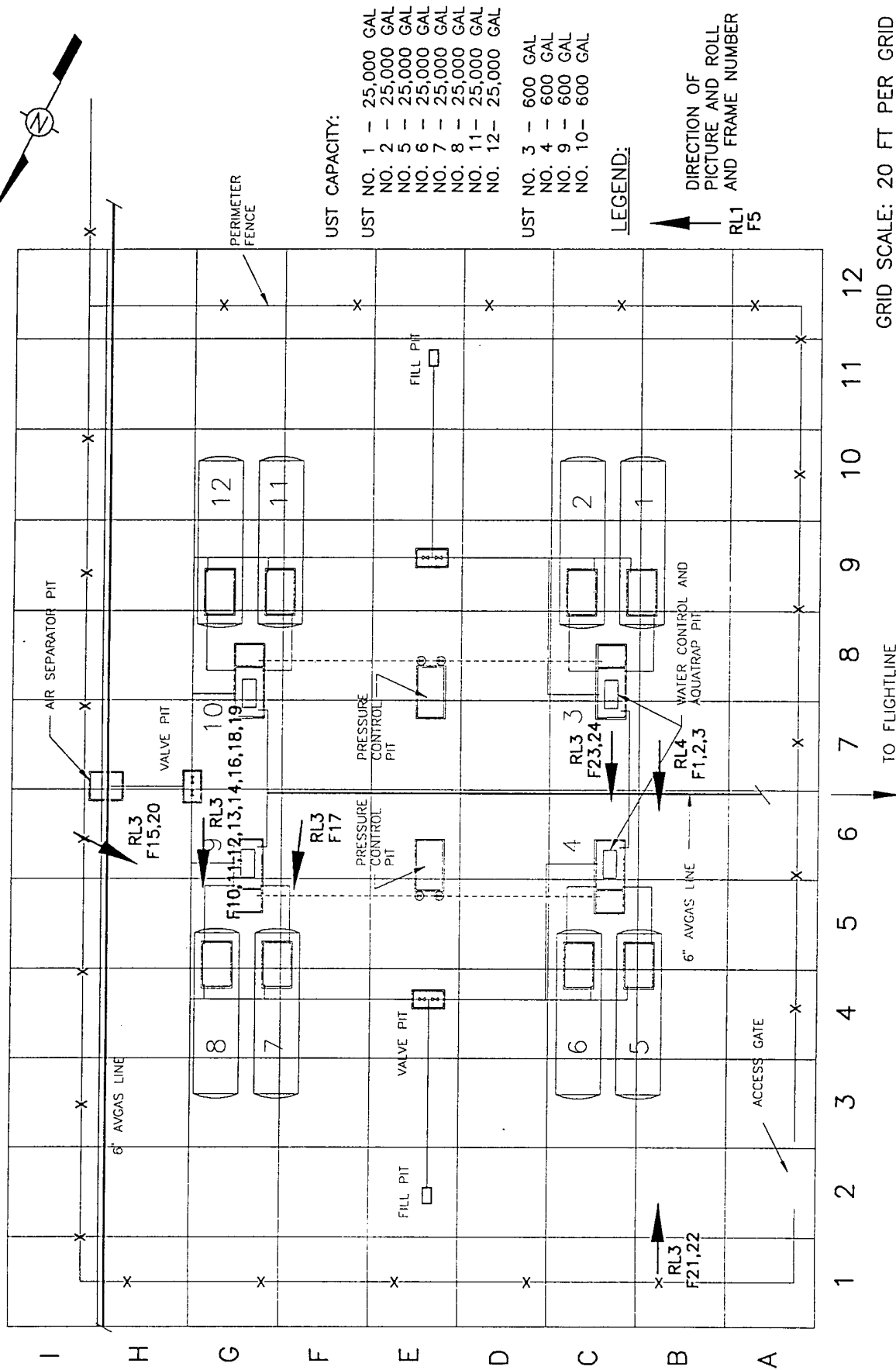
SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	6	94/01/08	3	10	11	EXCAVATION OF UST No. 8; VIEW TO THE NW.
5	6	94/01/08	3	11	12	REMOVAL OF UST No. 8; VIEW TO THE NW.
5	6	94/01/08	3	12	13	REMOVAL OF UST No. 8; VIEW TO THE NW.
5	6	94/01/08	3	13	14	REMOVAL OF UST No. 8; VIEW TO THE NW.
5	6	94/01/08	3	14	15	REMOVAL OF UST No. 8; VIEW TO THE NW.
5	6	94/01/08	3	15	16	USTs IN TEMPORARY STORAGE; VIEW TO THE W.
5	6	94/01/08	3	16	17	EXCAVATION OF UST No. 7; VIEW TO THE NW.
5	6	94/01/08	3	17	18	REMOVAL OF UST No. 7; VIEW TO THE NW.
5	6	94/01/08	3	18	19	REMOVAL OF UST No. 7; VIEW TO THE NW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	6	94/01/08	3	19	20	REMOVAL OF UST No. 7; VIEW TO THE NW.
5	6	94/01/08	3	20	21	USTs IN TEMPORARY STORAGE; VIEW TO THE W.
5	6	94/01/08	3	21	22	EXCAVATION OF UST No. 5; VIEW TO THE SE.
5	6	94/01/08	3	22	23	EXCAVATION OF UST No. 5; VIEW TO THE SE.
5	6	94/01/08	3	23	24	EXCAVATION OF UST No. 5; VIEW TO THE NW.
5	6	94/01/08	3	24	END	EXCAVATION OF UST No. 5; VIEW TO THE NW.
5	6	94/01/08	4	1	2	REMOVAL OF UST No. 5; VIEW TO THE NW
5	6	94/01/08	4	2	3	REMOVAL OF UST No. 5; VIEW TO THE NW
5	6	94/01/08	4	3	4	REMOVAL OF UST No. 5; VIEW TO THE NW

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.



UST CAPACITY:

UST NO. 1 - 25,000 GAL
 UST NO. 2 - 25,000 GAL
 UST NO. 5 - 25,000 GAL
 UST NO. 6 - 25,000 GAL
 UST NO. 7 - 25,000 GAL
 UST NO. 8 - 25,000 GAL
 UST NO. 11 - 25,000 GAL
 UST NO. 12 - 25,000 GAL

UST NO. 3 - 600 GAL
 UST NO. 4 - 600 GAL
 UST NO. 9 - 600 GAL
 UST NO. 10 - 600 GAL

LEGEND:



DIRECTION OF
 PICTURE AND ROLL
 AND FRAME NUMBER

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

FILE: RANG58

DATE: 1994

SITE 5 - Photo Log No. 6
 Photo Grid Location/Orientation
 January 08, 1994

VANG BASE
 192nd Tactical Fighter Group
 Richmond International Airport
 Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	7	94/01/11	4	4	5	BACKFILL OPERATIONS, UST No. 7/8, VIEW TO THE NW;
5	7	94/01/11	4	5	6	DESTRUCTION OF AQUATRAP PIT FOR UST No. 10 VIEW TO THE E.
5	7	94/01/11	4	6	7	VIEW DOWN INTO AQUATRAP PIT FOR UST No. 4;
5	7	94/01/11	4	7	8	VIEW DOWN INTO AQUATRAP PIT FOR UST No. 4;
5	7	94/01/11	4	8	9	DESTRUCTION OF AQUATRAP PIT FOR UST No. 4; VIEW TO THE E.
5	7	94/01/11	4	9	10	VIEW FROM ACCESS ROAD INTO POL AREA; VIEW TO THE E.
5	7	94/01/11	4	10	11	EXCAVATED PIT FROM REMOVAL OF UST Nos. 11/12; VIEW TO THE NW.

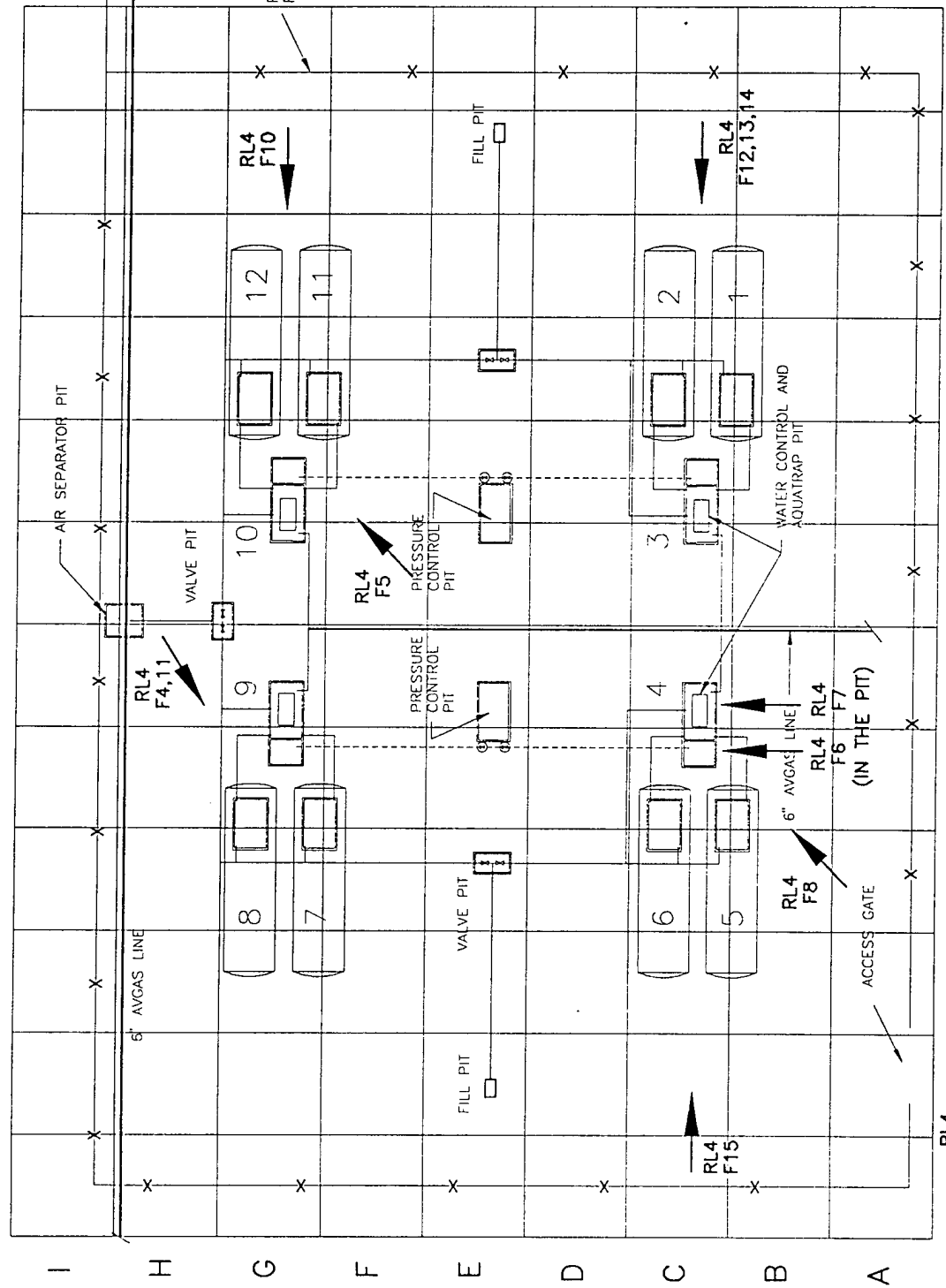
5 7 94/01/11 4 11 12 BACKFILL OPERATIONS, UST No. 7/8, VIEW TO THE NW;

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	7	94/01/11	4	12	13	EXCAVATED PIT FROM REMOVAL OF UST No. 1; VIEW TO THE NW.
5	7	94/01/11	4	13	14	EXCAVATED PIT FROM REMOVAL OF UST No. 1; VIEW TO THE NW.
5	7	94/01/11	4	14	15	EXCAVATED PIT FROM REMOVAL OF UST No. 1; VIEW TO THE NW.
5	7	94/01/11	4	15	16	EXCAVATED PIT FROM REMOVAL OF UST No. 5; VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 5 - 25,000 GAL
- UST NO. 6 - 25,000 GAL
- UST NO. 7 - 25,000 GAL
- UST NO. 8 - 25,000 GAL
- UST NO. 11 - 25,000 GAL
- UST NO. 12 - 25,000 GAL

LEGEND:

- UST NO. 3 - 600 GAL
- UST NO. 4 - 600 GAL
- UST NO. 9 - 600 GAL
- UST NO. 10 - 600 GAL



DIRECTION OF
PICTURE AND ROLL
AND FRAME NUMBER

RL4 F9/2
RL4 F10
RL4 F5
RL4 F4,11
RL4 F12,13,14
RL4 F8
RL4 F6, F7 (IN THE PIT)
RL4 F15

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

SITE 5 - Photo Log No. 7

FILE: RANG59

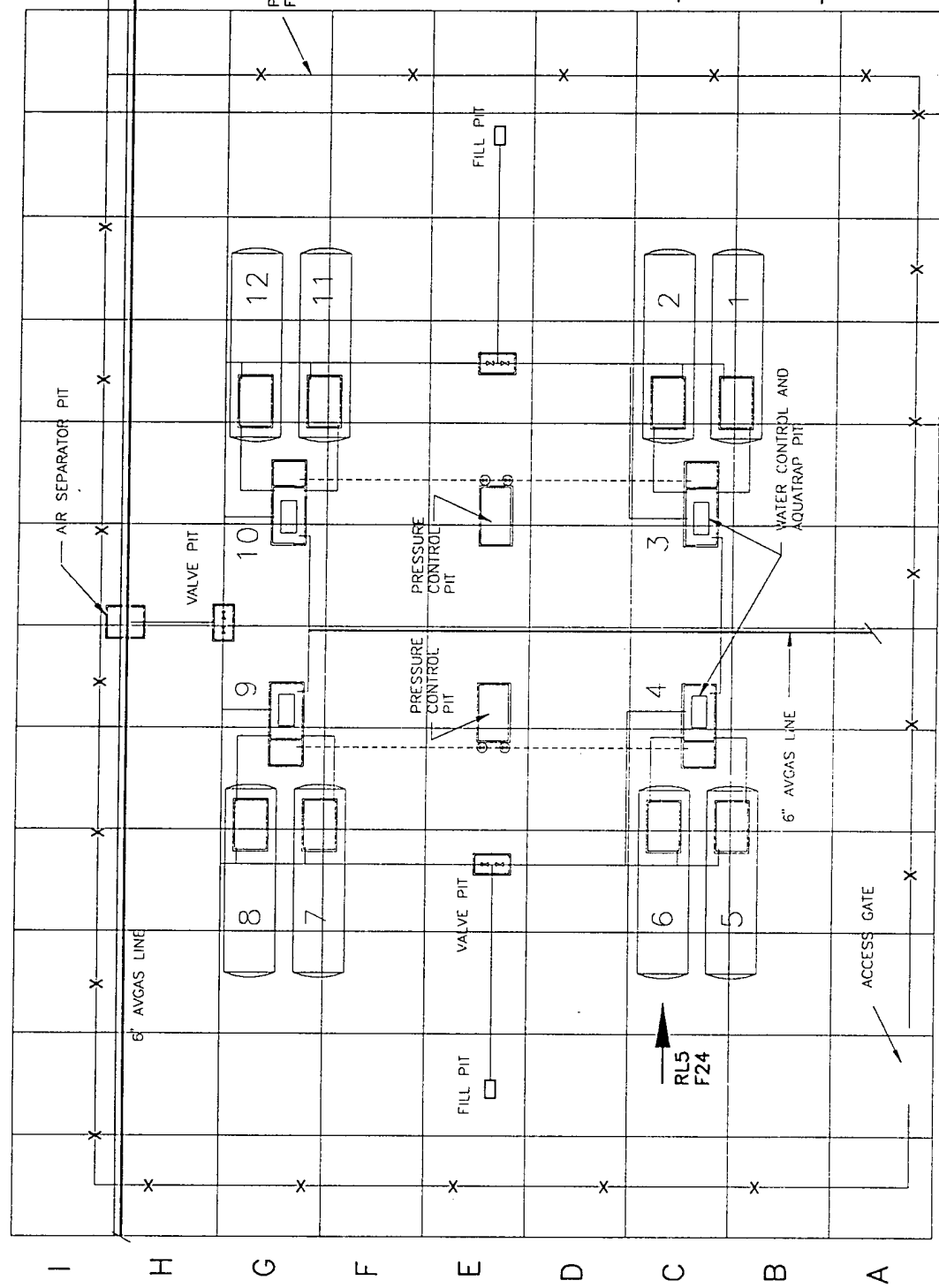
Photo Grid Location/Orientation
January 11, 1994

VANG BASE
192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
 UST REMOVAL
 VIRGINIA AIR NATIONAL GUARD
 SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	8	94/01/13	5	24	23	BOTTOM OF TANK PIT FOR UST No. 6; VIEW TO THE SE.

NOTE:
 PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



PERIMETER FENCE

UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- NO. 2 - 25,000 GAL
- NO. 5 - 25,000 GAL
- NO. 6 - 25,000 GAL
- NO. 7 - 25,000 GAL
- NO. 8 - 25,000 GAL
- NO. 11 - 25,000 GAL
- NO. 12 - 25,000 GAL

- UST NO. 3 - 600 GAL
- NO. 4 - 600 GAL
- NO. 9 - 600 GAL
- NO. 10 - 600 GAL

NOTE:

R5,F24 DEPICTS "GREENISH" LIQUID THAT WAS DETECTED BENEATH TANK NO. 6

LEGEND:

DIRECTION OF
PICTURE AND ROLL
RL1 AND FRAME NUMBER
F5

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

FILE: RANG60 DATE: 1994

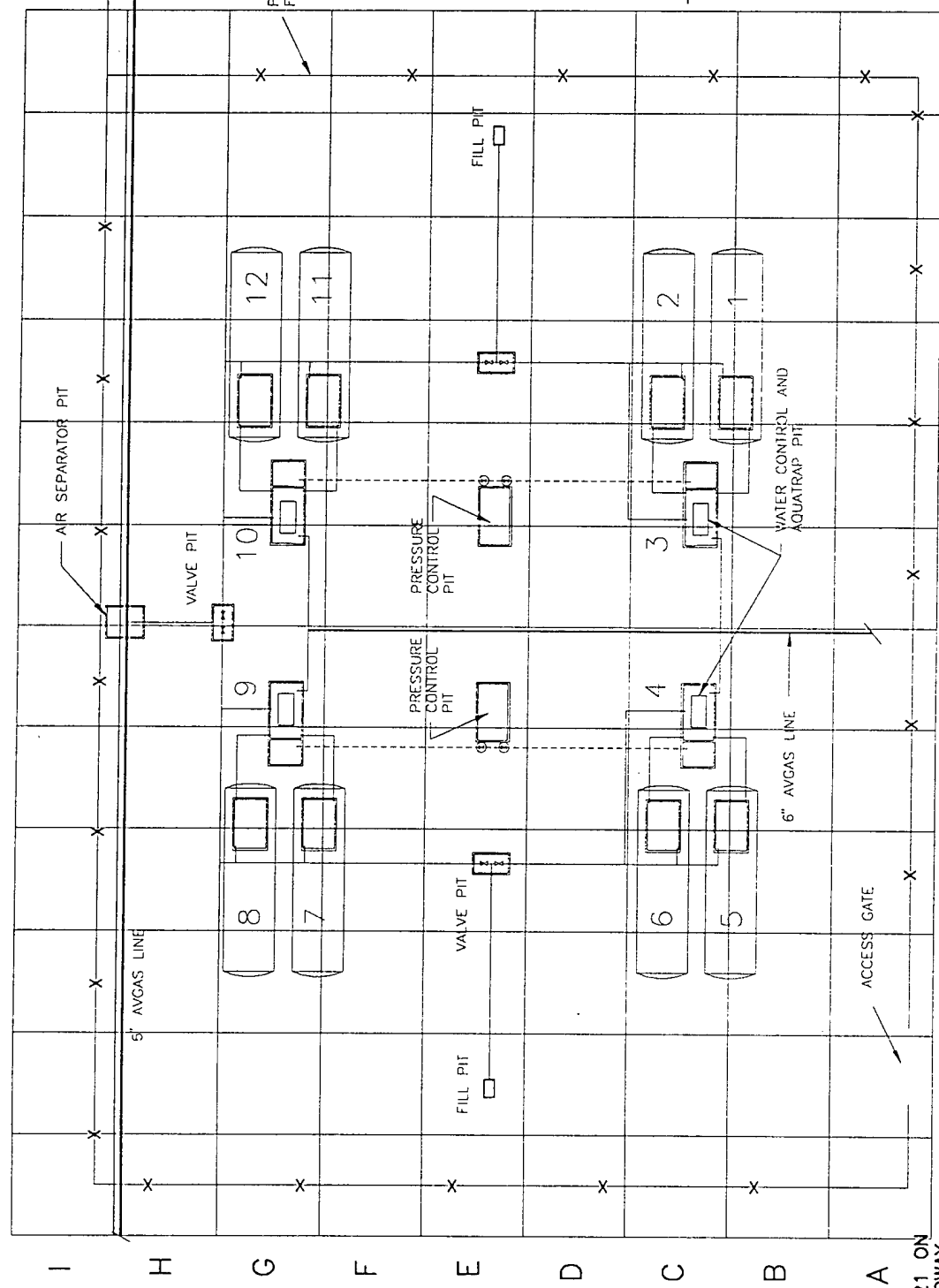
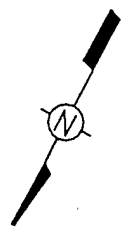
SITE 5 - Photo Log No. 8
Photo Grid Location/Orientation
January 13, 1994

VANG BASE
192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME		NEGATIVE No.	SUBJECT/DESCRIPTION
					No.		
5	9	94/01/14	5	21	20		EQUIPMENT ON PAVED ROAD ADJACENT TO SITE 5; VIEW TO THE E.
5	9	94/01/14	5	20	19		EQUIPMENT ON PAVED ROAD ADJACENT TO SITE 5; VIEW TO THE NW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



RL5, F20-21 ON
PAVED ROADWAY
WEST OF SITE 5

UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 5 - 25,000 GAL
- UST NO. 6 - 25,000 GAL
- UST NO. 7 - 25,000 GAL
- UST NO. 8 - 25,000 GAL
- UST NO. 11 - 25,000 GAL
- UST NO. 12 - 25,000 GAL

- UST NO. 3 - 600 GAL
- UST NO. 4 - 600 GAL
- UST NO. 9 - 600 GAL
- UST NO. 10 - 600 GAL

LEGEND:

DIRECTION OF
PICTURE AND ROLL
RL1
F5

GRID SCALE: 20 FT PER GRID

TO FLIGHTLINE

ADVANCED SCIENCES, INC.

SITE 5 - Photo Log No. 9

Photo Grid Location/Orientation
January 14, 1994

VANG BASE
192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

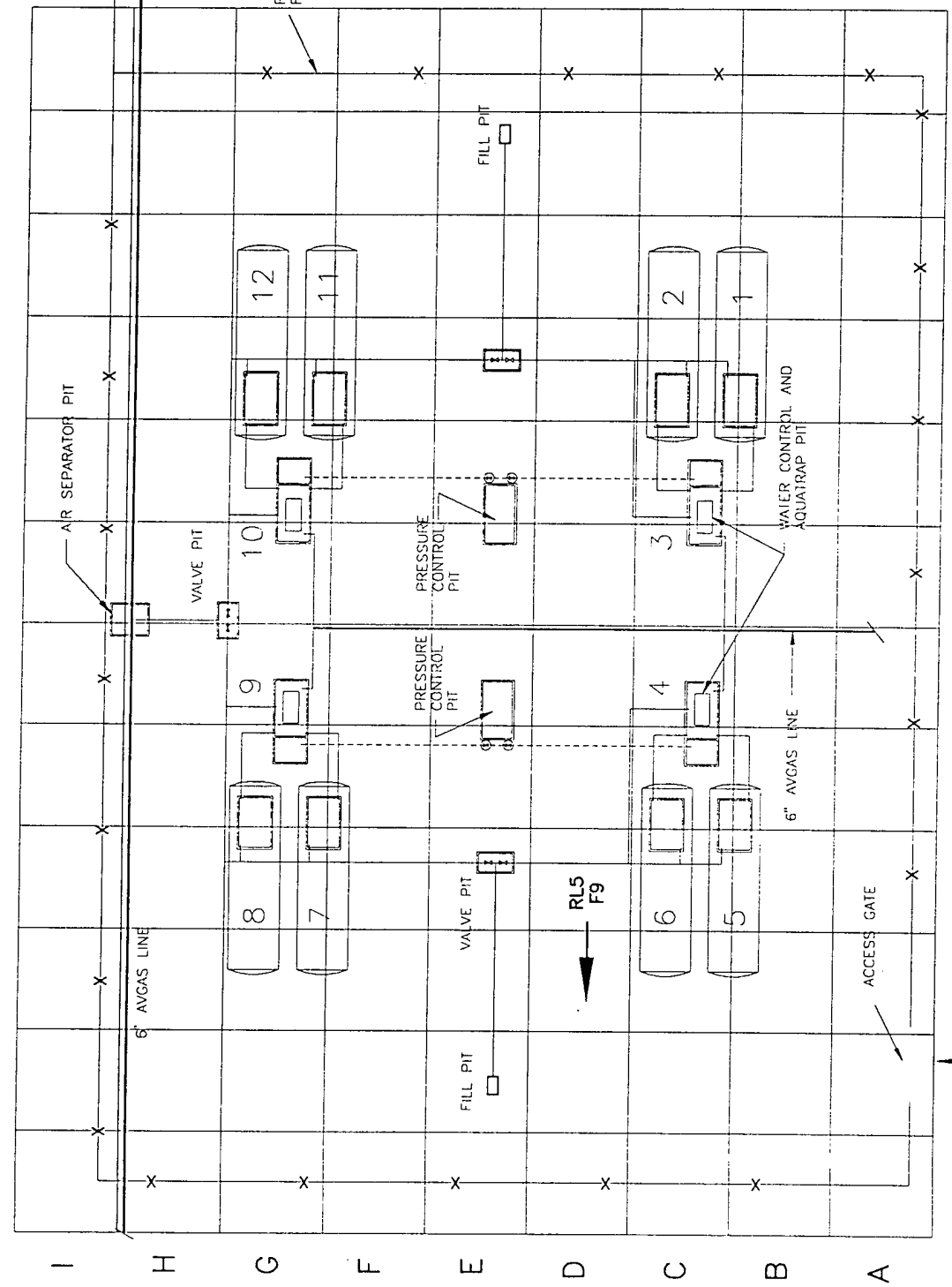
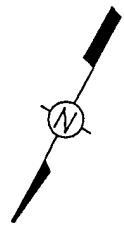
FILE: RANG61

DATE: 1994

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	10	94/01/27	5	11	10	VIEW FROM ACCESS ROAD INTO POL; VIEW TO THE EAST
5	10	94/01/27	5	9	8	USTs BEING DESTROYED; VIEW TO THE NW.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



UST CAPACITY:

- UST NO. 1 - 25,000 GAL
- UST NO. 2 - 25,000 GAL
- UST NO. 5 - 25,000 GAL
- UST NO. 6 - 25,000 GAL
- UST NO. 7 - 25,000 GAL
- UST NO. 8 - 25,000 GAL
- UST NO. 11 - 25,000 GAL
- UST NO. 12 - 25,000 GAL

- UST NO. 3 - 600 GAL
- UST NO. 4 - 600 GAL
- UST NO. 9 - 600 GAL
- UST NO. 10 - 600 GAL

LEGEND:

▲ DIRECTION OF PICTURE AND ROLL
RL1 F5

1 2 3 4 5 6 7 8 9 10 11 12
RL5 F11
GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

SITE 5 - Photo Log No. 10

Photo Grid Location/Orientation
January 27, 1994

VANG BASE
192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia

FILE: RANG62

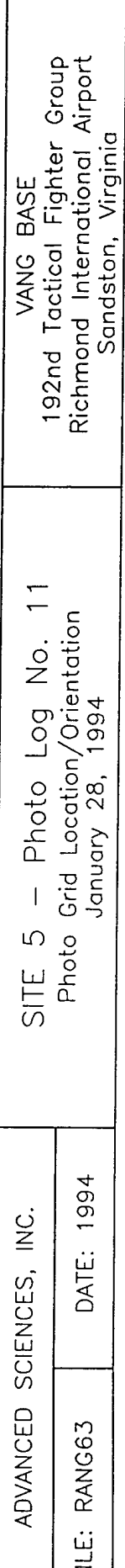
DATE: 1994

PHOTOGRAPH DOCUMENTATION
 UST REMOVAL
 VIRGINIA AIR NATIONAL GUARD
 SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
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5	11	94/01/28	5	8	7	USTs IN TEMPORARY STORAGE. MANWAYS CUT INTO TANK ENDS SIDES.
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NOTE:
 PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADIN VIEW TO THE NE.



FILE: RANG63

SITE 5 - Photo Log No. 11
Photo Grid Location/Orientation
January 28, 1994

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	12	94/02/10	7	1	2	VIEW FROM ACCESS ROAD INTO POL; VIEW TO THE EAST.
5	12	94/02/10	7	2	3	BACKFILLED AREA -- FORMERLY UST No. 5/6; VIEW TO THE SE.
5	12	94/02/10	7	3	4	FILL PIT/VALVE PIT AREA (CENTER); BACKFILLED AREAS FOR UST No. 5/6 (RIGHT), UST No. 7/8 (LEFT); VIEW TO THE SE.
5	12	94/02/10	7	4	5	BACKFILLED AREA FOR UST No. 11/12 IN BACKGROUND; VIEW TO THE SE.
5	12	94/02/10	7	5	6	EXCAVATION FOR PRINCIPAL 6 inch PIPELINE; VIEW TO THE SE.
5	12	94/02/10	7	6	7	CONCRETE AIR SEPARATOR BOX PRIOR TO REMOVAL; VIEW TO THE SW.
5	12	94/02/10	7	7	8	PIPE/VALVE PIT REMOVAL; VIEW TO THE NW.
5	12	94/02/10	7	8	9	CONCRETE VALVE BOX REMOVAL; VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING.

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

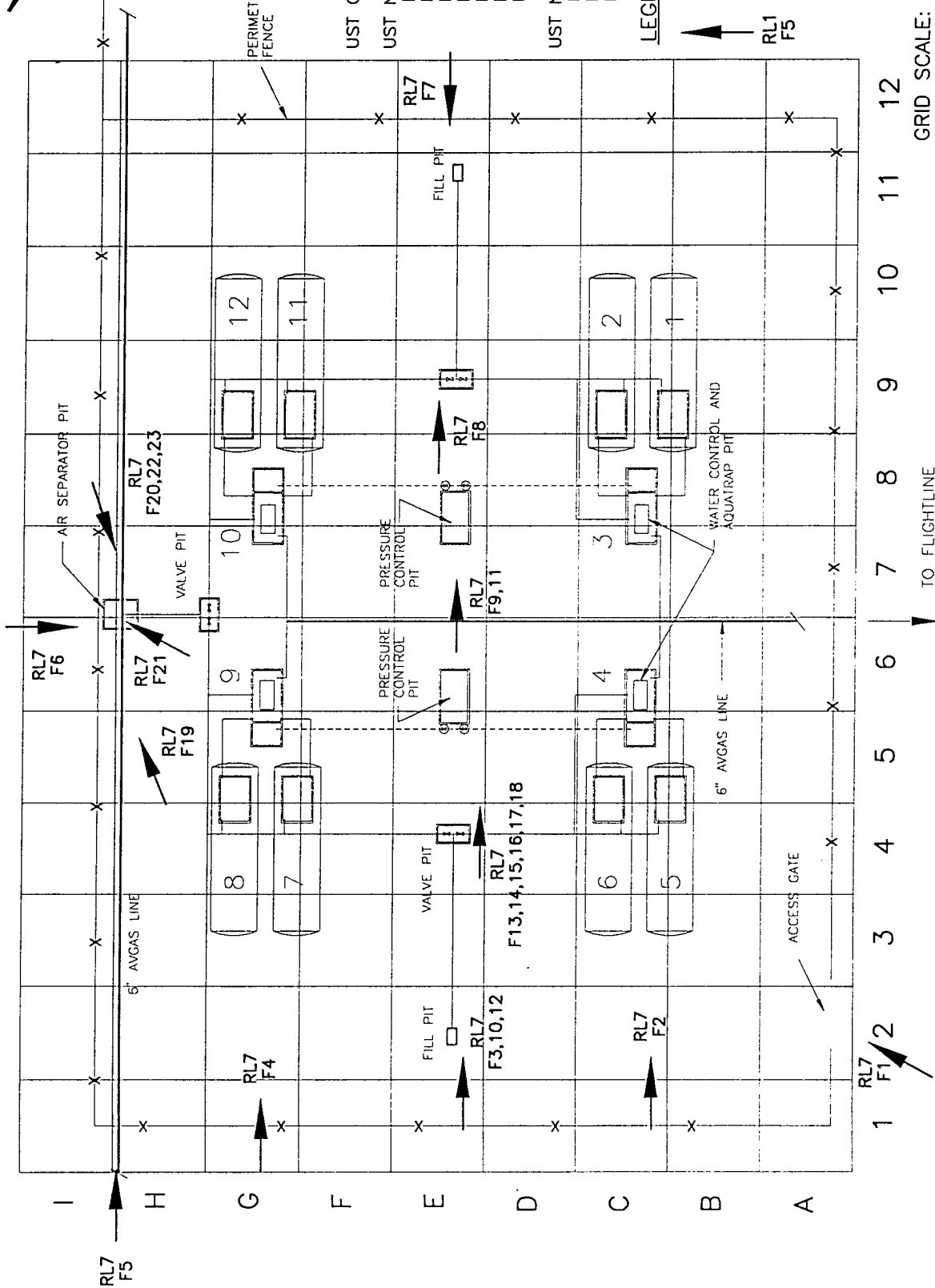
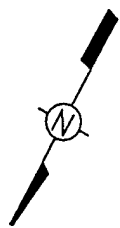
SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	12	94/02/10	7	9	10	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	10	11	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	11	12	CONCRETE PRESSURE CONTROL BOX REMOVAL/VALVE PIT; VIEW TO THE SE.
5	12	94/02/10	7	12	13	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	13	14	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	14	15	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	15	16	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	16	17	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	17	18	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .

PHOTOGRAPH DOCUMENTATION
UST REMOVAL
VIRGINIA AIR NATIONAL GUARD
SANDSTON, VA

SITE	PHOTO LOG No.	DATE	ROLL No.	FRAME No.	NEGATIVE No.	SUBJECT/DESCRIPTION
5	12	94/02/10	7	18	19	CONCRETE PRESSURE CONTROL BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	19	20	CONCRETE AIR SEPARATOR BOX REMOVAL; VIEW TO THE SE.
5	12	94/02/10	7	20	21	CONCRETE AIR SEPARATOR BOX REMOVAL; VIEW TO THE NW.
5	12	94/02/10	7	21	22	CONCRETE AIR SEPARATOR BOX REMOVAL; VIEW INTO THE PIT.
5	12	94/02/10	7	22	23	CONCRETE AIR SEPARATOR BOX REMOVAL; VIEW INTO THE PIT.
5	12	94/02/10	7	23	24	CONCRETE AIR SEPARATOR BOX REMOVAL; VIEW INTO THE PIT.

NOTE:
PHOTOGRAPHS INCLUDED IN THIS APPENDIX ARE INDICATED BY SHADING .



UST CAPACITY:

UST NO. 1 - 25,000 GAL
UST NO. 2 - 25,000 GAL
UST NO. 5 - 25,000 GAL
UST NO. 6 - 25,000 GAL
UST NO. 7 - 25,000 GAL
UST NO. 8 - 25,000 GAL
UST NO. 11 - 25,000 GAL
UST NO. 12 - 25,000 GAL

UST NO. 3 - 600 GAL
UST NO. 4 - 600 GAL
UST NO. 9 - 600 GAL
UST NO. 10 - 600 GAL

LEGEND:



DIRECTION OF
PICTURE AND ROLL
RL1
F5

GRID SCALE: 20 FT PER GRID

ADVANCED SCIENCES, INC.

FILE: RANG64

DATE: 1994

SITE 5 - Photo Log No. 12
Photo Grid Location/Orientation
February 10, 1994

VANG BASE
192nd Tactical Fighter Group
Richmond International Airport
Sandston, Virginia



Site 5 - Grubbing Operations, UST Nos. 5/6. View to the East.
(Photo Log No. 1; Roll No. 1/Frame No. 1)



Site 5 - After Grubbing UST Nos. 5/6. View to the East.
(Photo Log No. 2; Roll No. 1/Frame No. 19)



Site 5 - Grubbing Operations, Fill Pit/Valve Pit. View to the Southeast.
(Photo Log No. 1; Roll No. 1/Frame No. 17)



Site 5 - After Grubbing Operations, Fill Pit/Valve Pit. View to the Southeast.
(Photo Log No. 2; Roll No. 1/Frame No. 30)



Site 5 - Grubbing Operations, UST Nos. 7/8. View to the Southeast.
(Photo Log No. 1; Roll No. 1/Frame No. 16)



Site 5 - After Grubbing Operations, UST Nos. 7/8. View to the Southeast.
(Photo Log No. 2; Roll No. 1/Frame No. 29)



Site 5 - Grubbing Operations, UST Nos. 5/6. View to the Southeast.
(Photo Log No. 1; Roll No. 1/Frame No. 18)



Site 5 - After Grubbing Operations, UST Nos. 5/6. View to the Southeast.
(Photo Log No. 2; Roll No. 1/Frame No. 31)



Site 5 - Four 600 gallon Aquatrap USTs After Removal. Temporary Storage Site Located in Northwest Corner of Site 5. View to the Northwest.

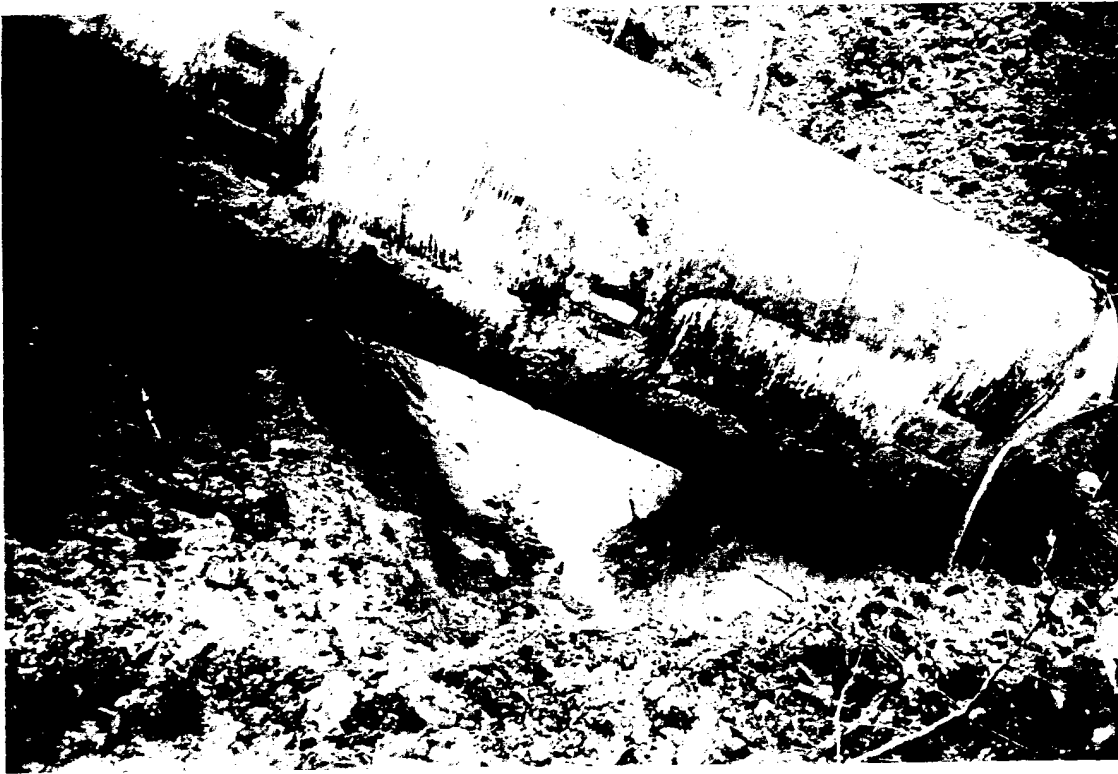
(Photo Log No. 4; Roll No. 2/Frame No. 3)



Site 5 - UST No. 12 Removal. View to the Northwest.
(Photo Log No. 4; Roll No. 2/Frame No. 18)



Site 5 - UST No. 12 in Temporary Storage. View to the North.
(Photo Log No. 5; Roll No. 2/Frame No. 21)



Site 5 - UST No. 11 Removal. View into the Pit.
(Photo Log No. 5; Roll No. 2/Frame No. 24)



Site 5 - UST No. 11 Removal. View to the West.
(Photo Log No. 5; Roll No. 2/Frame No. 27)



Site 5 - USTs After Manways have been cut in Tank-ends/sides.
View to the Northwest
(Photo Log No. 11; Roll No. 5/Frame No. 8)



Site 5 - Valve Pit/Pressure Control Pit Removal. View to the Southeast.
(Photo Log No. 12; Roll No. 7/Frame No. 11)



Site 5 - Pipe/Valve Pit Removal. View to the Northwest
(Photo Log No. 12; Roll No. 7/Frame No. 7)



Site 5 - Principal 6 inch
AVGAS Pipeline Removal.
View to the Northwest.
(Photo Log No. 2;
Roll No. 1/Frame No. 27)



Site 5 - Principal 6 inch
AVGAS Pipeline Removal.
View to the Southeast.
(Photo Log No. 2;
Roll No. 1/Frame No. 28)



Site 5 - Backfill Operations, UST Nos. 7/8. View to the Northwest.
(Photo Log No. 7; Roll No. 4/Frame No. 4)



Site 5 - Backfill Operations, UST Nos. 7/8. View to the Northwest.
(Photo Log No. 7; Roll No. 4/Frame No. 11)

**ANALYTICAL RESULTS FOR CLOSURE SAMPLES
COLLECTED AT SITE 4**

ENVIRONMENTAL LABORATORIES INC.

9211 Burge Avenue, Richmond, VA 23237

CHAIN OF CUSTODY

Sheet ①

Client: Advanced Sciences, Inc. Address: 65 N. Tenthell Rd off Rose, RD 37834

Company Contact: Hawk, Joseph Phone: (854) 83-1274 Submit Report to: Hawk, Joseph

P.O. No.:

Submit Bill to:

Sampler: Joe Hawk ANALYSIS REQUESTED

Project ID/Location: <u>9750-K10 / ADE SITE 4 Hawk BCL</u>		SAMPLE INFORMATION				N O. CONT.				REMARKS:			
LAB ID (Lab Use) (Only)	Location	Date	Time	C O M P	G R A B								
1401285-01	R1D4TF3D1801	1/25/94	0800			✓	✓	✓	✓	✓	✓	✓	24K-TX-RAN
-02	R1D4TF3C1801	1/25/94	0815			✓	✓	✓	✓	✓	✓	✓	
-03	R1D4TF3B1801	1/25/94	0840			✓	✓	✓	✓	✓	✓	✓	
-04	R1D4TF3C1801	1/25/94	0900			✓	✓	✓	✓	✓	✓	✓	
-05	R1D4TF3B1801	1/25/94	0940			✓	✓	✓	✓	✓	✓	✓	
-06	R1D4TF3C1801	1/25/94	1000			✓	✓	✓	✓	✓	✓	✓	
-07	R1D4TF3C1801	1/25/94	1600			✓	✓	✓	✓	✓	✓	✓	
-08	R1D4TF3C1801	1/25/94	1615			✓	✓	✓	✓	✓	✓	✓	
-09	R1D4TF3B1801	1/25/94	1630			✓	✓	✓	✓	✓	✓	✓	

Samples Relinquished by:	Date	Time	Samples Received by:	Date	Time	Reason for Trans.
<u>Joe Hawk</u>	1/25/94	1720	<u>J. Chuldras</u>	1/26/94	17:20	

Preservative check in lab: Temp: pH check: Preservatives added: Comments:

CHAIN OF CUSTODY

9211 Burge Avenue, Richmond, VA 23237

client: ADVANCE SCIENCES INC

Address: 165 M/Venell Road Oak Ridge, TN 37830

Company Contact: D.J. McMullen

Phone: 615/4831274 Submit Report to: McMurtry, P. T

P.O. No.:

Submit Bill to: ASI-OAK RIDGE: ATTN: JOE HART

Sampler: McMullen, P.J.

ANALYSIS REQUESTED

Project ID/Location:

Project ID/Location: 0750 K10 VAN6 TANK PULL SITE 4/5

[illegible]

Samples Relinquished by:

Date _____

Time

Sat

Samples Received by:

Date _____

Time

Reason for Trans

D. McMillan

07/09/20

75

000000

Andrea L. Williams

29/2/20

5:59

--	--

Preservative check in lab:

Temp:

pH c

H check:

ative

added

Comments:

Advance Sciences Inc.
165 Mitchell Road
Oak Ridge, TN 37830

Attn: P. J. McMullen

Purchase Order: Subcontract #9750-3-94
Invoice Number:

Order #: 94-01-225
Date: 01/31/94 17:35
Work ID: 9750-K10 TANK PULL
Date Received: 01/26/94
Date Completed: 01/30/94

Client Code: 1103

Sampled by Advanced Sciences Inc.

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	RMD4TP5D1801	06	RMD4TP3C1801
02	RMD4TP6C1801	07	RMD4TP11C1801
03	RMD4TP6B1801	08	RMD4TP9C1801
04	RMD4TP5C1801	09	RMD4TP10B1801
05	RMD4TP5B1801		

Mindy Baldwin
Certified By

Order # 94-01-225
01/31/94 17:35

Page 2

TEST RESULTS BY SAMPLE

Sample: 01AR RMD4TP5D1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

Result	Limit	Units	Analyzed	By
BDL	5.0	mg/Kg	01/27/94	JTS

Sample: 01BR RMD4TP5D1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

Result	Limit	Units	Analyzed	By
BDL	5.0	mg\Kg	01/27/94	SN

Sample: 02AR RMD4TP6C1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

Result	Limit	Units	Analyzed	By
BDL	5.0	mg/Kg	01/27/94	JTS

Sample: 02BR RMD4TP6C1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

Result	Limit	Units	Analyzed	By
BDL	5.0	mg\Kg	01/27/94	SN

Sample: 03AR RMD4TP6B1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

Result	Limit	Units	Analyzed	By
12.0	5.0	mg/Kg	01/27/94	JTS

Sample: 03B RMD4TP6B1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

Result	Limit	Units	Analyzed	By
BDL	5.0	mg\Kg	01/27/94	SN

Sample: 04AR RMD4TP5C1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

Result	Limit	Units	Analyzed	By
BDL	5.0	mg/Kg	01/27/94	JTS

Order # 94-01-225
01/31/94 17:35

TEST RESULTS BY SAMPLE

Page 3

Sample: 04BR RMD4TP5C1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
14.8	5.0	mg/Kg	01/27/94	SN

Sample: 05AR RMD4TP5B1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg/Kg	01/27/94	JTS

Sample: 05BR RMD4TP5B1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg/Kg	01/27/94	SN

Sample: 06AR RMD4TP3C1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg/Kg	01/27/94	JTS

Sample: 06BR RMD4TP3C1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg/Kg	01/27/94	SN

Sample: 07AR RMD4TP11C1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg/Kg	01/27/94	JTS

Sample: 07BR RMD4TP11C1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
448.8	125	mg/Kg	01/27/94	SN

Order # 94-01-225
01/31/94 17:35

TEST RESULTS BY SAMPLE

Page 4

Sample: 08AR RMD4TP9C1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg/Kg	01/27/94	JTS

Sample: 08BR RMD4TP9C1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg\Kg	01/27/94	SN

Sample: 09AR RMD4TP10B1801

Collected: 01/26/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5.0	mg/Kg	01/27/94	JTS

Sample: 09BR RMD4TP10B1801

Collected: 01/26/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
5.7	5.0	mg\Kg	01/27/94	SN

Order # 94-01-225
01/31/94 17:35

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TEST METHODOLOGIES

Diesel Range Organics in Soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

Advance Sciences Inc.
165 Mitchell Road
Oak Ridge, TN 37830

Attn: P. J. McMullen

Purchase Order: Subcontract #9750-3-94
Invoice Number:

Order #: 94-01-245
Date: 01/31/94 18:01
Work ID: 9750-K10 TANK PULL
Date Received: 01/29/94
Date Completed: 01/29/94

Client Code: 1103

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	RMD4AT8C1001

Sample Number	Sample Description
02	RMD4AT6C1001

Mundy Baldwin
Certified By

Order # 94-01-245
01/31/94 18:01

TEST RESULTS BY SAMPLE

Sample: 01A RMD4AT8C1001		Collected: 01/29/94 Category: SOIL			
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
Gasoline Range Organics		9.9	5.0	mg/Kg	01/29/94 MB
Sample: 01B RMD4AT8C1001		Collected: 01/29/94 Category: SOIL			
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
Diesel Range Organics		8.2	5.0	mg\Kg	01/29/94 SN
Sample: 02A RMD4AT6C1001		Collected: 01/29/94 Category: SOIL			
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
Gasoline Range Organics		<5.0	5.0	mg/Kg	01/29/94 MB
Sample: 02B RMD4AT6C1001		Collected: 01/29/94 Category: SOIL			
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
Diesel Range Organics		<5.0	5.0	mg\Kg	01/29/94 SN

Order # 94-01-245
01/31/94 17:53

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TEST METHODOLOGIES

Diesel Range Organics in Soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

Advance Sciences Inc.
165 Mitchell Road
Oak Ridge, TN 37830

Attn: *Joe Hawk*

Purchase Order: Subcontract #9750-3-94
Invoice Number:

Order #: 94-02-106
Date: 02/23/94 17:54
Work ID: 9750K10-VANG TANKPULL SITE4/5
Date Received: 02/09/94
Date Completed: 02/23/94

Client Code: 1103

Sampled by Advance Sciences

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	RMD4TP9C1801 GRAB
02	RMD4TP10D1801 GRAB

Sample Number	Sample Description
03	RMD4TP11C1801 GRAB
04	RMD4TP10C1801 GRAB

Mindy Baldwin, Michelle Hugner
Certified By

Order # 94-02-106
02/23/94 17:54

TEST RESULTS BY SAMPLE

Sample: 01B		RMD4TP9C1801/02 GRAB	Collected: 02/09/94		Category: SOIL
<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
Arsenic	1.7	0.5	mg/Kg	02/17/94	MLH
Barium	15.6	1.0	mg/Kg	02/23/94	MLH
Cadmium	<0.1	0.1	mg/Kg	02/22/94	MLH
Chromium	4.9	0.8	mg/Kg	02/18/94	MLH
Lead	6.8	0.5	mg/Kg	02/20/94	MLH
Mercury	<0.10	0.10	mg/Kg	02/18/94	MLH
Selenium	<5.0	5.0	mg/Kg	02/18/94	MLH
Silver	<0.2	0.2	mg/Kg	02/15/94	MLH
TOTAL METALS	02/14/94		Complete		MLH

Sample: 02B		RMD4TP10D1801/02 GRAB	Collected: 02/09/94		Category: SOIL
<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
Arsenic	1.7	0.5	mg/Kg	02/17/94	MLH
Barium	13.5	1.0	mg/Kg	02/23/94	MLH
Cadmium	0.1	0.1	mg/Kg	02/22/94	MLH
Chromium	6.0	0.8	mg/Kg	02/18/94	MLH
Lead	7.2	0.5	mg/Kg	02/20/94	MLH
Mercury	<0.10	0.10	mg/Kg	02/18/94	MLH
Selenium	<5.0	5.0	mg/Kg	02/18/94	MLH
Silver	<0.2	0.2	mg/Kg	02/15/94	MLH
TOTAL METALS	02/14/94		Complete		MLH

Sample: 03B		RMD4TP11C1801/02 GRAB	Collected: 02/09/94		Category: SOIL
<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
Arsenic	2.0	0.5	mg/Kg	02/17/94	MLH
Barium	12.8	1.0	mg/Kg	02/23/94	MLH
Cadmium	<0.1	0.1	mg/Kg	02/22/94	MLH
Chromium	6.1	0.8	mg/Kg	02/18/94	MLH
Lead	8.2	0.5	mg/Kg	02/20/94	MLH
Mercury	<0.10	0.10	mg/Kg	02/18/94	MLH
Selenium	<5.0	5.0	mg/Kg	02/18/94	MLH

Order # 94-02-106
02/23/94 17:54

TEST RESULTS BY SAMPLE

<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
Silver	<0.2	0.2	mg/Kg	02/15/94	MLH
TOTAL METALS	02/14/94		Complete		MLH

Sample: 04B RMD4TP10C1801/02 GRAB Collected: 02/09/94 Category: SOIL

<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
Arsenic	1.3	0.5	mg/Kg	02/17/94	MLH
Barium	10.1	1.0	mg/Kg	02/23/94	MLH
Cadmium	<0.1	0.1	mg/Kg	02/22/94	MLH
Chromium	7.0	0.8	mg/Kg	02/18/94	MLH
Lead	6.5	0.5	mg/Kg	02/20/94	MLH
Mercury	<0.10	0.10	mg/Kg	02/18/94	MLH
Selenium	<5.0	5.0	mg/Kg	02/18/94	MLH
Silver	<0.2	0.2	mg/Kg	02/15/94	MLH
TOTAL METALS	02/14/94		Complete		MLH

Order # 94-02-106
02/23/94 17:54

TEST RESULTS BY SAMPLE
Page 4

Sample Description: RMD4TP9C1801 GRAB Lab No: 01A
Test Description: Volatile Organics in Soil Method: METHOD 8240 Test Code: M8240S
Collected: 02/09/94 14:30 Category: SOIL

VOLATILE ORGANICS IN SOIL BY METHOD 8240 UNITS ug/Kg

ANALYTE	RESULT	LOQ	ANALYTE	RESULT	LOQ
Chloromethane	BDL	10	1,2-Dichloropropane	BDL	5.0
Bromomethane	BDL	10	trans-1,3-Dichloropropene	BDL	5.0
Vinyl Chloride	BDL	10	Trichloroethene	BDL	5.0
Chloroethane	BDL	10	Dibromochloromethane	BDL	5.0
Methylene Chloride	10.2	5.0	1,1,2-Trichloroethane	BDL	5.0
Acetone	BDL	100	Benzene	BDL	5.0
Carbon Disulfide	BDL	100	cis-1,3-Dichloropropene	BDL	5.0
1,1-Dichloroethene	BDL	5.0	2-Chloroethyl Vinyl ether	BDL	10
1,1-Dichloroethane	BDL	5.0	Bromoform	BDL	5.0
trans-1,2-Dichloroethene	BDL	5.0	2-Hexanone	BDL	50
Chloroform	BDL	5.0	4-Methyl-2-Pentanone	BDL	50
1,2-Dichloroethane	BDL	5.0	Tetrachloroethene	BDL	5.0
2-Butanone	BDL	100	Toluene	BDL	5.0
1,1,1-Trichloroethane	BDL	5.0	Chlorobenzene	BDL	5.0
Carbon Tetrachloride	BDL	5.0	Ethyl Benzene	BDL	5.0
Vinyl Acetate	BDL	50	Styrene	BDL	5.0
Bromodichloromethane	BDL	5.0	Total Xylenes	BDL	15
1,1,2,2-Tetrachloroethane	BDL	5.0			

NOTES AND DEFINITIONS FOR THIS REPORT

All results Reported in micrograms/kilogram unless otherwise specified.
BDL=Below Specified Detection Limit
LOQ=Analytical Limit of Quantitation.
* = Sample not Analyzed for this Compound.

Order # 94-02-106
02/23/94 17:54

TEST RESULTS BY SAMPLE
Page 5

Sample Description: RMD4TP1001801 GRAB Lab No: 02A
Test Description: Volatile Organics in Soil Method: METHOD 8240 Test Code: M8240S
Collected: 02/09/94 14:40 Category: SOIL

VOLATILE ORGANICS IN SOIL BY METHOD 8240				UNITS ug/Kg	
ANALYTE	RESULT	LOQ	ANALYTE	RESULT	LOQ
Chloromethane	BDL	10	1,2-Dichloropropane	BDL	5.0
Bromomethane	BDL	10	trans-1,3-Dichloropropene	BDL	5.0
Vinyl Chloride	BDL	10	Trichloroethene	BDL	5.0
Chloroethane	BDL	10	Dibromochloromethane	BDL	5.0
Methylene Chloride	9.2	5.0	1,1,2-Trichloroethane	BDL	5.0
Acetone	BDL	100	Benzene	BDL	5.0
Carbon Disulfide	BDL	100	cis-1,3-Dichloropropene	BDL	5.0
1,1-Dichloroethene	BDL	5.0	2-Chloroethyl Vinyl ether	BDL	10
1,1-Dichloroethane	BDL	5.0	Bromoform	BDL	5.0
trans-1,2-Dichloroethene	BDL	5.0	2-Hexanone	BDL	50
Chloroform	BDL	5.0	4-Methyl-2-Pentanone	BDL	50
1,2-Dichloroethane	BDL	5.0	Tetrachloroethene	BDL	5.0
2-Butanone	BDL	5.0	Toluene	BDL	5.0
1,1,1-Trichloroethane	BDL	5.0	Chlorobenzene	BDL	5.0
Carbon Tetrachloride	BDL	5.0	Ethyl Benzene	BDL	5.0
Vinyl Acetate	BDL	50	Styrene	BDL	5.0
Bromodichloromethane	BDL	5.0	Total Xylenes	BDL	15
1,1,2,2-Tetrachloroethane	BDL	5.0			

NOTES AND DEFINITIONS FOR THIS REPORT

All results Reported in micrograms/kilogram unless otherwise specified.
BDL=Below Specified Detection Limit
LOQ=Analytical Limit of Quantitation.
* = Sample not Analyzed for this Compound.

Order # 94-02-106
02/23/94 17:54

TEST RESULTS BY SAMPLE

Sample Description: RMD4TP11C1801 GRAB Lab No: 03A
Test Description: Volatile Organics in Soil Method: METHOD 8240 Test Code: M8240S
Collected: 02/09/94 14:45 Category: SOIL

VOLATILE ORGANICS IN SOIL BY METHOD 8240 UNITS ug/Kg

ANALYTE	RESULT	LOQ	ANALYTE	RESULT	LOQ
Chloromethane	BDL	10	1,2-Dichloropropane	BDL	5.0
Bromomethane	BDL	10	trans-1,3-Dichloropropene	BDL	5.0
Vinyl Chloride	BDL	10	Trichloroethene	BDL	5.0
Chloroethane	BDL	10	Dibromochloromethane	BDL	5.0
Methylene Chloride	5.1	5.0	1,1,2-Trichloroethane	BDL	5.0
Acetone	BDL	100	Benzene	BDL	5.0
Carbon Disulfide	BDL	100	cis-1,3-Dichloropropene	BDL	5.0
1,1-Dichloroethene	BDL	5.0	2-Chloroethyl Vinyl ether	BDL	10
1,1-Dichloroethane	BDL	5.0	Bromoform	BDL	5.0
trans-1,2-Dichloroethene	BDL	5.0	2-Hexanone	BDL	50
Chloroform	BDL	5.0	4-Methyl-2-Pentanone	BDL	50
1,2-Dichloroethane	BDL	5.0	Tetrachloroethene	BDL	5.0
2-Butanone	BDL	50	Toluene	BDL	5.0
1,1,1-Trichloroethane	BDL	5.0	Chlorobenzene	BDL	5.0
Carbon Tetrachloride	BDL	5.0	Ethyl Benzene	BDL	5.0
Vinyl Acetate	BDL	50	Styrene	BDL	5.0
Bromodichloromethane	BDL	5.0	Total Xylenes	BDL	15
1,1,2,2-Tetrachloroethane	BDL	5.0			

NOTES AND DEFINITIONS FOR THIS REPORT

All results Reported in micrograms/kilogram unless otherwise specified.
BDL=Below Specified Detection Limit
LOQ=Analytical Limit of Quantitation.
* = Sample not Analyzed for this Compound.

Order # 94-02-106

02/23/94 17:54

TEST RESULTS BY SAMPLE

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Sample Description: RMD4TP10C1801 GRAB

Lab No: 04A

Test Description: Volatile Organics in Soil Method: METHOD 8240 Test Code: M8240S

Collected: 02/09/94 14:50

Category: SOIL

VOLATILE ORGANICS IN SOIL BY METHOD 8240 UNITS ug/Kg

ANALYTE	RESULT	LOQ	ANALYTE	RESULT	LOQ
Chloromethane	BDL	10	1,2-Dichloropropane	BDL	5.0
Bromomethane	BDL	10	trans-1,3-Dichloropropene	BDL	5.0
Vinyl Chloride	BDL	10	Trichloroethene	BDL	5.0
Chloroethane	BDL	10	Dibromochloromethane	BDL	5.0
Methylene Chloride	BDL	5.0	1,1,2-Trichloroethane	BDL	5.0
Acetone	BDL	100	Benzene	BDL	5.0
Carbon Disulfide	BDL	100	cis-1,3-Dichloropropene	BDL	5.0
1,1-Dichloroethene	BDL	5.0	2-Chloroethyl Vinyl ether	BDL	10
1,1-Dichloroethane	BDL	5.0	Bromoform	BDL	5.0
trans-1,2-Dichloroethene	BDL	5.0	2-Hexanone	BDL	50
Chloroform	BDL	5.0	4-Methyl-2-Pentanone	BDL	50
1,2-Dichloroethane	BDL	5.0	Tetrachloroethene	BDL	5.0
2-Butanone	BDL	50	Toluene	BDL	5.0
1,1,1-Trichloroethane	BDL	5.0	Chlorobenzene	BDL	5.0
Carbon Tetrachloride	BDL	5.0	Ethyl Benzene	BDL	5.0
Vinyl Acetate	BDL	50	Styrene	BDL	5.0
Bromodichloromethane	BDL	5.0	Total Xylenes	BDL	15.0
1,1,2,2-Tetrachloroethane	BDL	5.0			

NOTES AND DEFINITIONS FOR THIS REPORT

All results Reported in micrograms/kilogram unless otherwise specified.

BDL=Below Specified Detection Limit

LOQ=Analytical Limit of Quantitation.

* = Sample not Analyzed for this Compound.

Order # 94-02-106
02/23/94 17:54

TEST METHODOLOGIES

Page 8

Volatile Organics in Soil analysis was performed according to EPA method 8240.

Mercury analysis was performed according to EPA SW-846 method 7471.

Silver analysis was performed according to EPA SW-846 method 7761.

Arsenic analysis was performed according to EPA SW-846 method 7060.

Barium analysis was performed according to EPA SW-846 method 7081.

Cadmium analysis was performed according to EPA SW-846 method 7131.

Chromium analysis was performed according to EPA SW-846 method 7191.

Lead analysis was performed according to EPA SW-846 method 7421.

Selenium analysis was performed according to EPA SW-846 method 7740.

**ANALYTICAL RESULTS FOR CLOSURE SAMPLES
COLLECTED AT SITE 5**

Preservative check in lab: _____ pH check: _____ Preservatives added: _____

Comments: _____

ENVIRONMENTAL LABORATORIES INC.

9211 Burge Avenue, Richmond, VA 23237

CHAIN OF CUSTODY

②

Client: ADVANCED SCIENCES INC

Address: 165 Mitchell Rd, Oak Ridge, TN 37830

Company Contact: McMullen, P.J.

Phone: 615/4831274 Submit Report to: McMullen, P.J.

P.O. No.:

Submit Bill to:

Sampler: McMullen, P.J.

ANALYSIS REQUESTED

Project ID/Location:

9750-K10 - VANU-TANK Pull

LAB ID (Lab Use) (Only)	SAMPLE INFORMATION			Date	Time	N O. C O N T. G R A B				REMARKS:
	Location									
14010TT-01	RMD5TP9F1801			01/07/94	0845				X	24hr TURNAROUND
02	RMD5TP9G2001			01/07/94	0920				X	
03	RMD5TP9B1801			01/07/94	1045				X	
04	RMD5TP10C1801			01/07/94	1135				X	
05	RMD5TP8C1801			01/07/94	1340				X	
06	RMD5TP9D1801			01/07/94	1430				X	
07	RMD5TP4H1801			01/07/94	1630				X	
08	RMD5TP5G1801			01/07/94	1645				X	
09	RMD5TP9C2001			01/07/94	1700				X	

Samples Relinquished by:	Date	Time	Samples Received by:	Date	Time	Reason for Trans.
--------------------------	------	------	----------------------	------	------	-------------------

P.J. McMullen 01/08/94 0650 McMullen 7/5/94 6:50

Preservative check in lab: Temp: pH check: Preservatives added:

Comments:

CHAIN OF CUSTODY

9211 Burge Avenue, Richmond, VA 23237

client: Advanced Sciences, Inc

Address: 705 Mitchell Road Oak Ridge, TN 37830

Company Contact: McMullen, P.J.

Phone: 615/4831274

P.O. No.:

Submit Bill to:

Sampler: McMullen, P.J.

ANALYSIS REQUESTED

Project ID/Location:

Project ID/Location:
9750.K10 VANG-TANK BULL

[illegible]

Samples Relinquished by:

Time

Samples

Received by:

Date _____

Time

Reason for Trans.

D.J. The Muller

01/08/24	0650
----------	------

10

8-9

25.

Preservative check in lab:

Temp:

pH check:

Preservatives added:

Comments:

ENVIRONMENTAL LABORATORIES INC.

9211 Burge Avenue, Richmond, VA 23237

CHAIN OF CUSTODY

③

Client: ADVANCED SCIENCES, INC Address: 165 Mitchell Road, Oak Ridge, TN 37830
 Company Contact: Mc Mullen, P.J Phone: 615/4831274 Submit Report to: Mc Mullen, P.J
 P.O. No.: _____ Submit Bill to: _____

Sampler: Mc Mullen, P.J. ANALYSIS REQUESTED _____

Project ID/Location: 9750.K10-VAN6-Track Pull				LAB ID (Lab Use) (Only)			SAMPLE INFORMATION			LAB ID (Lab Use) (Only)		REMARKS:	
LAB ID (Lab Use) (Only)	Location	Date	Time	C O M P	G R A B	C O N T.	N O.	G R O 8/15	D R O 8/15				
9401078-01A	RMD 5 TP 3 G 1801	01/08/94	0810		X			X	X				24 hr TURNAROUND
9401078-02A	RMD 5 TP 4 F 1801	01/08/94	0910		X			X	X				
9401078-03A	RMD 5 TP 5 C 1801	01/08/94	1320		X			X	X				
9401078-04A	RMD 5 TP 4 B 1801	01/08/94	1340		X			X	X				
9401078-05A	RMD 5 TP 3 C 1801	01/08/94	1410		X			X	X				
9401078-06A	RMD 5 TP 4 D 1801	01/08/94	1515		X			X	X				

Samples Relinquished by:		Date	Time	Samples Received by:		Date	Time	Reason for Trans.	
<u>D.J. Mc Mullen</u>		01/08/94	1610	<u>Mc Mullen</u>		01/08/94	4:13		

Preservative check in lab: _____ Temp: _____ pH check: _____ Preservatives added: _____
 Comments: _____

ENVIRONMENTAL LABORATORIES INC.

9211 Burge Avenue, Richmond, VA 23237

CHAIN OF CUSTODY

Client: ADVANCED SCIENCES, INC Address: 165 MITCHELL ROAD, DOCK RIDGE, TN 37830
 Company Contact: Mc MULLEN, P.J. Phone: 615/4831274 Submit Report to: Mc MULLEN, P.J.
 P.O. No.: Submit Bill to:

SAMPLE INFORMATION				ANALYSIS REQUESTED									
LAB ID (Lab Use) (Only)	Location	Date	Time	C O M P		G R A B		N O.	REMARKS:				
	RMD5 AT 760701	01/11/94	0950			X							24 hr turnaround
	RMD5 AT 660701	01/11/94	1130			X							11
	RMD5 AT 760701	01/11/94	1530			X							11
	~~RMD5~~												
	RMD5 660701	01/10/94	1610			X							11

Samples Relinquished by:		Date	Time	Samples Received by:		Date	Time	Reason for Trans.
<u>P.J. Mc Mullen</u>		<u>01/12/94</u>	<u>1040</u>	<u>Jaycha J. Mullens</u>		<u>1/12/94</u>	<u>10:40</u>	

Preservative check in lab: Temp: pH check: Preservatives added:
 Comments:

ENVIRONMENTAL LABORATORIES INC.

9211 Burge Avenue, Richmond, VA 23237

CHAIN OF CUSTODY SAMPLE LOG (5)

Client: ADVANCED SCIENCES, INC Address: 165 Mitchell Road, Oak Ridge, TN 37830

Company Contact: JOE HAWK

Phone: 615/4831274

Submit Report to: JOE HAWK

P.O. No.:

Submit Bill to: ASI - Oak Ridge, ATTN: JOE HAWK

Sampler: MC MULLEN, P.J.

ANALYSIS REQUESTED

Project ID/Location:

9753 K10-VANG - TANK FILL SITE 4/5

SAMPLE INFORMATION

LAB ID (Lab Use) (Only)	SAMPLE INFORMATION		C O M P		G R A B		N O	
	Location	Date	Time					

RMD5FP11E0701	2/10/94	0930	X	✓	✓	✓	✓	✓	✓	✓	ROUTINE TIME FOR TURNAROUND
RMD5VP9E0701	2/10/94	0950	X	✓	✓	✓	✓	✓	✓	✓	
RMD5PC8E0701	2/10/94	1150	X	✓	✓	✓	✓	✓	✓	✓	
RMD5PC6E0701	2/10/94	1330	X	✓	✓	✓	✓	✓	✓	✓	
RMD5PR10E0401	2/10/94	1345	X	✓	✓	✓	✓	✓	✓	✓	
RMD5AS6H0701	2/10/94	1430	X	✓	✓	✓	✓	✓	✓	✓	DO NOT NEED 24 HR TURNAROUND

REMARKS:

Samples Relinquished by:	Date	Time	Samples Received by:	Date	Time	Reason for Trans.
P.J. Mc Mullen	2/11/94	1215	George W. Mullen	11 Feb 94	1215	
George W. Mullen	14 Feb 94	1230	George Ross	2/14/94	1227	
George Ross	2/14/94	1335	George Ross	2/14/94	1335	

Preservative check in lab:

Temp:

pH check:

Preservatives added:

Comments:

ENVIRONMENTAL LABORATORIES INC.

9211 Burge Avenue, Richmond, VA 23237

CHAIN OF CUSTODY

Client: ADVANCED SCIENCES, INC

Address: 165 Mitchell Road, Oak Ridge, TN 37830

Company Contact: Joe Hawk

Phone: 615/4831274 Submit Report to: Joe Hawk

P.O. No.:

Submit Bill to: ASI - Oak Ridge, ATTN: Joe Hawk

Sampler: McMullen, P.J

ANALYSIS REQUESTED

Project ID/Location:

9750-K10-VANG-TANK FILL, Site 4/5

LAB ID (Lab Use) (Only)	SAMPLE INFORMATION		Date		Time		C O M P		G R A B		N O.	REMARKS:
	Location											
	<u>RMD 5 PR 6F 0401</u>		<u>2/11/94</u>		<u>1000</u>					<u>X</u>	<u>✓</u>	<u>Routine</u>
	<u>RMD 5 PR 3E 0401</u>		<u>2/11/94</u>		<u>1020</u>					<u>X</u>	<u>✓</u>	
	<u>RMD 5 PR 6C 0401</u>		<u>2/11/94</u>		<u>1035</u>					<u>X</u>	<u>✓</u>	
												<u>Do Not NEED</u>
												<u>24 hr turnaround</u>

Samples Relinquished by:	Date	Time	Samples Received by:	Date	Time	Reason for Trans.
<u>P.J. McMullen</u>	<u>2/11/94</u>	<u>1215</u>	<u>Joseph W. Mikhali</u>	<u>11 Feb 94</u>	<u>1215</u>	
<u>Joseph W. Mikhali</u>	<u>14 Feb 94</u>	<u>1230</u>	<u>Georgie Ross</u>	<u>2/14/94</u>	<u>1227</u>	
<u>Georgie Ross</u>	<u>2/14/94</u>	<u>1336</u>	<u>Georgie Ross</u>	<u>2/14/94</u>	<u>1336</u>	

Preservative check in lab: Temp: _____ pH check: _____ Preservatives added: _____

Comments:

Advance Sciences Inc.
6739 Academy Rd. NE
Alberquerque, NM 87109

Attn: Ellie Krueger
Invoice Number:

Order #: 94-01-058
Date: 01/19/94 11:36
Work ID: 9750.K10 RICH, VA. A.N.G TANK
Date Received: 01/07/94
Date Completed: 01/18/94
Client Code: 1103

Sampled by Advance Sciences

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>
01	RMD5TP9H1801 GRAB
02	RMD5TP8G1801 GRAB
03	RMD5TP10G1801 GRAB

<u>Sample Number</u>	<u>Sample Description</u>
04	RMD5PR1H0601 GRAB
05	RMD5PR6A0601 GRAB

Mandy Baldwin
Certified By

Order # 94-01-058
01/19/94 11:36

TEST RESULTS BY SAMPLE

Sample: 01A	RMD5TP9H1801	GRAB	Collected: 01/06/94	Category: SOIL					
<u>Test Description</u>									
Diesel Range Organics			<u>Result</u> <5.0	<u>Limit</u> 5	<u>Units</u> mg/Kg	<u>Analyzed</u> 01/07/94	<u>By</u> SN		
Sample: 01B	RMD5TP9H1801	GRAB	Collected: 01/06/94	Category: SOIL					
<u>Test Description</u>									
Gasoline Range Organics			<u>Result</u> <5.0	<u>Limit</u> 5	<u>Units</u> mg/Kg	<u>Analyzed</u> 01/07/94	<u>By</u> JTS		
Sample: 02A	RMD5TP8G1801	GRAB	Collected: 01/06/94	Category: SOIL					
<u>Test Description</u>									
Diesel Range Organics			<u>Result</u> <5.0	<u>Limit</u> 5.0	<u>Units</u> mg/Kg	<u>Analyzed</u> 01/07/94	<u>By</u> SN		
Sample: 02B	RMD5TP8G1801	GRAB	Collected: 01/06/94	Category: SOIL					
<u>Test Description</u>									
Gasoline Range Organics			<u>Result</u> <5.0	<u>Limit</u> 5	<u>Units</u> mg/Kg	<u>Analyzed</u> 01/07/94	<u>By</u> JTS		
Sample: 03A	RMD5TP10G1801	GRAB	Collected: 01/06/94	Category: SOIL					
<u>Test Description</u>									
Diesel Range Organics			<u>Result</u> <5.0	<u>Limit</u> 5.0	<u>Units</u> mg/Kg	<u>Analyzed</u> 01/07/94	<u>By</u> SN		
Sample: 03B	RMD5TP10G1801	GRAB	Collected: 01/06/94	Category: SOIL					
<u>Test Description</u>									
Gasoline Range Organics			<u>Result</u> <5.0	<u>Limit</u> 5	<u>Units</u> mg/Kg	<u>Analyzed</u> 01/07/94	<u>By</u> JTS		
Sample: 04A	RMD5PR1H0601	GRAB	Collected: 01/06/94	Category: SOIL					
<u>Test Description</u>									
Diesel Range Organics			<u>Result</u> <5.0	<u>Limit</u> 5.0	<u>Units</u> mg/Kg	<u>Analyzed</u> 01/07/94	<u>By</u> SN		

Order # 94-01-058
01/19/94 11:36

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TEST RESULTS BY SAMPLE

Sample: 04B RMD5PR1H0601 GRAB

Collected: 01/06/94 Category: SOIL

Test Description
Gasoline Range Organics

Result
 <5.0

Limit₅

<u>Units</u>	<u>Analyzed</u>
mg/Kg	01/07/94

By
JTS

Sample #: 05A RMD5PR6A0601 GRAB

Collected: 01/06/94 Category: SOIL

<u>Test Description</u>	Test Results
Diesel Range Organics	0.0000

<u>Result</u>
<5.0

$$\frac{\text{Limit}}{5.0}$$

<u>Units</u>	<u>Analyzed</u>
mg/Kg	01/07/94

BY SN

Sample: 05B RMD5PR6A0601 GRAB

Collected: 01/06/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>
<5.0

Limit₅

<u>Units</u>	<u>Analyzed</u>
mg/Kg	01/07/94

By
JTS

Order # 94-01-058
01/18/94 15:38

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TEST METHODOLOGIES

Diesel Range Organics in Soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

Advance Sciences Inc.
6739 Academy Rd. NE
Alberquerque, NM 87109

Attn: Ellie Krueger
Invoice Number:

Order #: 94-01-077
Date: 01/18/94 16:38
Work ID: 9750-K10-VANG-TANK PULL
Date Received: 01/08/94
Date Completed: 01/18/94
Client Code: 1103

Sampled by Advance Sciences

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	RMD5TP9F1801
02	RMD5TP9G2001
03	RMD5TP9B1801
04	RMD5TP10C1801
05	RMD5TP8C1801
06	RMD5TP9D1801
07	RMD5TP4H1801

Sample Number	Sample Description
08	RMD5TP5G1801
09	RMD5TP9C2001
10	RMD5PR3H0601
11	RMD5PR6H0601
12	RMD5PR8H0601
13	RMD5PR10H0601

Mindy Baldwin
Certified By

Order # 94-01-077
01/18/94 16:38

TEST RESULTS BY SAMPLE

Sample: 01A	RMD5TP9F1801	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
		<5.0	5	mg/Kg	01/08/94 JTS
Sample: 01B	RMD5TP9F1801	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
		7.1	5	mg/Kg	01/08/94 SN
Sample: 02A	RMD5TP9G2001	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
		<5.0	5	mg/Kg	01/08/94 JTS
Sample: 02B	RMD5TP9G2001	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
		33.87	5	mg/Kg	01/08/94 SN
Sample: 03A	RMD5TP9B1801	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
		<5.0	5	mg/Kg	01/08/94 JTS
Sample: 03B	RMD5TP9B1801	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
		<5.0	5.0	mg/Kg	01/08/94 SN
Sample: 04A	RMD5TP10C1801	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed By</u>
		145	5	mg/Kg	01/08/94 JTS

Order # 94-01-077
01/18/94 16:38

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TEST RESULTS BY SAMPLE

Sample: 04B RMD5TP10C1801

Collected: 01/07/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
230.5	50	mg/Kg	01/08/94	SN

Sample: 05A RMD5TP8C1801

Collected: 01/07/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5	mg/Kg	01/08/94	JTS

Sample: 05B RMD5TP8C1801

Collected: 01/07/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5.0	mg/Kg	01/08/94	SN

Sample: 06A RMD5TP9D1801

Collected: 01/07/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5	mg/Kg	01/08/94	JTS

Sample: 06B RMD5TP9D1801

Collected: 01/07/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5.0	mg/Kg	01/08/94	SN

Sample: 07A RMD5TP4H1801

Collected: 01/07/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5	mg/Kg	01/08/94	JTS

Sample: 07B RMD5TP4H1801

Collected: 01/07/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5.0	mg\Kg	01/08/94	SN

Order # 94-01-077
01/18/94 16:38

TEST RESULTS BY SAMPLE

Sample: 08A	RMD5TP5G1801	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>By</u>
		<5.0	5	mg/Kg	01/08/94 JTS
Sample: 08B	RMD5TP5G1801	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>By</u>
		<5.0	5.0	mg/Kg	01/08/94 SN
Sample: 09A	RMD5TP9C2001	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>By</u>
		9.9	5	mg/Kg	01/08/94 JTS
Sample: 09B	RMD5TP9C2001	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>By</u>
		92.2	50	mg/Kg	01/08/94 SN
Sample: 10A	RMD5PR3H0601	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>By</u>
		<5.0	5	mg/Kg	01/08/94 JTS
Sample: 10B	RMD5PR3H0601	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>By</u>
		<5.0	5.0	mg/Kg	01/08/94 SN
Sample: 11A	RMD5PR6H0601	Collected: 01/07/94 Category: SOIL			
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>By</u>
		<5.0	5	mg/Kg	01/08/94 JTS

Order # 94-01-077
01/18/94 16:38

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TEST RESULTS BY SAMPLE

Sample: 11B RMD5PR6H0601

Collected: 01/07/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5.0	mg/Kg	01/08/94	SN

Sample: 12A RMD5PR8H0601

Collected: 01/07/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5	mg/Kg	01/08/94	JTS

Sample: 12B RMD5PR8H0601

Collected: 01/07/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5.0	mg/Kg	01/08/94	SN

Sample: 13A RMD5PR10H0601

Collected: 01/07/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5	mg/Kg	01/08/94	JTS

Sample: 13B RMD5PR10H0601

Collected: 01/07/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
<5.0	5.0	mg/Kg	01/08/94	SN

Order # 94-01-077
01/18/94 15:39

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TEST METHODOLOGIES

Diesel Range Organics in Soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

Advance Sciences Inc.
6739 Academy Rd. NE
Alberquerque, NM 87109

Attn: Ellie Krueger
Invoice Number:

Order #: 94-01-078
Date: 01/18/94 16:38
Work ID: 9750K10-VANG-TANK PULL
Date Received: 01/08/94
Date Completed: 01/18/94
Client Code: 1103

Sampled by Advance Sciences

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>
01	RMD5TP3G1801
02	RMD5TP4F1801
03	RMD5TP5C1801

<u>Sample Number</u>	<u>Sample Description</u>
04	RMD5TP4B1801
05	RMD5TP3C1801
06	RMD5TP4D1801

Mindy Baldwin
Certified By

Order # 94-01-078
01/18/94 16:38

TEST RESULTS BY SAMPLE

Sample: 01A RMD5TP3G1801

Collected: 01/08/94 Category: SOIL

Test Description
Gasoline Range Organics

Result BDL
Limit 5
Units mg/Kg
Analyzed 01/08/94
By JTS

Sample: 01B RMD5TP3G1801

Collected: 01/08/94 Category: SOIL

Test Description
Diesel Range Organics

Result <5.0
Limit 5.0
Units mg/Kg
Analyzed 01/09/94
By SN

Sample: 02A RMD5TP4F1801

Collected: 01/08/94 Category: SOIL

Test Description
Gasoline Range Organics

Result BDL
Limit 5
Units mg/Kg
Analyzed 01/08/94
By JTS

Sample: 02B RMD5TP4F1801

Collected: 01/08/94 Category: SOIL

Test Description
Diesel Range Organics

Result 64.8
Limit 50
Units mg/Kg
Analyzed 01/09/94
By SN

Sample: 03A RMD5TP5C1801

Collected: 01/08/94 Category: SOIL

Test Description
Gasoline Range Organics

Result BDL
Limit 5
Units mg/Kg
Analyzed 01/08/94
By JTS

Sample: 03B RMD5TP5C1801

Collected: 01/08/94 Category: SOIL

Test Description
Diesel Range Organics

Result 5.3
Limit 5.0
Units mg/Kg
Analyzed 01/09/94
By SN

Sample: 04A RMD5TP4B1801

Collected: 01/08/94 Category: SOIL

Test Description
Gasoline Range Organics

Result 23.7
Limit 5
Units mg/Kg
Analyzed 01/08/94
By JTS

Order # 94-01-078
01/18/94 16:38

Page 3

TEST RESULTS BY SAMPLE

Sample: 04B RMD5TP4B1801

Collected: 01/08/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
32.56	5.0	mg/Kg	01/09/94	SN

Sample: 05A RMD5TP3C1801

Collected: 01/08/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
BDL	5	mg/Kg	01/08/94	JTS

Sample: 05B RMD5TP3C1801

Collected: 01/08/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
14.7	5.0	mg/Kg	01/09/94	SN

Sample: 06A RMD5TP4D1801

Collected: 01/08/94 Category: SOIL

Test Description
Gasoline Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
31.5	5	mg/Kg	01/08/94	JTS

Sample: 06B RMD5TP4D1801

Collected: 01/08/94 Category: SOIL

Test Description
Diesel Range Organics

<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
57.5	50.0	mg/Kg	01/09/94	SN

Order # 94-01-078
01/18/94 15:39

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TEST METHODOLOGIES

Diesel Range Organics in Soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

Advance Sciences Inc.
6739 Academy Rd. NE
Alberquerque, NM 87109

Attn: Ellie Krueger
Invoice Number:

Order #: 94-01-111
Date: 01/18/94 16:39
Work ID: 9750.K10-VANG TANK PULL
Date Received: 01/12/94
Date Completed: 01/18/94
Client Code: 1103

Sampled by Advance Sciences

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	RMD5 AT7G0701 GRAB
02	RMD5 AT 6C0701 GRAB

Sample Number	Sample Description
03	RMD5 AT 7C0701 GRAB
04	RMD56G0701 GRAB

AT

Mindy Bobbitt
Certified By

Order # 94-01-111
01/18/94 16:39

TEST RESULTS BY SAMPLE

Sample: 01A	RMD5 AT7G0701 GRAB	Collected: 01/11/94	Category: SOIL
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u> <5.0	<u>Limit</u> 5
		<u>Units</u> mg/Kg	<u>Analyzed</u> 01/12/94
			<u>By</u> JTS
Sample: 01B	RMD5 AT7G0701 GRAB	Collected: 01/11/94	Category: SOIL
<u>Test Description</u>	Diesel Range Organics	<u>Result</u> <5.0	<u>Limit</u> 5.0
		<u>Units</u> mg/Kg	<u>Analyzed</u> 01/12/94
			<u>By</u> SN
Sample: 02A	RMD5 AT 6C0701 GRAB	Collected: 01/11/94	Category: SOIL
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u> <5.0	<u>Limit</u> 5
		<u>Units</u> mg/Kg	<u>Analyzed</u> 01/12/94
			<u>By</u> JTS
Sample: 02B	RMD5 AT 6C0701 GRAB	Collected: 01/11/94	Category: SOIL
<u>Test Description</u>	Diesel Range Organics	<u>Result</u> <5.0	<u>Limit</u> 5.0
		<u>Units</u> mg/Kg	<u>Analyzed</u> 01/12/94
			<u>By</u> SN
Sample: 03A	RMD5 AT 7C0701 GRAB	Collected: 01/11/94	Category: SOIL
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u> <5.0	<u>Limit</u> 5
		<u>Units</u> mg/Kg	<u>Analyzed</u> 01/12/94
			<u>By</u> JTS
Sample: 03B	RMD5 AT 7C0701 GRAB	Collected: 01/11/94	Category: SOIL
<u>Test Description</u>	Diesel Range Organics	<u>Result</u> <5.0	<u>Limit</u> 5.0
		<u>Units</u> mg/Kg	<u>Analyzed</u> 01/12/94
			<u>By</u> SN
Sample: 04A	RMD56G0701 GRAB	Collected: 01/10/94	Category: SOIL
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u> <5.0	<u>Limit</u> 5
		<u>Units</u> mg/Kg	<u>Analyzed</u> 01/12/94
			<u>By</u> JTS

Order # 94-01-111
01/18/94 16:39

Page 3

TEST RESULTS BY SAMPLE

Sample: 04B RMD56G0701 GRAB Collected: 01/10/94 Category: SOIL

Test Description	Result	Limit	Units	Analyzed	By
Diesel Range Organics	<5.0	5.0	mg/Kg	01/12/94	SN

Order # 94-01-111
01/18/94 15:38

Page 4

TEST METHODOLOGIES

Diesel Range Organics in Soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

Advance Sciences Inc.
165 Mitchell Road
Oak Ridge, TN 37830

Attn: P. J. McMullen

Purchase Order: Subcontract #9750-3-94
Invoice Number:

Sampled by Advance Sciences

Order #: 94-02-141
Date: 02/21/94 12:54
Work ID: 9750K10-VANG-TANKPULL SITE4/5
Date Received: 02/14/94
Date Completed: 02/17/94

Client Code: 1103

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	RMD5FP11E0701 GRAB
02	RMD5VP9E0701 GRAB
03	RMD5PC8E0701 GRAB

Sample Number	Sample Description
04	RMD5PC6E0701 GRAB
05	RMD5PR10E0401 GRAB
06	RMD5AS6H0701 GRAB

Mindy Baldwin
Certified By

Order # 94-02-141
02/21/94 12:54

Page 2

TEST RESULTS BY SAMPLE

Sample: 01A	RMD5FP11E0701 GRAB	Collected: 02/10/94 Category: SOIL		
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u> <u>Analyzed</u> <u>By</u>
		BDL	5	mg/Kg 02/17/94 EVY
Sample: 01B	RMD5FP11E0701 GRAB	Collected: 02/10/94 Category: SOIL		
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u> <u>Analyzed</u> <u>By</u>
		BDL	5.0	mg/Kg 02/16/94 SN
Sample: 02A	RMD5VP9E0701 GRAB	Collected: 02/10/94 Category: SOIL		
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u> <u>Analyzed</u> <u>By</u>
		BDL	5.0	mg/Kg 02/16/94 EVY
Sample: 02B	RMD5VP9E0701 GRAB	Collected: 02/10/94 Category: SOIL		
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u> <u>Analyzed</u> <u>By</u>
		BDL	5.0	mg/Kg 02/16/94 SN
Sample: 03A	RMD5PC8E0701 GRAB	Collected: 02/10/94 Category: SOIL		
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u> <u>Analyzed</u> <u>By</u>
		BDL	5.0	mg/Kg 02/16/94 EVY
Sample: 03B	RMD5PC8E0701 GRAB	Collected: 02/10/94 Category: SOIL		
<u>Test Description</u>	Diesel Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u> <u>Analyzed</u> <u>By</u>
		BDL	5.0	mg/Kg 02/16/94 SN
Sample: 04A	RMD5PC6E0701 GRAB	Collected: 02/10/94 Category: SOIL		
<u>Test Description</u>	Gasoline Range Organics	<u>Result</u>	<u>Limit</u>	<u>Units</u> <u>Analyzed</u> <u>By</u>
		BDL	5.0	mg/Kg 02/16/94 EVY

Order # 94-02-141
02/21/94 12:54

TEST RESULTS BY SAMPLE

Sample: 04B	RMD5PC6E0701 GRAB	Collected: 02/10/94	Category: SOIL		
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>
Diesel Range Organics		BDL	5.0	mg/Kg	02/16/94
					By SN
Sample: 05A	RMD5PR10E0401 GRAB	Collected: 02/10/94	Category: SOIL		
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>
Gasoline Range Organics		BDL	5.0	mg/Kg	02/16/94
					By EVY
Sample: 05B	RMD5PR10E0401 GRAB	Collected: 02/10/94	Category: SOIL		
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>
Diesel Range Organics		BDL	5.0	mg/Kg	02/16/94
					By SN
Sample: 06A	RMD5AS6H0701 GRAB	Collected: 02/10/94	Category: SOIL		
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>
Gasoline Range Organics		BDL	5.0	mg/Kg	02/16/94
					By EVY
Sample: 06B	RMD5AS6H0701 GRAB	Collected: 02/10/94	Category: SOIL		
<u>Test Description</u>		<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>
Diesel Range Organics		BDL	5.0	mg/Kg	02/16/94
					By SN

Order # 94-02-141
02/21/94 12:54

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TEST METHODOLOGIES

Diesel Range Organics in Soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

Advance Sciences Inc.
165 Mitchell Road
Oak Ridge, TN 37830

Attn: P. J. McMullen

Purchase Order: Subcontract #9750-3-94
Invoice Number:

Order #: 94-02-142
Date: 02/21/94 12:54
Work ID: 9750K10-VANG-TANKPULL SITE4/5
Date Received: 02/14/94
Date Completed: 02/17/94

Client Code: 1103

Sampled by Advance Sciences

SAMPLE IDENTIFICATION

<u>Sample Number</u>	<u>Sample Description</u>
01	RMD5PR6F0401 GRAB
02	RMD5PR3E0401 GRAB

<u>Sample Number</u>	<u>Sample Description</u>
03	RMD5PR6C0401 GRAB

Mindy Baldwin
Certified By

Order # 94-02-142
02/21/94 12:54

TEST RESULTS BY SAMPLE

Sample: 01A	RMD5PR6F0401	GRAB	Collected: 02/11/94	Category: SOIL	
<u>Test Description</u>	Gasoline Range Organics		<u>Result</u>	<u>Limit</u>	<u>Units</u>
			BDL	5.0	mg/Kg
					<u>Analyzed</u>
					02/16/94
					<u>By</u>
					EVY
Sample: 01B	RMD5PR6F0401	GRAB	Collected: 02/11/94	Category: SOIL	
<u>Test Description</u>	Diesel Range Organics		<u>Result</u>	<u>Limit</u>	<u>Units</u>
			BDL	5.0	mg\Kg
					<u>Analyzed</u>
					02/16/94
					<u>By</u>
					SN
Sample: 02A	RMD5PR3E0401	GRAB	Collected: 02/11/94	Category: SOIL	
<u>Test Description</u>	Gasoline Range Organics		<u>Result</u>	<u>Limit</u>	<u>Units</u>
			BDL	5.0	mg/Kg
					<u>Analyzed</u>
					02/16/94
					<u>By</u>
					EVY
Sample: 02B	RMD5PR3E0401	GRAB	Collected: 02/11/94	Category: SOIL	
<u>Test Description</u>	Diesel Range Organics		<u>Result</u>	<u>Limit</u>	<u>Units</u>
			BDL	5.0	mg/Kg
					<u>Analyzed</u>
					02/16/94
					<u>By</u>
					SN
Sample: 03A	RMD5PR6C0401	GRAB	Collected: 02/11/94	Category: SOIL	
<u>Test Description</u>	Gasoline Range Organics		<u>Result</u>	<u>Limit</u>	<u>Units</u>
			BDL	5.0	mg/Kg
					<u>Analyzed</u>
					02/16/94
					<u>By</u>
					EVY
Sample: 03B	RMD5PR6C0401	GRAB	Collected: 02/11/94	Category: SOIL	
<u>Test Description</u>	Diesel Range Organics		<u>Result</u>	<u>Limit</u>	<u>Units</u>
			BDL	5.0	mg\Kg
					<u>Analyzed</u>
					02/16/94
					<u>By</u>
					SN

Order # 94-02-142
02/21/94 12:54

Page 3

TEST METHODOLOGIES

Diesel Range Organics in soil analysis was performed according to EPA SW846
Standard Methods, Method 8100.

LABORATORY QUALITY CONTROL DATA

ENVIRONMENTAL LABORATORIES INC.

Certified

Drinking Water Laboratory
Virginia Dept. General Services

Approved

Virginia Dept. Environmental Quality
Water Division

Accredited

American Industrial Hygiene
Association

U.S. Dept. Commerce
National Voluntary Laboratory
Accreditation Program

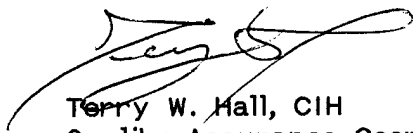
May 6, 1994

Advanced Sciences, Inc.
Attn: Mr. Joseph Hawk (9750.K10)
165 Mitchell Road
Oak Ridge, Tennessee 37830-7919

Dear Sir:

The laboratory quality control data required under our recent contract with your firm is enclosed. Please let me know if you have any questions or comments.

Sincerely,



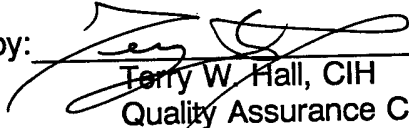
Terry W. Hall, CIH
Quality Assurance Coordinator

**QA/QC REPORT
for
ADVANCE SCIENCES**

Work Orders

94-01-058
94-01-077
94-01-078
94-01-111
94-01-225
94-01-245
94-02-106
94-02-141
94-02-142

Submitted by: _____


Terry W. Hall, CIH
Quality Assurance Coordinator

May 6, 1994

QA/QC REPORT TABLE OF CONTENTS

Client: Advance Sciences
Project: 9750-K10-VANG Tank Pull
Report Date: 05/06/94

	page #
Analytical Run Summary	1
Matrix Spikes and Matrix Spike Duplicates	2 - 6
Blanks	7 - 12

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT ANALYTICAL RUN SUMMARY

Report Date: 05/06/94

Work Order #	Analysis	Run Date/Time		Instrument
9401058	DRO	1/7/94		GC01
	GRO	1/7/94		GC03
9401077	DRO	1/8/94		GC01
	GRO	1/8/94		GC03
	GRO	1/9/94		GC03
9401078	DRO	1/9/94		GC01
	GRO	1/8/94		GC03
	GRO	1/9/94		GC03
9401111	DRO	1/12-13/94		GC01
	GRO	1/12/94		GC03
9401225	DRO	1/27/94		GC01
	GRO	1/27-29/94		GC03
9401245	DRO	1/29/94		GC01
	GRO	1/27-29/94		GC03
9402106	Arsenic	2/17/94	09:19	AA_G2
	Arsenic	4/28/94	16:49	AA_G2
	Barium	2/23/94	09:17	AA_G2
	Chromium	2/17/94	16:59	AA_G2
	Lead	2/20/94	14:29	AA_G2
	Mercury	2/18/94	16:25	AA_CV
	Selenium	2/18/94	11:37	AA_G2
	Silver	2/15/94	08:50	AA_G2
	Volatiles	2/14/94	11:58	MS01
	Volatiles	2/16/94	15:03	MS01
9402141	DRO	2/16/94		GC01
	GRO	2/16-17/94		GC03
9402142	DRO	2/16/94		GC01
	GRO	2/16-17/94		GC03

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT
MATRIX SPIKES, MATRIX SPIKE DUPLICATES
Report Date: 05/06/94

Run Date/Time: 2/18/94 16:25			Instrument: AA_CV		Analyst: BZ		Units: mg/L		
Method: AAS Cold Vapor									
Sample #			Analyte – Matrix	Original Result	Spike Amount	Spike Recovery Result (%)	Limits	RPD	Limit
9402122-01A	KM	Hg – TCLP		0.00005	0.002	0.00222	108.5 75-125		
9402122-01A	KMD	Hg – TCLP		0.00005	0.002	0.00219	107.0 75-125	1.4	20
9402066-02M	KM	Hg – Water		0.0001	0.002	0.00214	102.0 80-120		
9402066-02M	KMD	Hg – Water		0.0001	0.002	0.00204	97.0 80-120	4.8	20
9402106-04B	KM	Hg – Soil		0.00014	0.002	0.00235	110.5 75-125		
9402106-04B	KMD	Hg – Soil		0.00014	0.002	0.00218	102.0 75-125	7.5	20
9402176-01A	KM	Hg – TCLP		0.00006	0.002	0.00232	113.0 75-125		

Run Date/Time:		2/17/94 16:59	Instrument: AA_G2		Analyst: MH		Units: mg/L		
Method:		AAS Furnace							
Sample #		Analyte-Matrix	Original Result	Spike Amount	Spike Recovery Result (%)		Limits	RPD	Limit
9402073-01A	KM	Cr - Oil	0.0036	0.002	0.0054	90.0	75-125		
9402073-01A	KMD	Cr - Oil	0.0036	0.002	0.0054	90.0	75-125	0	20
9402095-02C	KM	Cr - Water	0.0008	0.002	0.0026	90.0	80-120		
9402095-02C	KMD	Cr - Water	0.0008	0.002	0.0025	85.0	80-120	3.9	20
9402110-02A	KM	Cr - Oil	0.0071	0.0025	0.0096	100.0	75-125		
9402110-05A	KM	Cr - Oil	0.0044	0.002	0.0069	125.0	75-125		
9402110-05A	KMD	Cr - Oil	0.0044	0.002	0.006	80.0	75-125	14	20
9402130-01A	KM	Cr - Water	0.0056	0.0025	0.0077	84.0	80-120		
9402054-05D	KM	Cr - Water	0.0034	0.0025	0.0055	84.0	80-120		
9402106-03B	KM	Cr - Soil	0.0061	0.0025	0.0082	84.0	75-125		

Run Date/Time:		2/15/94 08:50	Instrument: AA_G2		Analyst: MH		Units: mg/L		
Method:		AAS Furnace							
Sample #		Analyte-Matrix	Original Result	Spike Amount	Spike Recovery Result (%)		Limits	RPD	Limit
9402029-03A	KM	Ag - Water	0.003	0.002	0.00523	111.5	80-120		
9402029-03A	KMD	Ag - Water	0.003	0.002	0.00454	77.0	80-120	14.1	20
9402106-02B	KM	Ag - Soil	0.00015	0.0033	0.00268	76.7	75-125		

Run Date/Time:		2/17/94 09:19		Instrument: AA_G2		Analyst: MH		Units: mg/L	
Method:		AAS Furnace							
Sample #		Analyte-Matrix		Original Result	Spike Amount	Spike Recovery Result (%) Limits		RPD Limit	
9402061-01F	KM	As - Water		0.0023	0.025	0.028	102.8	80-120	
9402066-02M	KMD	As - Water		0.0023	0.02	0.0204	90.5	80-120	
9402066-02M	KMD	As - Water		0.0023	0.02	0.0215	96.0	5.3	20
9402073-01	KM	As - Oil		0.0014	0.02	0.0237	111.5	75-125	
9402073-01	KMD	As - Oil		0.0014	0.02	0.0207	96.5	13.5	20
9402050-01E	KM	As - Soil		0.0018	0.025	0.023	84.8	75-125	
9402106-04B	KM	As - Soil		0.0134	0.02	0.0367	116.5	75-125	
9402106-04B	KMD	As - Soil ¹		0.0134	0.02	0.021	38.0	54.4	20
9402110-01A	KM	As - Oil		0.0025	0.025	0.0289	105.6	75-125	
9402110-05A	KM	As - Oil		BDL	0.02	0.0209	104.5	75-125	
9402110-05A	KMD	As - Oil		BDL	0.02	0.0204	102.0	2.4	20
¹ Analysis was repeated 4/28/94. Subsequent recovery acceptable.									

¹ Analysis was repeated 4/28/94. Subsequent recovery acceptable.

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT
MATRIX SPIKES, MATRIX SPIKE DUPLICATES
Report Date: 05/06/94

Run Date/Time:		2/20/94 14:29	Instrument: AA_G2		Analyst: MH		Units: mg/L	
Method:		AAS Furnace						
Sample #		Analyte-Matrix	Original Result	Spike Amount	Spike Recovery Result (%) Limits		RPD	Limit
9402087-01B	KM	Pb - Water	0.0034	0.02	0.0244	105.0 80-120		
9402087-01B	KMD	Pb - Water	0.0034	0.02	0.0238	102.0 80-120	2.5	20
9402095-02C	KM	Pb - Water	0.0024	0.02	0.0227	101.5 80-120		
9402095-02C	KMD	Pb - Water	0.0024	0.02	0.0193	84.5 80-120	16.2	20
9402117-01A	KM	Pb - Water	0.0183	0.025	0.0422	95.6 80-120		
9402131-01A	KM	Pb - Water	0.0012	0.025	0.0244	92.8 80-120		
9402106-02B	KM	Pb - Soil	0.0719	0.025	0.098	104.4 75-125		
9402106-04B	KM	Pb - Soil	0.0654	0.02	0.0844	95.0 75-125		
9402106-04B	KMD	Pb - Soil	0.0654	0.02	0.0841	93.5 75-125	0.4	20
9402110-04A	KM	Pb - Oil	0.0743	0.025	0.0957	85.6 75-125		
9402110-05A	KM	Pb - Oil 1	0.0643	0.02	0.0954	128.7 75-125		
9402110-05A	KMD	Pb - Oil 1	0.0643	0.02	0.073	70.3 75-125	26.6	20
1 Acceptable performance limits under evaluation at time of analysis.								

¹ Acceptable performance limits under evaluation at time of analysis.

Run Date/Time:		2/18/94 11:37	Instrument: AA_G2		Analyst: MH		Units: mg/L	
Method:		AAS Furnace						
Sample #	Analyte—Matrix	Original Result	Spike Amount	Spike Recovery Result	(%) Limits	RPD Limit		
9402106—04B KM	Se — Soil	BDL	0.025	0.0231	92.4 75—125			

Run Date/Time: 2/23/94 09:17			Instrument: AA_G2		Analyst: MH		Units: mg/L		
Method: AAS Furnace									
Sample #			Analyte—Matrix	Original Result	Spike Amount	Spike Recovery Result (%)	Limits	RPD	Limit
9402106—03B	KM	Ba — Soil	0.064	0.025	0.093	116.0	75—125		
9402106—04B	KM	Ba — Soil	0.098	0.02	0.107	45.0	75—125		
9402106—04B	KMD	Ba — Soil	0.098	0.02	0.033	42.5	75—125	105.	20
9402177—03A	KM	Ba — Water	0.068	0.025	0.099	124.0	80—120		
9402178—01A	KM	Ba — Water	0.011	0.02	0.031	100.0	80—120		
9402178—01A	KMD	Ba — Water	0.011	0.02	0.032	105.0	80—120	3.2	20

Run Date/Time:		2/21/94 15:57		Instrument: AA_G2		Analyst: MH		Units: mg/L	
Method:		AAS Furnace							
Sample #		Analyte – Matrix		Original Result	Spike Amount	Spike Recovery Result	(%) Limits	RPD Limit	
9402106–04B	KM	Cd – Soil	¹	0.00029	0.002	0.00322	132.0 75–125		
9402106–04B	KMD	Cd – Soil	¹	0.00029	0.002	0.00325	133.5 75–125	0.9	20
9402110–01A	KM	Cd – Oil		0.00171	0.002	0.0042	124.5 75–125		
9402110–05A	KM	Cd – Oil	²	0.00165	0.0005	0.00195	32.5 75–125		
9402110–05A	KMD	Cd – Oil	²	0.00165	0.0005	0.0016	17.5 75–125	19.7	20
¹ Analysis was repeated by Standard Additions									
² Spike recovery masked by high dilution factor.									

¹ Analysis was repeated by Standard Additions

² Spike recovery masked by high dilution factor.

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT
MATRIX SPIKES, MATRIX SPIKE DUPLICATES
Report Date: 05/06/94

Run Date/Time:		4/28/94 1649		Instrument: AA_G2		Analyst: MH		Units: mg/L	
Method:		AAS Furnace							
Sample #		Analyte—Matrix	Original Result	Spike Amount	Spike Recovery Result (%)	Limits	RPD Limit		
9402106—04B KM		As — Soil	0.0128	0.02	0.0323	97.5	75—125		
9402106—04B KMD		As — Soil	0.0128	0.02	0.0334	103.0	75—125	3.3	20

Run Date/Time:		2/16/94	Instrument: MS_01		Analyst: EVY		Units: ug/kg	
Method:		8240						
Sample #	Analyte		Original Result	Spike Amount	Spike Recovery Result	(%) Limits	RPD Limit	
9402106-01A	KM	1,1-Dichloroethene	BDL	50	77.6	155.2	59-172	
9402106-01A	KMD		BDL	50	79.6	159.2		2.5 22
9402106-01A	KM	Trichloroethene	BDL	50	45.9	91.8	62-137	
9402106-01A	KMD		BDL	50	46	92.0		0.2 24
9402106-01A	KM	Benzene	BDL	50	55.9	111.8	66-142	
9402106-01A	KMD		BDL	50	55.6	111.2		0.5 21
9402106-01A	KM	Toluene	BDL	50	48.7	97.4	59-139	
9402106-01A	KMD		BDL	50	49	98.0		0.6 21
9402106-01A	KM	Chlorobenzene	BDL	50	48.8	97.6	60-133	
9402106-01A	KMD		BDL	50	48.9	97.8		0.2 31

Run Date/Time: 1/7/94			Instrument: GC_03		Analyst: TS		Units: mg/kg	
Method: GRO								
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result (%)	Limits	RPD Limit	
9401058-01	KM	GRO	< 5	0.25	0.26	104.0	none	
	KMD	GRO	< 5	0.25	0.24	96.0	none	8 none

Run Date/Time: 1/8/94			Instrument: GC_03		Analyst: TS		Units: mg/kg	
Method: GRO								
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result (%)		Limits	RPD Limit
9401078-01	KM	GRO	< 5	0.25	0.257	102.8	none	
	KMD	GRO	< 5	0.25	0.24	96.0	none	6.8 none

Run Date/Time:		1/9/94		Instrument: GC_03		Analyst: MB		Units: mg/kg	
Method:		GRO							
Sample #		Analyte		Original Result	Spike Amount	Spike Recovery Result (%)	Limits	RPD Limit	
9401078-01 KM		GRO		< 5	0.25	0.215	86.0	none	
(re-run)		KMD GRO		< 5	0.25	0.284	113.6	none 27.7 none	

Run Date/Time:		1/12/94		Instrument: GC_03		Analyst: TS		Units: mg/kg	
Method:		GRO							
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result (%)		Limits	RPD Limit	
9401111-01		KM GRO	< 5	0.25	0.24	96.0	none		
		KMD GRO	< 5	0.25	0.29	116.0	none	18.9	none

ENVIRONMENTAL LABORATORIES INC.

MATRIX SPIKES, MATRIX SPIKE DUPLICATES

Report Date: 05/06/94

Run Date/Time:		1/27-29/94		Instrument: GC_03		Analyst: MB		Units: mg/kg	
Method:		GRO							
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result	(%)	Limits	RPD Limit	
9401245-02	KM	GRO	< 5	0.25	0.188	75.2	none		
	KMD	GRO	< 5	0.25	0.175	70.0	none	7.2 none	

Run Date/Time:		2/16-17/94		Instrument: GC_03		Analyst: EVY		Units: mg/kg	
Method:		GRO							
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result	(%)	Limits	RPD Limit	
9402141-02	KM	GRO	< 5	0.25	0.23	92.0	none		
	KMD	GRO	< 5	0.25	0.25	100.0	none	8.3	none

Run Date/Time:		1/7/94		Instrument: GC_01		Analyst: SN		Units: mg/kg	
Method:		DRO							
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result	(%) Limits	RPD Limit		
9401058-01	KM	DRO	BDL	500	227.6	46.0 none			
	KMD	DRO	BDL	500	347.3	69.0 none	41.6 none		

Run Date/Time:		1/8/94	Instrument: GC_01		Analyst: SN	Units:	mg/kg
Method:		DRO					
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result	(%) Limits	RPD Limit
9401077-01	KM	DRO	7.1	500	370.8	74.0 none	

Run Date/Time:		1/9/94		Instrument: GC_01		Analyst: SN		Units: mg/kg	
Method:		DRO							
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result	(%) Limits	RPD Limit		
9401078-01	KM	DRO	BDL	500	292	53.0	none		
	KMD	DRO	BDL	500	256.6	51.0	none 12.9 none		

Run Date/Time:		1/12-13/94		Instrument: GC_01		Analyst: SN		Units: mg/kg	
Method:		DRO							
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result	(%)	Limits	RPD Limit	
9401111-04	KM	DRO	BDL	500	251.4	50.0	none		
	KMD	DRO	BDL	500	273.9	54.0	none	8.6	none

Run Date/Time:		1/27/94		Instrument: GC_01		Analyst: SN		Units: mg/kg	
Method:		DRO							
Sample #		Analyte		Original Result	Spike Amount	Spike Recovery Result (%)		Limits	RPD Limit
9401225-01	KM	DRO		BDL	500	259.4	52.0	none	
	KMD	DRO		BDL	500	278.1	56.0	none	7 none

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT

MATRIX SPIKES, MATRIX SPIKE DUPLICATES

Report Date:

05/06/94

Run Date/Time:		1/29/94	Instrument: GC_01		Analyst: SN	Units:	mg/kG
Method:		DRO					
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result (%)	Limits	RPD Limit
9401245-01	KM	DRO	8.2	500	235.9	47.0 none	

Run Date/Time:		2/16/94	Instrument: GC_01		Analyst: SN	Units:	mg/kG
Method:		DRO					
Sample #		Analyte	Original Result	Spike Amount	Spike Recovery Result (%)	Limits	RPD Limit
9402141-01	KM	DRO	BDL	500	209.4	42.0 none	
	KMD	DRO	BDL	500	187.3	37.0 none	11.1 none

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT

BLANKS

Report Date:

05/06/94

Run Date/Time: 2/18/94 16:25		Instrument: AA_CV		Analyst: BZ	Units: mg/L
Method: AAS Cold Vapor					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
TC BK 2/18	Hg	TCLP	0.00003	50	0.01

Run Date/Time: 2/17/94 16:59		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 2/8	Cr	Oil	0.003	500	0.4
DG BK 2/14	Cr	Water	0.0004	1	0.008
DG BK 2/14	Cr	Soil	0.0054	100	0.08
DG BK 2/14	Cr	Oil	0.0056	500	0.4
DG BK 2/15	Cr	Water	< 0.0008	1	0.0008

Run Date/Time: 2/10/94 09:27		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 2-4	Ag	Water	0.00004	1	0.0005
DG BK 2-8	Ag	Water	0.00002	1	0.0005

Run Date/Time: 2/15/94 08:50		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 2-14	Ag	Soil	0.00001	100	0.05
DG BK 2-8	Ag	Water	0.0011	1	0.0005
DG BK 2/18 OIL	Ag	Oil	0.0003	500	0.25
DG BK 2-8	Ag	Soil	0.0013	100	0.05
DG BK 2-15	Ag	Water	0.0018	1	0.0005
DG BK 2-14	Ag	Oil	0.0018	500	0.25

Run Date/Time: 2/20/94 14:29		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 2-9	Pb	Water	0.002	1	0.005
DG BK 2-14	Pb	Water	0.0064	1	0.005
DG BK 2-15	Pb	Water	0.0048	1	0.005
DG BK 2-14	Pb	Soil	0.0028	100	0.5
DG BK 2/14	Pb	Oil	0.0017	500	2.5

Run Date/Time: 2/18/94		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 2/8	Se	Soil	0.0008	100	0.5
DG BK 2/8	Se	Water	0.0009	1	0.005
DG BK 2/14	Se	Soil	0.0035	100	0.5

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT

BLANKS

Report Date:

05/06/94

Run Date/Time: 2/23/94 09:17		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 2/14	Ba	Soil	- 0.002	100	0.5
DG BK 2/22	Ba	Water	- 0.001	1	0.005

Run Date/Time: 2/21/94 15:57		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 2/14	Cd	Soil	0.00022	100	0.05
DG BK 2/14 OIL	Cd	Oil	0.00042	500	0.25

Run Date/Time: 4/28/94 16:49		Instrument: AA_G2		Analyst: MH Units: mg/L	
Method: AAS Furnace					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DG BK 4/28	As	Soil	0.0017	100	0.005

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT

BLANKS

Report Date:

05/06/94

Run Date/Time: 2/14/94 11:58		Instrument: MS_01	Analyst: EVY Units: ug/kG		
Method: 8240					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Chloromethane	Soil	BDL	1	10
DI Blank	Vinyl chloride	Soil	BDL	1	10
DI Blank	Bromomethane	Soil	BDL	1	10
DI Blank	Chloroethane	Soil	BDL	1	10
DI Blank	Trichlorofluoroethane	Soil	****	1	****
DI Blank	Acrolein	Soil	****	1	****
DI Blank	Acetone	Soil	BDL	1	100
DI Blank	1,1-Dichloroethene	Soil	BDL	1	2.8
DI Blank	Methylene chloride	Soil	BDL	1	2.8
DI Blank	Carbon disulfide	Soil	BDL	1	100
DI Blank	Acrylonitrile	Soil	****	1	****
DI Blank	(trans) 1,2-Dichloroethene	Soil	BDL	1	1.6
DI Blank	Vinyl acetate	Soil	BDL	1	50
DI Blank	1,1-Dichloroethane	Soil	BDL	1	4.7
DI Blank	2-Butanone	Soil	BDL	1	100
DI Blank	Chloroform	Soil	BDL	1	1.6
DI Blank	1,1,1-Trichloroethane	Soil	BDL	1	3.8
DI Blank	Carbon tetrachloride	Soil	BDL	1	2.8
DI Blank	1,2-Dichloroethane	Soil	BDL	1	2.8
DI Blank	Benzene	Soil	BDL	1	4.4
DI Blank	Trichloroethene	Soil	BDL	1	1.9
DI Blank	1,2-Dichloropropane	Soil	BDL	1	6
DI Blank	Bromochloromethane	Soil	BDL	1	2.2
DI Blank	2-Chloroethylvinyl ether	Soil	BDL	1	50
DI Blank	4-Methyl-2-pentanone	Soil	BDL	1	10
DI Blank	(cis) 1,3-Dichloropropene	Soil	BDL	1	5
DI Blank	Toluene	Soil	BDL	1	6
DI Blank	(trans) 1,3-Dichloropropene	Soil	BDL	1	5
DI Blank	1,1,2-Trichloroethane	Soil	BDL	1	5
DI Blank	2-Hexanone	Soil	BDL	1	10
DI Blank	Tetrachloroethene	Soil	BDL	1	4.1
DI Blank	Dibromochloromethane	Soil	BDL	1	3.1
DI Blank	Chlorobenzene	Soil	BDL	1	6
DI Blank	Ethylbenzene	Soil	BDL	1	7.2
DI Blank	m,p-Xylene	Soil	BDL	1	10
DI Blank	o-Xylene	Soil	BDL	1	5
DI Blank	Styrene	Soil	BDL	1	5
DI Blank	Bromoform	Soil	BDL	1	4.7
DI Blank	1,1,2,2-Tetrachloroethane	Soil	BDL	1	6.9
DI Blank	1,3-Dichlorobenzene	Soil	****	1	****
DI Blank	1,4-Dichlorobenzene	Soil	****	1	****
DI Blank	1,2-Dichlorobenzene	Soil	****	1	****

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT

BLANKS

Report Date:

05/06/94

Run Date/Time: 2/16/94 15:03		Instrument: MS_01		Analyst: EVY Units: ug/kG	
Method: 8240					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Chloromethane	Soil	BDL	1	10
DI Blank	Vinyl chloride	Soil	BDL	1	10
DI Blank	Bromomethane	Soil	BDL	1	10
DI Blank	Chloroethane	Soil	BDL	1	10
DI Blank	Trichlorofluoroethane	Soil	****	1	****
DI Blank	Acrolein	Soil	****	1	****
DI Blank	Acetone	Soil	BDL	1	100
DI Blank	1,1-Dichloroethene	Soil	BDL	1	2.8
DI Blank	Methylene chloride	Soil	BDL	1	2.8
DI Blank	Carbon disulfide	Soil	BDL	1	100
DI Blank	Acrylonitrile	Soil	****	1	****
DI Blank	(trans) 1,2-Dichloroethene	Soil	BDL	1	1.6
DI Blank	Vinyl acetate	Soil	BDL	1	50
DI Blank	1,1-Dichloroethane	Soil	BDL	1	4.7
DI Blank	2-Butanone	Soil	BDL	1	100
DI Blank	Chloroform	Soil	BDL	1	1.6
DI Blank	1,1,1-Trichloroethane	Soil	BDL	1	3.8
DI Blank	Carbon tetrachloride	Soil	BDL	1	2.8
DI Blank	1,2-Dichloroethane	Soil	BDL	1	2.8
DI Blank	Benzene	Soil	BDL	1	4.4
DI Blank	Trichloroethene	Soil	BDL	1	1.9
DI Blank	1,2-Dichloropropane	Soil	BDL	1	6
DI Blank	Bromochloromethane	Soil	BDL	1	2.2
DI Blank	2-Chloroethylvinyl ether	Soil	BDL	1	50
DI Blank	4-Methyl-2-pentanone	Soil	BDL	1	10
DI Blank	(cis) 1,3-Dichloropropene	Soil	BDL	1	5
DI Blank	Toluene	Soil	BDL	1	6
DI Blank	(trans) 1,3-Dichloropropene	Soil	BDL	1	5
DI Blank	1,1,2-Trichloroethane	Soil	BDL	1	5
DI Blank	2-Hexanone	Soil	BDL	1	10
DI Blank	Tetrachloroethene	Soil	BDL	1	4.1
DI Blank	Dibromochloromethane	Soil	BDL	1	3.1
DI Blank	Chlorobenzene	Soil	BDL	1	6
DI Blank	Ethylbenzene	Soil	BDL	1	7.2
DI Blank	m,p-Xylene	Soil	BDL	1	10
DI Blank	o-Xylene	Soil	BDL	1	5
DI Blank	Styrene	Soil	BDL	1	5
DI Blank	Bromoform	Soil	BDL	1	4.7
DI Blank	1,1,2,2-Tetrachloroethane	Soil	BDL	1	6.9
DI Blank	1,3-Dichlorobenzene	Soil	****	1	****
DI Blank	1,4-Dichlorobenzene	Soil	****	1	****
DI Blank	1,2-Dichlorobenzene	Soil	****	1	****

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT

BLANKS

Report Date:

05/06/94

Run Date/Time: 1/7/94		Instrument: GC_03		Analyst: TS	Units: mg/kG
Method: GRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Gasoline Range Organics	Soil	BDL	1	5

Run Date/Time: 1/8/94		Instrument: GC_03		Analyst: TS	Units: mg/kG
Method: GRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Gasoline Range Organics	Soil	BDL	1	5

Run Date/Time: 1/9/94		Instrument: GC_03		Analyst: MB	Units: mg/kg
Method: GRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Gasoline Range Organics	Soil	BDL	1	5

Run Date/Time: 1/12/94		Instrument: GC_03		Analyst: TS	Units: mg/kg
Method: GRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Gasoline Range Organics	Soil	BDL	1	5

Run Date/Time: 1/27-29/94		Instrument: GC_03		Analyst: MB	Units: mg/kg
Method: GRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Gasoline Range Organics	Soil	BDL	1	5
DI Blank	Gasoline Range Organics	Soil	BDL	1	5

Run Date/Time: 2/16–17/94		Instrument: GC_03		Analyst: EVY Units: mg/kg	
Method: GRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
DI Blank	Gasoline Range Organics	Soil	BDL	1	5
DI Blank	Gasoline Range Organics	Soil	BDL	1	5

ENVIRONMENTAL LABORATORIES INC.

QA/QC REPORT

BLANKS

Report Date:

05/06/94

Run Date/Time: 1/7/94		Instrument: GC_01		Analyst: SN	Units: mg/kg
Method: DRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
PREP BLANK	Diesel Range Organics	Soil	BDL	1	5

Run Date/Time: 1/8/94		Instrument: GC_01		Analyst: SN	Units: mg/kg
Method: DRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
PREP BLANK	Diesel Range Organics	Soil	BDL	1	5

Run Date/Time: 1/9/94		Instrument: GC_01		Analyst: SN	Units: mg/kg
Method: DRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
PREP BLANK	Diesel Range Organics	Soil	BDL	1	5

Run Date/Time: 1/12-13/94		Instrument: GC_01		Analyst: SN	Units: mg/kg
Method: DRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
PREP BLANK	Diesel Range Organics	Soil	BDL	1	5

Run Date/Time: 1/27/94		Instrument: GC_01		Analyst: SN	Units: mg/kg
Method: DRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
PREP BLANK	Diesel Range Organics	Soil	BDL	1	5

Run Date/Time: 1/29/94			Instrument: GC_01		Analyst: SN		Units: mg/kg
Method: DRO							
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit		
PREP BLANK	Diesel Range Organics	Soil	BDL	1	5		

Run Date/Time: 2/16/94		Instrument: GC_01		Analyst: SN	Units: mg/kg
Method: DRO					
Sample #	Analyte	Matrix	Result	Dilution Factor	Detection Limit
PREP BLANK	Diesel Range Organics	Soil	BDL	1	5