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# INSTALLATION RESTORATION PROGRAM

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Final  
**UST REMOVAL REPORT**

**117th REFUELING WING**  
Alabama Air National Guard  
Birmingham Airport  
Birmingham, Alabama

and

**226th COMBAT INFORMATION SYSTEMS GROUP**  
Martin Air National Guard Station  
Gadsden Airport  
Gadsden, Alabama

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INSTALLATION RESTORATION PROGRAM

UST REMOVAL REPORT

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ALABAMA AIR NATIONAL GUARD  
BIRMINGHAM AIRPORT

and

226th COMBAT INFORMATION SYSTEMS GROUP  
MARTIN AIR NATIONAL GUARD STATION  
GADSDEN AIRPORT

Submitted to:

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MARTIN MARIETTA ENERGY SYSTEMS, INC.  
OAK RIDGE, TENNESSEE

for the

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JANUARY 1997

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## ACRONYMS

AANG	Alabama Air National Guard
ADEM	Alabama Department of Environmental Management
ANG	Air National Guard
ANGS	Air National Guard Station
ANGRC	Air National Guard Readiness Center
API	American Petroleum Institute
BTEX	Benzene, Toluene, Ethyl Benzene, and Xylene
CAL	Corrective Action Limits
DOD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency
gpm	gallons per minute
GPR	Ground Penetrating Radar
HAZWRAP	Hazardous Waste Remedial Actions Program
IRP	Installation Restoration Program
IT	IT Corporation of Port Allen, Louisiana
N/A	Not Available
NFAR	No Further Action Required
NGB	National Guard Bureau
NS	Not Sampled
OWS	Oil/Water Separator
PA	Preliminary Assessment
POL	Petroleum, Oil, and Lubricants
POTW	Publicly Owned Treatment Works
ppb	parts per billion
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SI	Site Investigation
TPH	Total Petroleum Hydrocarbon
USPFO	United States Property and Fiscal Office
UST	Underground Storage Tank
VOC	Volatile Organic Compound

## EXECUTIVE SUMMARY

The Installation Restoration Program (IRP) was initiated by the Air National Guard Readiness Center (ANGRC), previously known as the National Guard Bureau (NGB), to evaluate potential contamination to the environment caused by past practices at Air National Guard (ANG) installations. As a part of this phased program, abandoned underground storage tanks (USTs) are investigated, tanks are removed (if found), and a recommendation for further consideration at each UST site is developed.

Ten abandoned USTs at nine sites were identified during a preliminary assessment (PA) of the Alabama Air National Guard (AANG) bases at Birmingham and Gadsden. (HMTC, 1987).

During the site investigation (SI) (CH2M Hill, 1991), the general approach to investigate the potential areas of contamination included conducting a survey to locate the tanks and obtain historical data, preparing plans and specifications for tank removals, removing the abandoned USTs and their associated liquids and contaminated soils, monitoring environmental conditions through analytical testing, and providing a report that details additional work that may be necessary.

No tanks were found in the areas of UST 30, 175, 211, 301, and 450 during the field survey. Therefore, it is recommended that no further action be taken at these sites.

The UST at Gadsden (UST 1) was removed in November 1989. UST 380 at Birmingham was removed in January 1991. The soils remaining at these former UST pits are below the Alabama Department of Environmental Management's (ADEM's) corrective action limit of 100 parts per million (ppm) total petroleum hydrocarbon (TPH). It is recommended that these USTs be removed from further IRP consideration and that no further action be taken.

USTs 120 and 130 were removed in January 1991 at the Birmingham facility. Soils that remain at the former UST sites are above ADEM's corrective action limit of 100 ppm TPH, but the contamination is believed to be limited to soils directly adjacent to the tank pits. The nature of the materials which were stored in the USTs (diesel fuels, typically not mobile in similar geologic environments) reinforces this conclusion.

On the basis of recommendations (ADEM, 1991) it is recommended that no further action be taken at these UST sites, and that they be removed from further IRP consideration. Table ES.1 presents the disposition of the UST sites.

<b>Table ES.1. UST Summary</b>		
<b>UST</b>	<b>Capacity (Gallons)</b>	<b>Decision</b>
1	2,000	NFAR
30	UST not found	NFAR
120	1,600	NFAR
130	4,100	NFAR
175	UST not found	NFAR
211	UST not found	NFAR
301	UST not found	NFAR
380	280	NFAR
450	UST not found	NFAR
<b>Note:</b> NFAR = No Further Action Required		

## 1. INTRODUCTION

The Air National Guard Readiness Center (ANGRC), previously known as the National Guard Bureau (NGB), through the Air National Guard (ANG), initiated an Installation Restoration Program (IRP) in response to the policies of the Department of Defense (DOD).

The IRP was developed as a phased program for identifying and addressing environmental contamination caused by past practices at ANG installations. As a part of the IRP, the ANGRC entered into an interagency agreement with the Department of Energy (DOE). The DOE provides technical assistance for implementing this program. The Hazardous Waste Remedial Actions Program (HAZWRAP), as a DOE contractor, is responsible for managing this effort under the interagency agreement.

A preliminary assessment (PA) of the Alabama Air National Guard (AANG) facility at Birmingham revealed potentially contaminated areas (HMTC, 1987). As a result of the PA, a site investigation (SI) was initiated through the IRP (CH2M Hill, 1991) v. The location map for the AANG facility in Birmingham is presented as Figure 1.1. Several abandoned underground storage tanks (USTs) were included in the SI at areas where the potential for contamination from underground tanks existed.

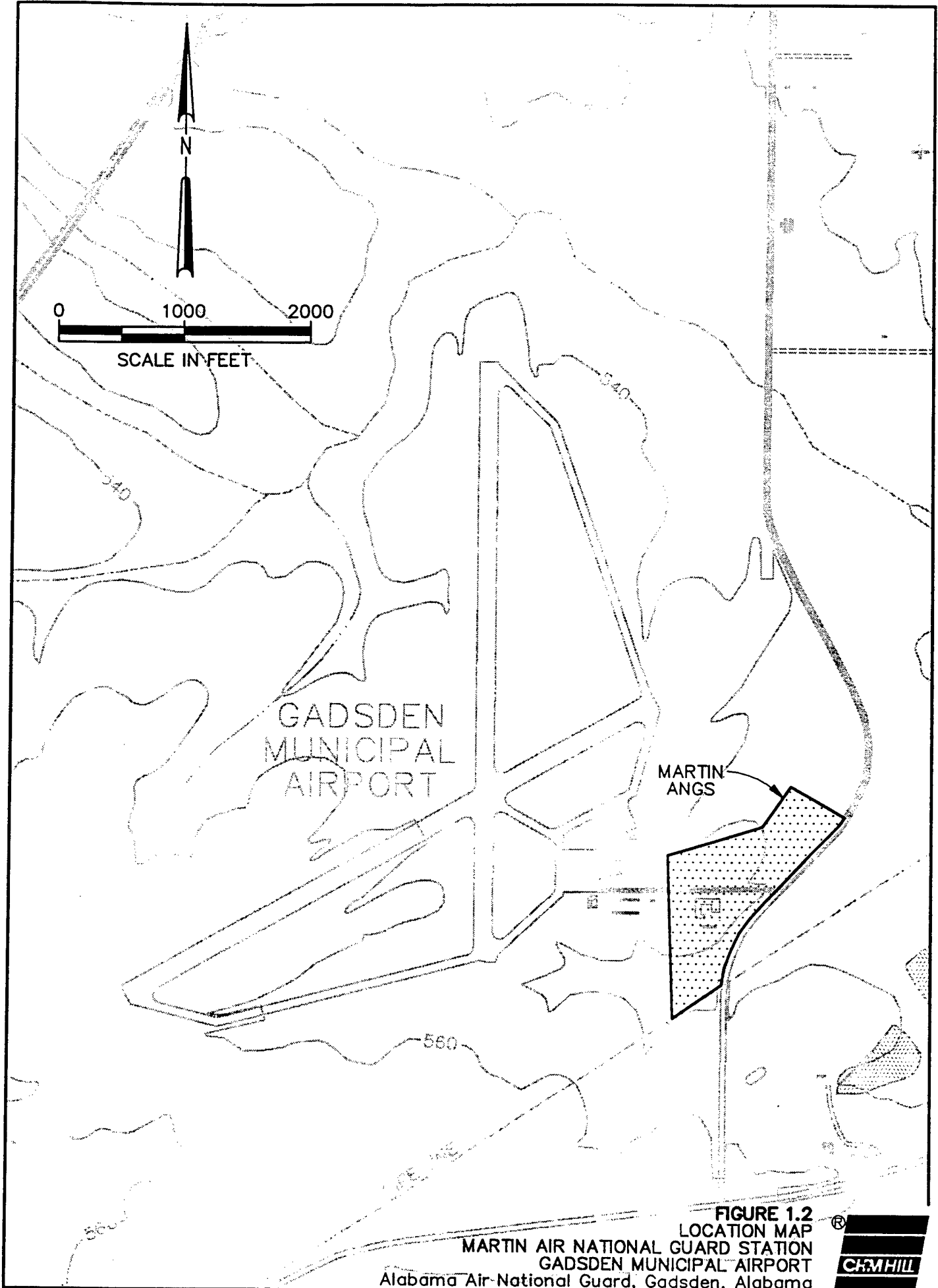
The location map for the Martin Air National Guard Station (ANGS) in Gadsden is presented as Figure 1.2. One UST at the Gadsden facility was identified by ANGS personnel and included as part of the SI. This tank (UST 1) was not included in tank removal plans and specifications for the Birmingham facility, but was contracted separately. Sampling was conducted at the tank site upon UST removal; results are presented in this report.

The general approach used for the UST evaluation is outlined below.

- A survey to locate the tanks and obtain historical data
- Preparing plans and specifications for tank removal and decommissioning
- UST removal
- Soil sampling and observation during UST removal
- Waste sampling for materials generated from UST removal
- A final report summarizing tank conditions and analytical results

This report documents tank location and sampling, tank removal procedures, and the analytical program used for the tanks included in the UST removal project. Underground tanks found at the Birmingham AANG facility were removed in January 1991. Field observations during tank removal, analytical results for site samples, and recommendations are presented in site-specific Decision Documents. The decisions for each UST site are summarized in Section 4 of this report. Tank sites are referenced according to the number of the building served by the tank.





**FIGURE 1.2**  
**LOCATION MAP**  
**MARTIN AIR NATIONAL GUARD STATION**  
**GADSDEN MUNICIPAL AIRPORT**  
Alabama Air-National Guard, Gadsden, Alabama



Appendix A presents the project-associated Survey Task Memorandum. The data validation memorandum for the UST laboratory soil and water samples is included as Appendix B. Correspondence about the disposition of the investigation-derived wastes are found in Appendix C. Laboratory reports are presented in Volume 2 as Appendix D.

## 2. TANK LOCATION AND SAMPLING

This section presents the activities involved in assessing the UST locations at the AANG facilities in Birmingham and Gadsden and the sampling conducted before their removal.

### 2.1 TANK LOCATION AND USE

ANG personnel conducted a review of records during April 1989. An assessment of information obtained during the records review and interviews with ANG personnel who had knowledge of the UST sites suggested that eight abandoned UST sites (containing nine abandoned USTs) were present at the AANG facility in Birmingham.

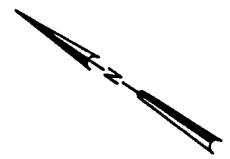
Information gathered during the records review and interviews included estimated tank size, suspected tank use, and estimated tank location. Table 2.1 presents the information gathered from ANG personnel during the preliminary investigation on the abandoned USTs at the AANG facility. Figure 2.1 presents the abandoned UST locations on base property in Birmingham. ANG personnel located one UST at the Gadsden ANG facility near Building 1. The site map for UST 1 is presented as Figure 2.2. No other tanks were found by ANG personnel.

**Table 2.1. Initial UST Information  
Birmingham AANG**

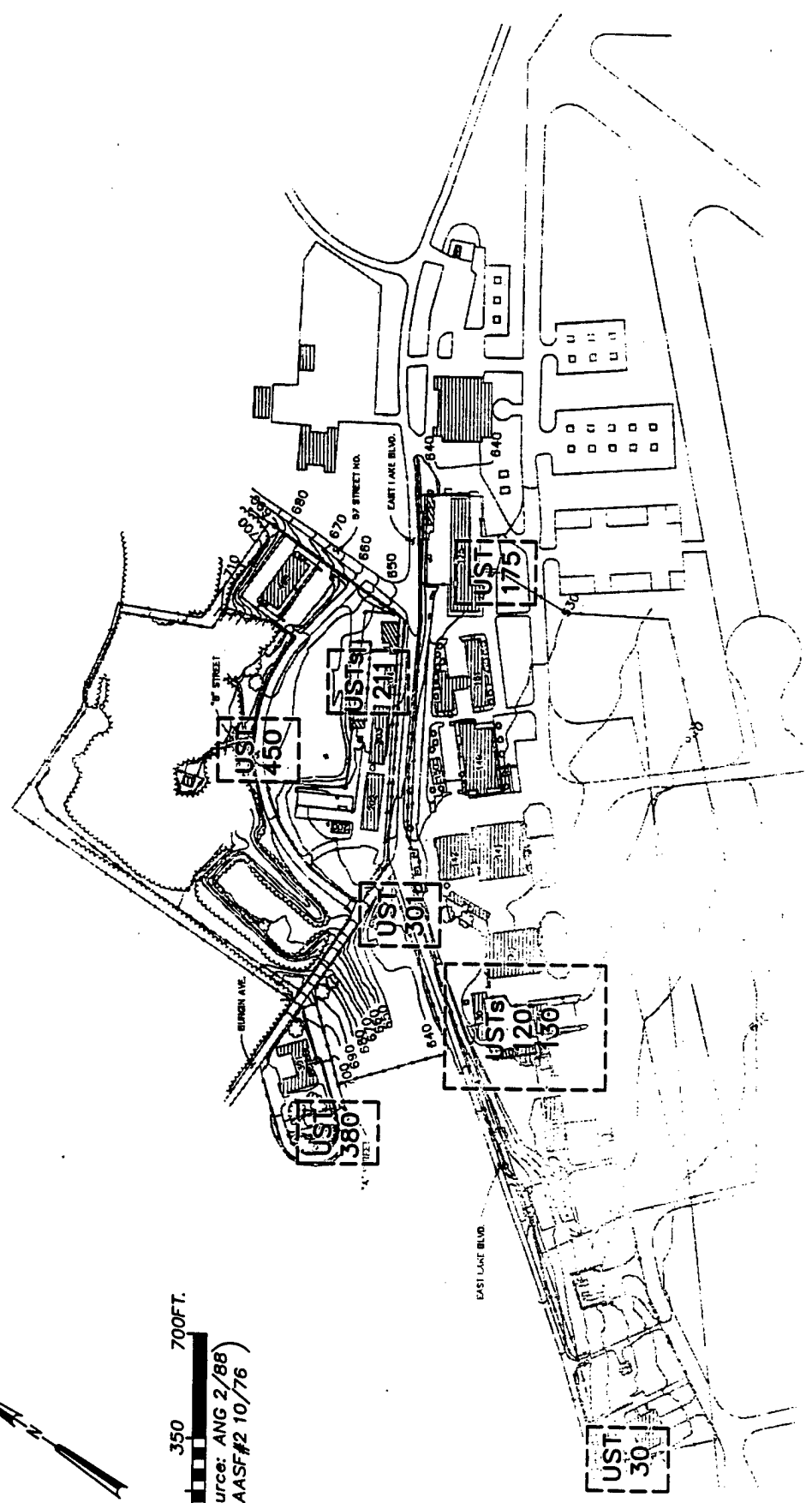
Tank Number	Estimated Size	Suspected Use	Last Used
UST 30	Unknown	POL	1946
UST 120	Unknown	Diesel	1972
UST 130	Unknown	Diesel	1972
UST 175	Unknown	Unknown	Unknown
UST 211 <sup>a</sup>	Unknown	Gasoline	1946
UST 301	Unknown	Butane	1970
UST 380	500 gal	Diesel	1980
UST 450	Unknown	Unknown	Unknown

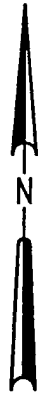
<sup>a</sup>Two tanks suspected at UST 211 site

Note:  
POL = Petroleum, Oil, and Lubricants



0 350 700FT.  
(Source: ANG 2/88  
AASF #2 10/76)

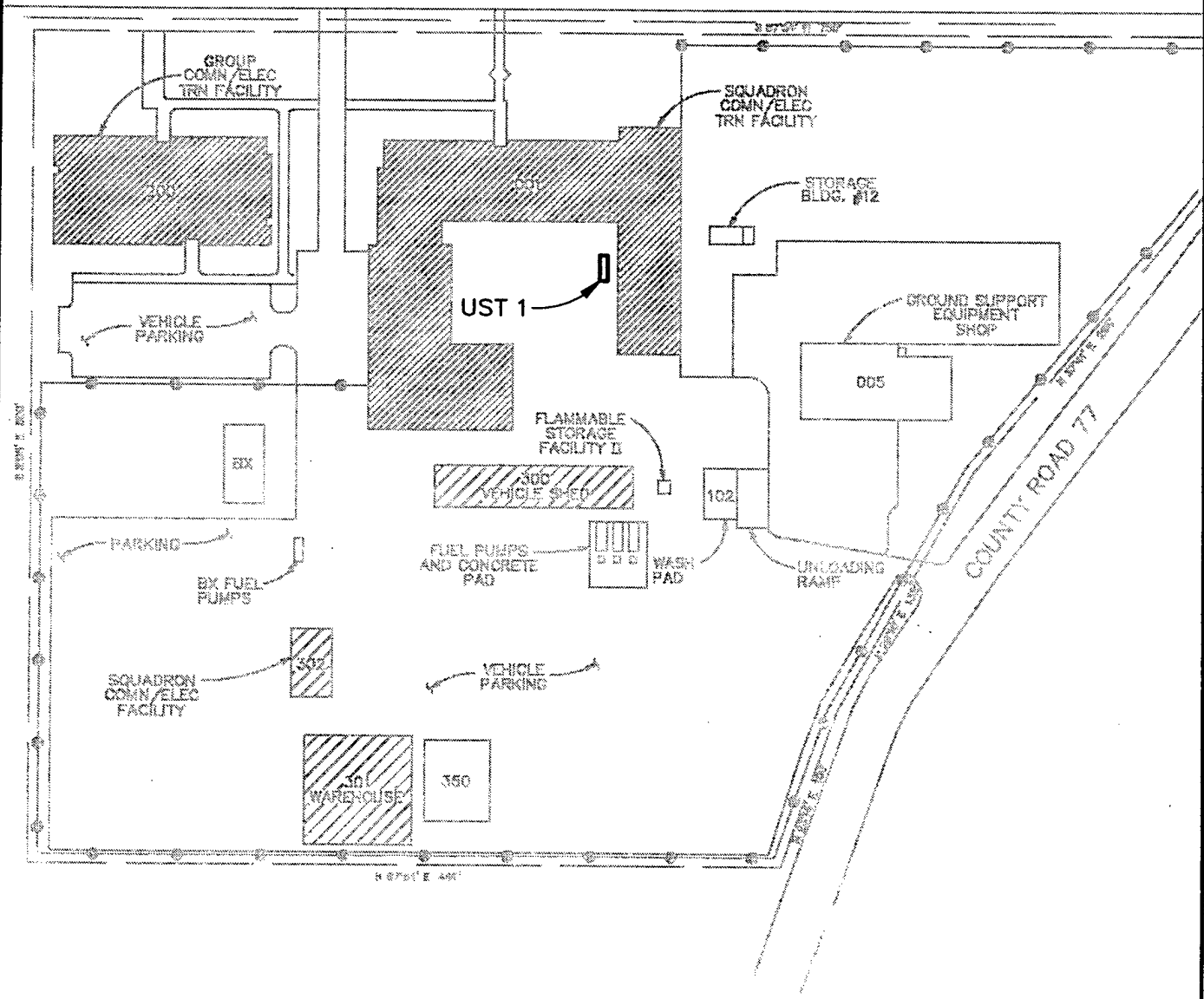




SCALE IN FEET  
(SOURCE: ANG 5/88)

BOUNDARY FENCE  
AROUND ADDED  
PROPERTY

AIRPORT ROAD



**FIGURE 2.2**  
**UST 1 SITE MAP**  
Martin Air National Guard, Gadsden, Alabama



## 2.2 TANK IDENTIFICATION AND VERIFICATION

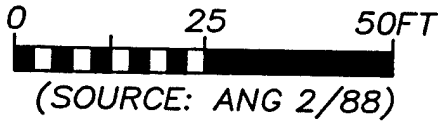
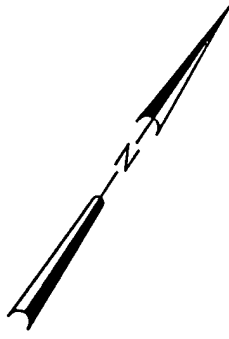
Before contract documents and technical specifications were developed for the UST removal project at Birmingham, a Predesign Survey Task was conducted to verify the location and existence of the abandoned USTs and to identify tank contents by sampling.

The survey conducted during November 1989 was used to identify, locate, and estimate the relative size of the abandoned USTs. Ground Penetrating Radar (GPR) instruments were used to estimate the location of the tank perimeter at the suspected UST locations. Either hand augering or backhoe excavation was used in conjunction with the geophysical instruments to assess the UST locations, when possible.

Table 2.2 presents the findings of the survey task conducted at Birmingham in November 1989. A memorandum discussing site activities in detail is presented as Appendix A.

<b>Table 2.2. Tank Survey Results Birmingham AANG</b>			
<b>Tank Number</b>	<b>Estimated Capacity</b>	<b>Suspected Use</b>	<b>Contents at Sampling</b>
UST 30	N/A	POL	UST Not Found
UST 120	500 gal.	Diesel	Water
UST 130	1,000 gal.	Diesel	NS
UST 175	N/A	Unknown	UST Not Found
UST 211 <sup>a</sup>	500 and 1,000 gal.	Gasoline	NS
UST 301	N/A	Butane	UST Not Found
UST 380	500 gal.	Diesel	Fuel Sludge
UST 450	N/A	Unknown	UST Not Found
*Two tanks suspected at UST 211 site			
Notes:			
N/A = Information not available			
NS = Not sampled because of access limitations			
POL = Petroleum, Oil, and Lubricants			

A review of aerial photography dated in the 1950s indicated that the UST 30 location may have been an aboveground storage facility; GPR and hand augering confirmed that it was unlikely that a UST existed at this site. The UST 30 site map (Figure 2.3) shows the area investigated.



EAST LAKE BLVD.

GEOPHYSICAL  
SURVEY  
SITE

**NOTE:**  
UST EXISTENCE AND LOCATIONS ARE BASED  
SOLELY ON ANG BASE CIVIL ENGINEERING  
INFORMATION.

620

30



USTs 120 and 380 were found during the survey task and located using field equipment. At both of these tank locations, a pipe existed at the surface. These tanks were sampled in accordance with the SI work plan. UST 120 and UST 380 site maps (Figures 2.4 and 2.5, respectively) outline the areas investigated.

USTs 130 and 211 did not have exposed piping at the surface, but were detected by the GPR survey. UST 130's location was confirmed by hand augering through the existing asphalt. Two separate areas were outlined for individual tanks at the UST 211 site. Hand augering was not possible because of the presence of concrete pavement. Site maps for USTs 130 and 211 are presented as Figures 2.6 and 2.7, respectively.

UST sites 175, 301, and 450 were investigated; no USTs were found. GPR information did not indicate an underground structure at UST 175's suspected location, and no further activities were conducted in this area. UST 301 was known to contain butane. The GPR survey and hand augering did not reveal a tank in the suspected area and no further activities were conducted. UST 450 was not found during the GPR survey or by excavation at a suspected location, and no further activities were conducted. The areas that were investigated during the survey task in an attempt to find these USTs are presented in Figures 2.8, 2.9, and 2.10.

### 2.3 TANK CONTENTS SAMPLING

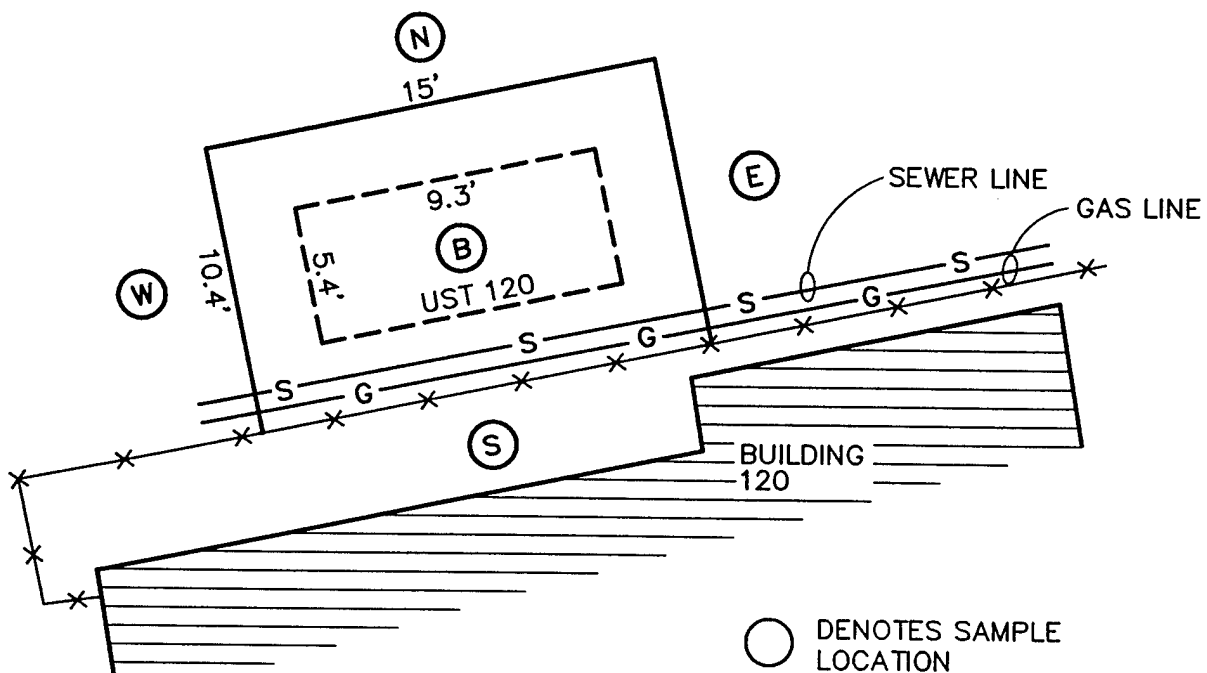
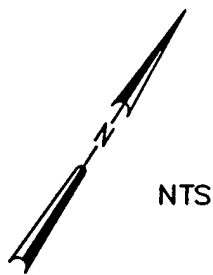
An analytical program was developed for testing tank contents and soils during the Predesign Survey Task and the UST removal project. Tank contents sampling was conducted to identify tank contents for hazardous waste determinations and to help identify potential bid items and quantities. This program is outlined in Section 3.6 of the *Site Investigation Work Plan, Alabama Air National Guard* (CH2M HILL, Inc., November 1989).

The analytical program used for the UST removal project consisted of the following four phases:

- Tank Content Sampling
- Field Screening Sampling
- Excavation and Spoil Pile Sampling
- Drummed Waste Sampling

Laboratory reports generated from sampling at the AANG facility in Birmingham can be found in Appendix D. The data validation memorandum for the analytical work, which is part of an overall Quality Assurance/Quality Control program, is presented in Appendix B.

Two tanks were sampled during the Predesign Survey Task because tank access was available at ground surface. Other tanks were not sampled during the Survey Task because of limited access or because the tanks could not be found.



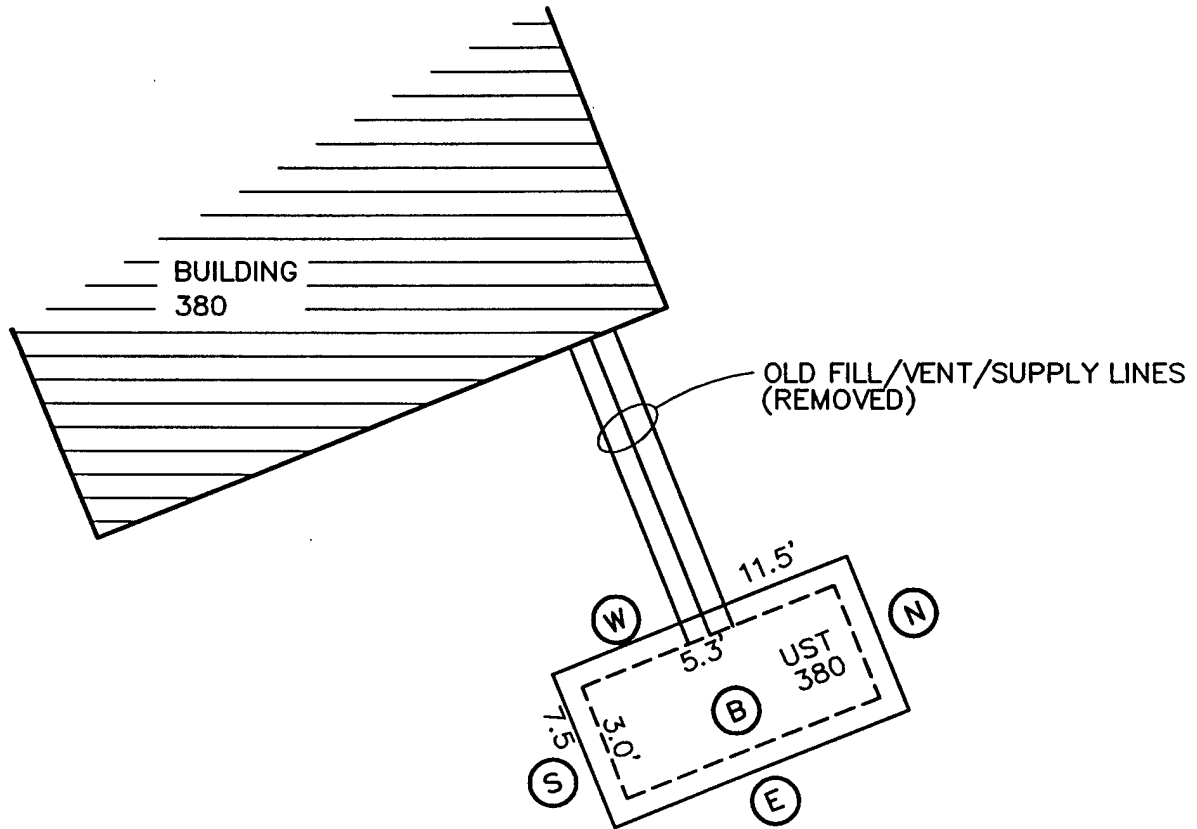
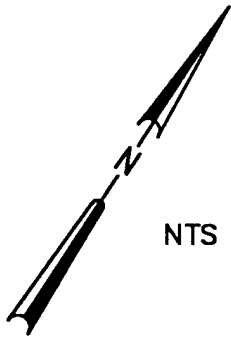
○ DENOTES SAMPLE LOCATION

----- FORMER TANK PERIMETER

HNU HEADSPACE READING	
LOCATION	(ppm)
120-N	9.4
120-S	15.8
120-E	6.8
120-W	7.4
120-B	6.6
120-SP	20.0

**FIGURE 2.4**  
**UST 120 SITE MAP**  
 Alabama Air National Guard, Birmingham, Alabama





○ DENOTES SAMPLE LOCATION

--- FORMER TANK PERIMETER

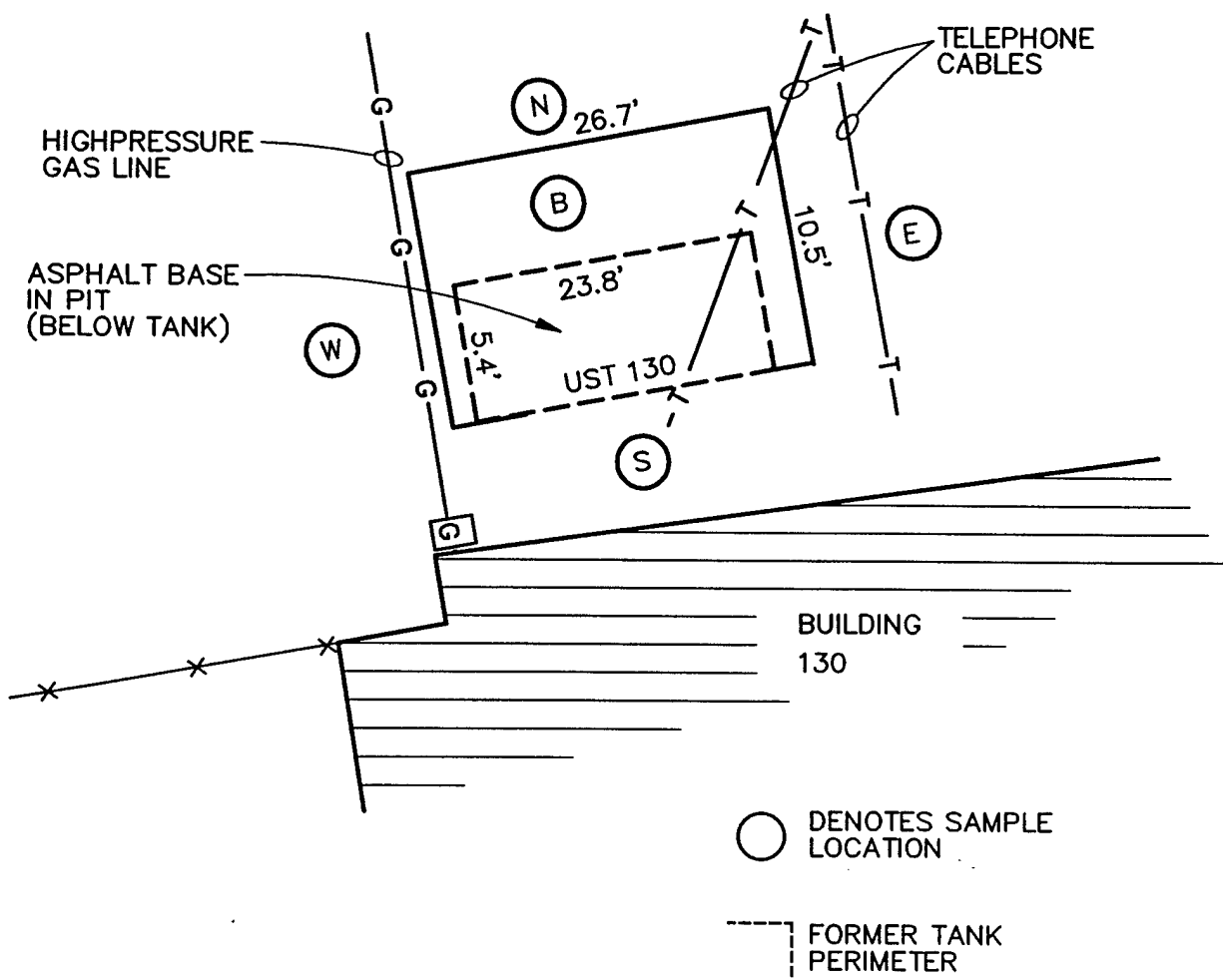
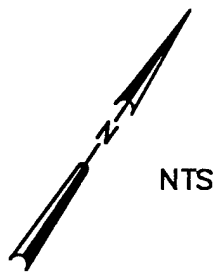
HNu HEADSPACE READING	
LOCATION	(ppm)
380-N	0
380-S	0
380-E	0
380-W	0
380-B	0
380-SP	0

Note: Readings based on initial calibration of 100 ppm isobutylene = 55.

**FIGURE 2.5**  
UST 380 SITE MAP

Alabama Air National Guard, Birmingham, Alabama



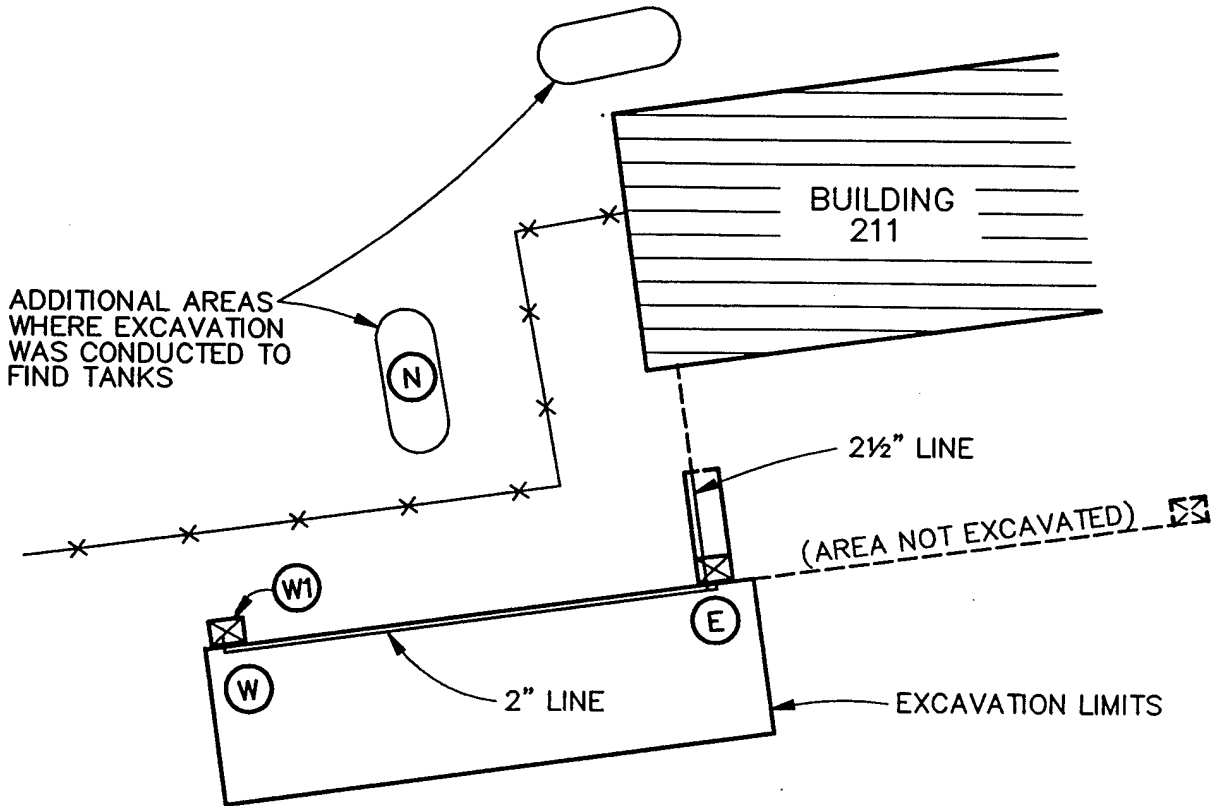
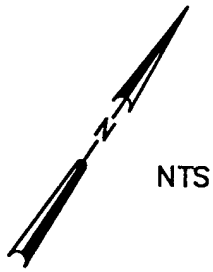


HNu HEADSPACE READING	
LOCATION	(ppm)
130-N	4
130-S	28
130-E	3
130-W	4
130-B	44
130-SP	30

**Note:** Readings based on initial calibration of 100 ppm isobutylene = 55.

**FIGURE 2.6**  
UST 130 SITE MAP  
Alabama Air National Guard, Birmingham, Alabama





- DENOTES SAMPLE LOCATION
- ⊠ OLD PUMP ISLAND LOCATIONS

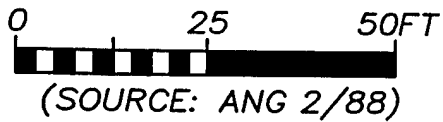
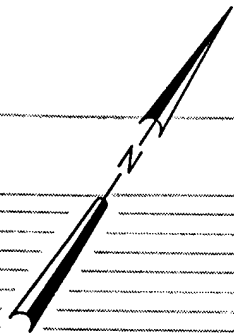
HNu HEADSPACE READING	
LOCATION	(ppm)
211-N	5.0
211-E	1.2
211-W	2.0
211-SP	-
W-1	170

Note: Readings based on initial calibration of 100 ppm isobutylene = 55.

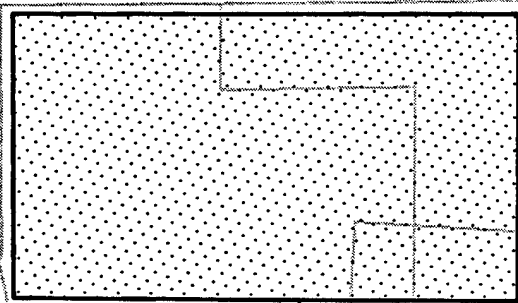
Alabama Air National Guard, Birmingham, Alabama

**FIGURE 2.7**  
UST 211 SITE MAP





175



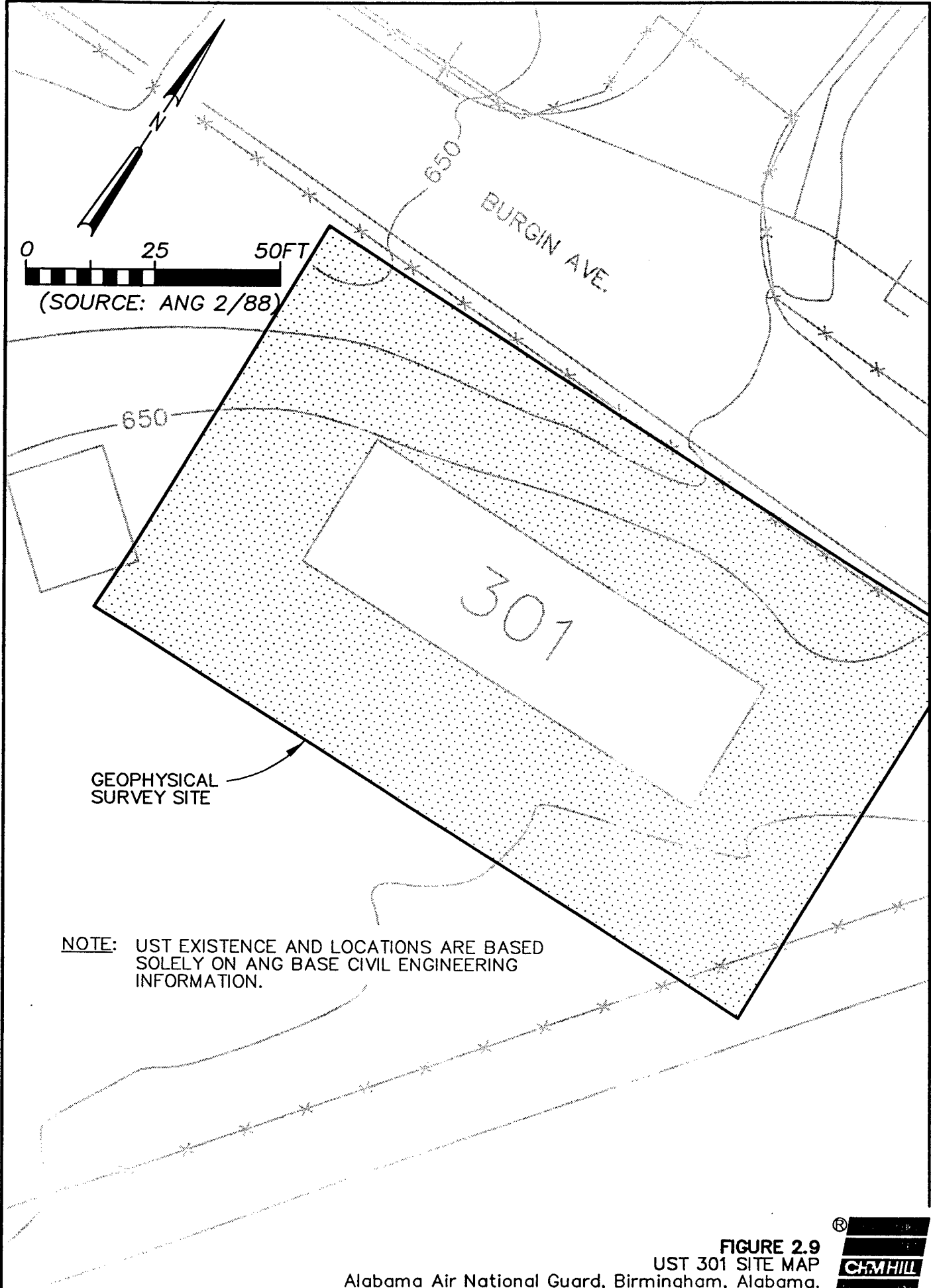
GEOPHYSICAL SURVEY SITE

**NOTE:**

UST EXISTENCE AND LOCATIONS ARE BASED SOLELY ON ANG BASE CIVIL ENGINEERING INFORMATION.

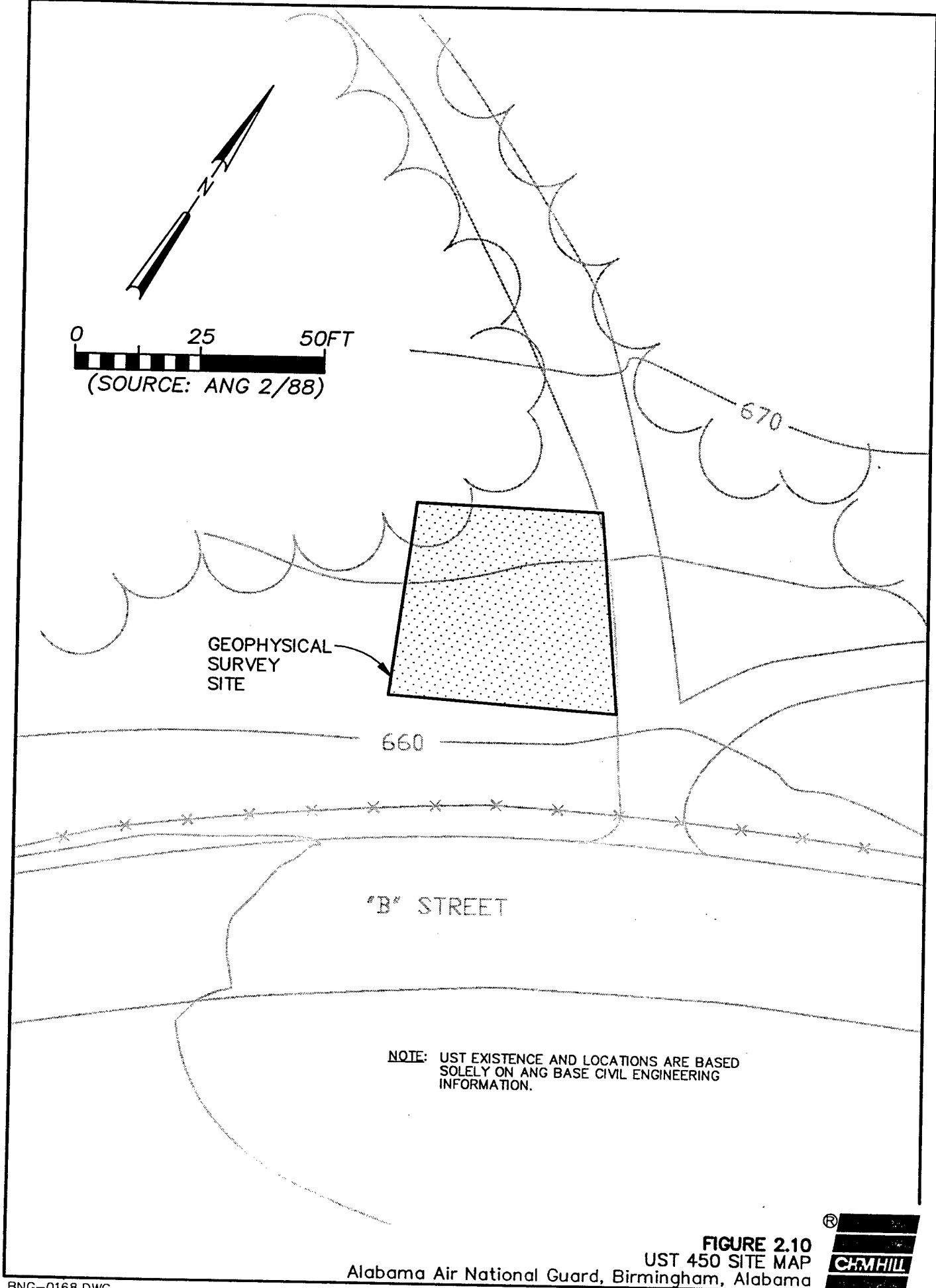
**FIGURE 2.8**  
**UST 175 SITE MAP**  
Alabama Air National Guard, Birmingham, Alabama





**FIGURE 2.9**  
**UST 301 SITE MAP**  
 Alabama Air National Guard, Birmingham, Alabama.





NOTE: UST EXISTENCE AND LOCATIONS ARE BASED SOLELY ON ANG BASE CIVIL ENGINEERING INFORMATION.

**FIGURE 2.10**  
**UST 450 SITE MAP**

Alabama Air National Guard, Birmingham, Alabama



Contents of USTs 120 and 380 were sampled on November 9, 1989, for laboratory chemical analyses. These samples were analyzed for the following constituents:

- Volatile organic compounds (Environmental Protection Agency [EPA]) Method 601 and 602)
- Total lead (EPA Method 239.2)
- Flash point (EPA Method 1010)
- Polynuclear aromatics (EPA Method 610)

Results of the chemical analyses are presented in Table 2.3. UST 120's contents were representative of water contaminated with diesel or fuel oil residuals. UST 380's contents indicated high levels of lead, xylenes, and naphthalenes with a low flash point, indicative of relatively undiluted fuel oil or diesel fuel.

**Table 2.3**  
**UST Contents Analytical Results**  
**Alabama Air National Guard**  
**Birmingham, Alabama**

Analytical Parameter	UST Number		
	120 (ug/l)	380 (ug/l)	380 Dup (ug/l)
Chloromethane	<10	<250000	<250000
Bromomethane	<10	<250000	<250000
Vinyl chloride	<10	<250000	<250000
Chloroethane	<10	<250000	<250000
Dichloromethane	<10	<250000	<250000
1,1-Dichloroethene	<10	<250000	<250000
1,1-Dichloroethane	<10	<250000	<250000
Trans-1,2-Dichloroethene	<10	<250000	<250000
Chloroform	<10	<250000	<250000
1,2-Dichloroethane	<10	<250000	<250000
1,1,1-Trichloroethane	<10	<250000	<250000
Carbon tetrachloride	<10	<250000	<250000
Bromodichloromethane	<10	<250000	<250000
1,2-Dichloropropane	<10	<250000	<250000
cis-1,3-Dichloropropene	<10	<250000	<250000
Trichloroethene	<10	<250000	<250000
Dibromochloromethane	<10	<250000	<250000
1,1,2-Trichloroethane	<10	<250000	<250000
trans-1,3-Dichloropropene	<10	<250000	<250000
Bromoform	<10	<250000	<250000
Tetrachloroethene	<10	<250000	<250000
1,1,2,2-Tetrachloroethane	<10	<250000	<250000
Tert-Butyl methyl ether	<10	<250000	<250000
Benzene	<10	<250000	<250000
Toluene	8.8	<250000	<250000
Chlorobenzene	<10	<250000	<250000
Ethylbenzene	<10	<250000	<250000
Xylenes (total)	52	6300000	5900000
1,3-Dichlorobenzene	<10	<250000	<250000
1,4-Dichlorobenzene	<10	<250000	<250000
1,2-Dichlorobenzene	<10	<250000	<250000
Note:			
< Parameter not present at the stated method detection limit			

**Table 2.3 (Continued)  
 UST Contents Analytical Results  
 Alabama Air National Guard  
 Birmingham, Alabama**

Analytical Parameter	UST Number		
	120 (ug/l)	380 (ug/l)	380 Dup (ug/l)
Naphthalene	19	<2000	<2000
2-Methylnaphthalene	210	11000	10000
1-Methylnaphthalene	180	5100	4500
Acenaphthylene	<10	<2000	<2000
Acenaphthene	15	<2000	<2000
Fluorene	22	<2000	<2000
Phenanthrene	<10	<2000	<2000
Anthracene	<10	<500	<500
Fluoranthene	<10	<500	<500
Pyrene	<10	<500	<500
Benzo(a)anthracene	<10	<500	<500
Chrysene	<10	<500	<500
Benzo(b)fluoranthene	<10	<500	<500
Benzo(k)fluoranthene	<10	<500	<500
Benzo(a)pyrene	<10	<500	<500
Indeno(1,2,3-cd)pyrene	<10	<500	<500
Dibenzo(a,h)anthracene	<10	<500	<500
Benzo(g,h,i)perylene	<10	<500	<500
Flashpoint (Deg F)	145	<64	<64
Lead (mg/l)	51	509	477
Note: < Parameter not present at the stated method detection limit			

### 3. TANK REMOVAL

The United States Property and Fiscal Office (USPFO) in Montgomery, Alabama, signed an agreement with IT Corporation of Port Allen, Louisiana (IT), to remove and decommission the abandoned USTs at the Birmingham AANG facility in accordance with contract plans and specifications. CH2M HILL was contracted by HAZWRAP to provide field sampling and construction oversight during the tank removal effort.

On January 8, 1991, the Contractor began mobilizing to the Birmingham AANG facility, scheduling equipment, and obtaining utility clearances at the UST sites. Three tanks at Birmingham were removed in the following sequence: UST 380, UST 130, and UST 120. UST 1 was removed previously during November 1989 at the Gadsden facility by a separate contractor and was not included under the plans and specifications prepared by CH2M HILL.

This section, which describes the work completed during the UST removal project at Birmingham, is divided into the following subsections:

- Piping Removal and Capping
- Tank Excavation
- Field Screening and Excavation Sampling
- Tank Disposition
- Excavation Backfill
- Spoil Pile Sampling
- Drummed Wastes Sampling

#### 3.1 PIPING REMOVAL AND CAPPING

Soils were excavated using conventional earthwork equipment. The Contractor excavated the material overlying each tank to expose tank piping and the top surface of each tank.

All piping less than 10 feet long was removed completely. Piping longer than 10 feet was cut at the excavation perimeter wall and capped. Fluids resulting from this operation were placed in the drums onsite.

#### 3.2 TANK EXCAVATION

After the piping was removed, capped, or both, and the perimeter was exposed, the Contractor excavated along the side walls of the UST to remove any potentially contaminated soils that came into direct contact with the UST surface and to free the tank from frictional surfaces preventing removal. Where possible, the excavation extended 2 feet beyond the tank edges on all sides.

Soils derived from the tank removal process were segregated by visual identification on the basis of contamination. These soils were placed in a secured area on the base specified by the installation's Civil Engineer. Appendix C documents the disposition of these soils.

After the excavation was complete, fluids remaining in the USTs were pumped into a tanker truck provided by the Contractor. About 1,600 gallons of fuel-contaminated water were removed from UST 120. Nearly 3,000 gallons of fuel and fuel-contaminated water were removed from UST 130. About 100 gallons of sludges were removed from UST 380. Appendix C documents the disposition of these fluids and sludges.

After fluids were removed from each UST, tie-down straps connected to the UST pad located beneath the tank were removed. The tank was then removed from the excavation using chains attached to the lifting rings located at the top of each tank.

The pit was further excavated to remove all soils that were visibly contaminated or contained high headspace readings as detected by a photoionization detector, manufactured by HNu Systems.

### **3.3 FIELD SCREENING AND EXCAVATION SAMPLING**

The UST excavation and the soils derived from the UST removal were sampled as part of the analytical program. Soil samples for field screening and laboratory chemical analyses were collected, in conformance with the SI Work Plan and the Alabama Department of Environmental Management's (ADEM's) UST regulations and guidance, from the four side walls, the pit bottom, and the spoil pile generated during removal, when possible.

Field screening activities with an HNu and explosimeter were conducted during tank removal for health and safety reasons and as an indicator parameter for contamination. Readings were collected periodically to determine if health and safety hazards were present during the excavation process.

Soil samples collected for headspace analysis were placed in clean 1-pint jars. Each jar was filled halfway with soil and covered with aluminum foil to create a headspace above the media. The soil was shaken after the jar was sealed and the air in the headspace was allowed to equilibrate. About 5 minutes after the sample was collected, the HNu probe was inserted through the foil into the headspace above the soil, and the volatile organic compound (VOC) content was measured.

Results of the headspace analysis were used to estimate the amount of excavation required to remove contaminated soils from the tank pit. The following amounts of soil were removed from the UST pits:

- UST 1                      80 cubic yards
- UST 120                    47 cubic yards
- UST 130                    64 cubic yards
- UST 211                    42 cubic yards

- UST 380 15 cubic yards

Results of the headspace readings at the Birmingham site after soil removal and excavation are presented in Table 3.1.

<b>Table 3.1. HNu Headspace Readings<sup>a</sup> Birmingham AANG</b>				
<b>Sample Location</b>	<b>Tank Number</b>			
	<b>UST 120</b>	<b>UST 130</b>	<b>UST 211</b>	<b>UST 380</b>
North Wall	9.4	4	5	0
South Wall	15.8	28	NS	0
East Wall	6.8	3	1.2	0
West Wall	7.4	4	2.0	0
Pit Bottom	6.6	44	NS	0
Spoil Pile	20.0	30	NS	0
<sup>a</sup> Readings based on initial calibration of 100 ppm isobutylene = 55 <sup>b</sup> Two tanks suspected at UST 211 site  Notes: NS = Not sampled				

Laboratory samples were collected at the same locations and during the same time period as the field headspace samples. The soil samples collected were analyzed for total petroleum hydrocarbon (TPH), total lead, and ignitability. The ADEM corrective action limits (CAL) pertaining to USTs is for TPH (100 ppm) in soil. Although not an ADEM CAL, no remedial action was considered for total lead concentrations in soil less than 5 ppm. Results of these analytical samples are presented in Table 3.2. UST 1 (in Gadsden) analytical samples were similarly collected and are also reported in Table 3.2.

### 3.4 TANK DISPOSITION

Upon removal, tanks were placed next to the tank pit or in the motor pool area for temporary storage. Tanks were blocked in an upright position to prevent spillage of residual tank contents.

After securing the tank, vapors inside the tank were purged with a minimum of 1.5 pounds of dry ice for each 100 gallons of tank capacity. The explosive limit for the tank was monitored using a portable explosimeter. Once the vapors from the tank were purged and the explosivity was less than 10 percent of the lower explosive limit, the tank was dismantled by cutting the ends of the tank with an acetylene torch. Explosivity was monitored throughout the use of the acetylene torch.

**Table 3.2  
Analytical Results - Soil Testing  
UST Removal Action  
Alabama Air National Guard**

<b>Sample ID</b>	<b>Location</b>	<b>TPH (mg/Kg)</b>	<b>Lead (mg/Kg)</b>	<b>IGNIT (Y/N)</b>
120-N	UST Pit North Wall	3.2	-	-
120-S	UST Pit South Wall	4.7	-	-
120-E	UST Pit East Wall	9.2	-	-
120-E DUP	UST Pit East Wall Dup	209	-	-
120-W	UST Pit West Wall	28.6	16.2	-
120-B	UST Pit Bottom	-	-	-
120-SP	UST Spoil Pile	27.6	-	N
120-SP DUP	UST Spoil Pile Dup	472	-	-
130-N	UST Pit North Wall	<1.9	-	-
130-N DUP	UST North Wall Dup	<2.0	-	-
130-S	UST Pit South Wall	335	-	-
130-E	UST Pit East Wall	2.9	-	-
130-W	UST Pit West Wall	73	-	-
130-B	UST Pit Bottom	130	16.4	-
130-SP	UST Spoil Pile	1270	-	N
130-SP-DUP	UST Spoil Pile Dup	-	-	N
211-N	North Excavation	21.4	-	-
211-E	East Excavation	4.2	-	N
211-W	West Excavation	10.7	42.5	-
380-N	UST Pit North Wall	9.6	-	-
380-S	UST Pit South Wall	2.7	-	-
380-E	UST Pit East Wall	<2.0	-	-
380-W	UST Pit West Wall	4	-	-
380-B	UST Pit Bottom	5.2	30.9	-
380-SP	UST Spoil Pile	16.8	-	N
1-N	UST Pit North Wall	<2.2	-	-
1-S	UST Pit South Wall	<2.1	-	-
1-E	UST Pit East Wall	<2.1	-	-
1-W	UST Pit West Wall	4.9	-	-
1-B	UST Pit Bottom	<2.1	17.6	-
1-SP	UST Spoil Pile	40.6	*	N

Birmingham Background Data - From other SI information

Average Background Lead Conc = 24.1 mg/Kg; n=40, S=18.4

Maximum Lead Conc = 114.4 mg/Kg; Minimum Lead Conc = 6.7 mg/Kg

TPH CAL = 100 ppm (mg/kg)

- Not Analyzed

\* EP Tox Lead sample resulted in less than 100 ppb

Once exposed on the ends, tanks were cleaned according to American Petroleum Institute (API) publication 2015, and wash waters were disposed with tank contents. Large tanks (UST 120 and UST 130) were further cut into small sections for ease of transport. Tank remains were sold locally to a scrap metal recycler.

### **3.5 EXCAVATION BACKFILL**

After tanks were removed and the soils were excavated from the tank pit, the excavation was backfilled. An imported crushed aggregate fill material was used.

Lifts of 12 inches were placed and compacted in each of the tank pits. Backfill compaction was completed with a hydraulic, vibratory backhoe attachment. Backfill compaction was checked with a portable density meter, comparing to a laboratory Standard Proctor test on the material. The degree of compaction met the 95% of maximum dry density criteria in the technical specifications.

### **3.6 SPOIL PILE SAMPLING**

Spoil piles were sampled during the UST removal project. The spoil piles were later remediated onsite in accordance with the SI Work Plan and the contract document. Appendix C documents the disposition of drummed soils and other investigation derived waste generated during the UST removal project, as of 1991. Final disposition of these wastes has been effected as recommended and documentaion is available on Base (verbal communications, Capt. G. Bailey, 9 Jan, 1997).

### **3.7 DRUMMED WASTES SAMPLING**

Before tank removal, each tank was evacuated using a pump truck provided by the Contractor. Three tanks were removed during the construction phase of work at the AANG facility. USTs 120, 130, and 380 each contained fluids before their removal. UST 1 at Gadsden contained fluids, but these fluids were disposed of through an oil/water separator (OWS) on base property.

UST 130 was found to contain a separate water and fuel phase upon excavation. These fluids were not sampled during the Survey Task of the project and thus could not be readily disposed of without sampling. The fluids from UST 130 were contained in 56 drums, which were placed behind Building 495 on the ANG complex. Eight drums were found to contain a substantial amount of free product and were removed offsite by a fuel recycler.

Representative drums for the remaining lot were selected randomly in the field. Two drums of UST 130's contents were sampled and one duplicate sample was collected on January 16, 1991. The samples were analyzed for VOCs (EPA Methods 601 and 602), total lead (EPA Method 239.2), ignitability (EPA Method SW846[1C]), polynuclear aromatics (EPA Method 610), and flashpoint (EPA Method 1010).

UST 120 and UST 380 were sampled previously during the Survey Task of the UST removal project. Results of the analytical samples collected at that time are presented in Table 2.3. The contents of UST 120 were reviewed for discharge into the OWS at the base.

The ADEM-suggested criterion for discharge to the Jefferson County Publicly Owned Treatment Works (POTW) was 500 parts per billion (ppb) of benzene, toluene, ethyl benzene, and xylene (BTEX). The contents of UST 120 had less than the suggested criterion and were delivered to the OWS and released at a rate of approximately 50 gallons per minute (gpm). At the end of tank discharge, some of the contents were found to be a dark, sludgy fluid with a fuel odor, and were not discharged to the sewer system.

Residual sludges and wash water from UST 120 and UST 130 cleaning were then incorporated into the tanker truck onsite. These wastes were deposited into five drums in the drum staging area. One drum was selected as a representative drum and sampled for the above-mentioned analytical parameters.

The sludge from UST 380 and its associated wash water were collected, placed into a drum, and stored with the other drums behind Building 495. Drum contents were analyzed for the same parameters as mentioned above for UST 130.

Table 3.3 presents data for the drums used in the UST removal project, the origin of their contents, and the current status.

Four drums were sampled for laboratory analyses. These four drums were selected to represent the drummed wastes resulting from the UST removal. One duplicate sample was collected during field sampling. Drums were numbered and labeled according to their origin. Drum numbers 12 and 34 were sampled and are representative of waste in drums derived from UST 130 (1 through 56, except 41-46 and 51-52). Drum number 57 was sampled and is representative of drums 57-60, and 64, which originated from the sludges and wash waters in UST's 120 and 130. Drum number 62 is representative of wastes derived from UST 380.

The results of the drummed waste sampling are presented in Table 3.4. Appendix C documents the current disposition of fluids generated during the UST removal project, as of 1991. All fluids have subsequently been disposed of as per the recommendations set forth in Appendix C (verbal communication, Capt G. Bailey, 9 Jan, 1997).

**Table 3.3. Recommended Drummed Waste Disposal  
Birmingham AANG**

<b>Drum Number</b>	<b>Origin</b>	<b>RCRA Hazardous</b>	<b>Status</b>
1-40	UST 130	NO	Sewer System <sup>a</sup>
41-46	UST 130	NO	Recycler <sup>b</sup>
47-50	UST 130	NO	Sewer System <sup>a</sup>
51-52	UST 130	NO	Recycler <sup>b</sup>
53-56	UST 130	NO	Sewer System <sup>a</sup>
57-60,62,64	UST 120/380	YES	Manifest <sup>c</sup>

<sup>a</sup>Provided that Jefferson County accepts the wastes

<sup>b</sup>These drums of nonhazardous wastes were recovered by a fuel recycler

<sup>c</sup>Dispose of as hazardous wastes after final analytical results are obtained and transmitted.

Note:

RCRA = Resource Conservation and Recovery Act

**Table 3.4**  
**Drum Contents Analytical Results**  
**Alabama Air National Guard**  
**Birmingham, Alabama**

Analytical Parameter	Drum Number				
	12 (ug/l)	12 Dup (ug/l)	34 (ug/l)	57 (mg/kg)	62 (ug/l)
Chloromethane	<10	<10	<10	<1300	<50
Bromomethane	<10	<10	<10	<1300	<50
Vinyl chloride	<10	<10	<10	<1300	<50
Chloroethane	<10	<10	<10	<1300	<50
Dichloromethane	<10	<10	<10	<1300	<50
1,1-Dichloroethene	<10	<10	<10	<1300	<50
1,1-Dichloroethane	<10	<10	<10	<1300	<50
Trans-1,2-Dichloroethene	<10	<10	<10	<1300	<50
Chloroform	<10	<10	<10	<1300	<50
1,2-Dichloroethane	<10	<10	<10	<1300	<50
1,1,1-Trichloroethane	<10	<10	<10	<1300	<50
Carbon tetrachloride	<10	<10	<10	<1300	<50
Bromodichloromethane	<10	<10	<10	<1300	<50
1,2-Dichloropropane	<10	<10	<10	<1300	<50
cis-1,3-Dichloropropene	<10	<10	<10	<1300	<50
Trichloroethene	<10	<10	<10	<1300	<50
Dibromochloromethane	<10	<10	<10	<1300	<50
1,1,2-Trichloroethane	<10	<10	<10	<1300	<50
trans-1,3-Dichloropropene	<10	<10	<10	<1300	<50
Bromoform	<10	<10	<10	<1300	<50
Tetrachloroethene	<10	<10	<10	<1300	<50
1,1,2,2-Tetrachloroethane	<10	<10	<10	<1300	<50
Tert-Butyl methyl ether	<10	<10	<10	<1300	<50
Benzene	49	42	33	<1300	<50
Toluene	<10	<10	<10	<1300	<50
Chlorobenzene	<10	<10	<10	<1300	<50
Ethylbenzene	<10	<10	<10	<1300	<50
Xylenes (total)	180	140	69	1900	220
1,3-Dichlorobenzene	<10	<10	<10	<1300	<50
1,4-Dichlorobenzene	<10	<10	<10	<1300	<50
1,2-Dichlorobenzene	<10	<10	<10	<1300	<50

Note:

< Parameter not present at the stated method detection limit

**Table 3.4 (Continued)**  
**Drum Contents Analytical Results**  
**Alabama Air National Guard**  
**Birmingham, Alabama**

Analytical Parameter	Drum Number				
	12 (ug/l)	12 Dup (ug/l)	34 (ug/l)	57 (mg/kg)	62 (ug/l)
Naphthalene	79	59	68	<350	<6000
2-Methylnaphthalene	240	170	220	1500	22000
1-Methylnaphthalene	130	84	130	540	7900
Acenaphthylene	<20	<20	<20	<300	<2000
Acenaphthene	<20	<20	<50	<300	<2000
Fluorene	<20	<20	<30	<300	<2000
Phenanthrene	33	29	44	320	<2000
Anthracene	<20	<20	<20	<300	<2000
Fluoranthene	<20	<20	<20	<300	<2000
Pyrene	<20	<20	<20	<300	<2000
Benzo(a)anthracene	<20	<20	<20	<300	<2000
Chrysene	<20	<20	<20	<300	<2000
Benzo(b)fluoranthene	<20	<20	<20	<300	<2000
Benzo(k)fluoranthene	<20	<20	<20	<300	<2000
Benzo(a)pyrene	<20	<20	<20	<300	<2000
Indeno(1,2,3-cd)pyrene	<20	<20	<20	<300	<2000
Dibenzo(a,h)anthracene	<20	<20	<20	<300	<2000
Benzo(g,h,i)perylene	<20	<20	<20	<300	<2000
Lead	<3	3	5	853.2	11700
Ignitability (Yes/No)	-	-	-	Yes	-
Flashpoint (Deg F)	>212	>212	>212	-	124
Note:					
- Not Analyzed					
< Parameter not present at the stated method detection limit					

#### 4. RECORD DECISIONS

This section of the report summarizes Decision Documents written to make recommendations about the former UST sites. The decisions were made after screening, identifying, and evaluating control measures applicable for each site. These measures considered the potential exposure to humans and the environment. The data obtained from each site were reviewed according to these control measures and the regulatory criteria set forth in the SI Work Plan. Regulatory guidance from ADEM at the time of work plan development for soil remediation, disposal, or both, was 100 ppm TPH and/or characteristically hazardous.

The actual size of the tank measured upon removal is listed in Table 4.1. Also found in Table 4.1 is a summary of the record decision for each of the USTs included in the SI Work Plan.

<b>Table 4.1. UST Investigation Summary Alabama Air National Guard</b>			
<b>UST</b>	<b>Size (ft)</b>	<b>Approximate Capacity (gallons)</b>	<b>Decision</b>
1	6.0' dia x 9.5'	2,000	NFAR
30	Not Found	-	NFAR
120	5.4' dia x 9.3'	1,600	NFAR
130	5.4' dia x 23.8'	4,100	NFAR
175	Not Found	-	NFAR
211	Not Found	-	NFAR
301	Not Found	-	NFAR
380	3.0' dia x 5.3'	280	NFAR
450	Not Found	-	NFAR
<p>Note: NFAR = No further action required.</p>			

#### 4.1 DECISION--UST 1 (GADSDEN)

UST 1 at the Gadsden facility was removed in November 1989. Analytical results show that minor amounts of organic fuel components remain in the soil onsite. The levels present are lower than ADEM's corrective action limits of 100 ppm TPH. Because no pollutant was found in the soil samples which exceeded ADEM's corrective action limits of 100 ppm TPH, it is recommended that no further action be taken

#### **4.2 DECISION—UST 30**

The UST 30 site was investigated during a field survey task, and no UST was found. Additional data review indicated a nearby aboveground storage facility that had been removed previously. Because no UST and concomitant pollutants were found at the UST 30 site, it is recommended that no further action be taken.

#### **4.3 DECISION—UST 120**

UST 120 was removed during the tank removal project in January 1991. Analytical results show that organic fuel components remain in the soils at the site. The levels found are greater than ADEM's corrective action limits of 100 ppm TPH, but are believed to be limited to soils adjacent to the tank. Based on the results of the data presented in the Decision Document and recommendations by ADEM (October, 1991), it is recommended that no further action be taken.

#### **4.4 DECISION—UST 130**

UST 130 was removed during the tank removal project in January 1991. Analytical results show that organic fuel components remain in the soils at the site. The levels found are greater than ADEM's criteria of 100 ppm TPH, but are believed to be limited to soils adjacent to the tank. Based on the results of the data presented in the Decision Document and recommendations by ADEM (October 1991), it is recommended that no further action be taken.

#### **4.5 DECISION—UST 175**

The UST 175 site was investigated during a field survey task and no UST was found. On the basis of information found during the field survey, it is suspected that UST 175 either was removed or was an aboveground storage tank. Because no UST and concomitant pollutants were found at the UST 175 site, it is recommended that no further action be taken.

#### **4.6 DECISION—UST 211**

The UST 211 site was investigated for two tanks during the UST removal project. Excavation was conducted in the suspected USTs' locations. No tanks were found. A buried pipe was found that is believed to be the supply line for the pump islands. The line ran northward under a building on the facility grounds. Soil samples were collected at various locations and no contamination was found. Because no pollutants were found at the

UST 211 site and with the concurrence of ADEM (May 1991), it is recommended that no further action be taken.

#### **4.7 DECISION—UST 301**

The UST 301 site was investigated during a field survey task, with no tank found. From information obtained during this task, the UST was believed to have contained butane. Because not UST and concomitant pollutants were found at the UST 301 site, it is recommended that no further action be taken.

#### **4.8 DECISION—UST 380**

UST 380 was removed during the tank removal project in January 1991. Results of the analytical samples of soils next to the former UST location show that minor amounts of fuel component organic compounds are present. The levels present are lower than ADEM's corrective action limits set forth in the SI Work Plan. Because soil remaining in the UST 380 pit contains petroleum components below the ADEM corrective action limits and with the concurrence of ADEM (May 1991), it is recommended that no further action be taken.

#### **4.9 DECISION—UST 450**

The UST 450 site was investigated during a field survey task and no UST was found. From information found during the field survey, it is suspected that UST 175 either was removed previously or was an aboveground storage tank. Because no UST and concomitant pollutants were found at the UST 450 site, it is recommended that no further action be taken.

## 5. LIST OF REFERENCES

- ADEM, 1991. Letters dated May 8, 1991 and October 11, 1991 from T.W. Pittman and D.M. Lovoy, respectively, ADEM Water Division to Colonel J. Copeland, Alabama ANG.
- CH2M HILL Southeast, 1991. Site investigation Report, 117th Tactical Reconnaissance Wing, Alabama ANG and Army Aviation Support Facility, Birmingham Airport, Birmingham, Alabama.
- HMTC, 1987. Installation Restoration Program Phase I - Records Search for Part A, Headquarters 117th Tactical Reconnaissance Wing, Alabama ANG, Birmingham and Part B, 226th Combat Information Systems Group, Martin ANG Station, Gadsden Municipal Airport, Gadsden, Rockville, MD, Contract No, DLA 900-82-C-4426.

**Appendix A**  
**Survey Task Memorandum**

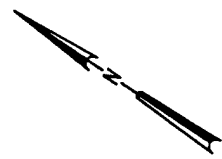
**TO:** J. P. Martin  
**FROM:** Bill Morgan  
**DATE:** April 25, 1990  
**SUBJECT:** Abandoned UST Predesign Survey Task Memorandum  
**PROJECT:** MGM27232.UB.TM

## **INTRODUCTION**

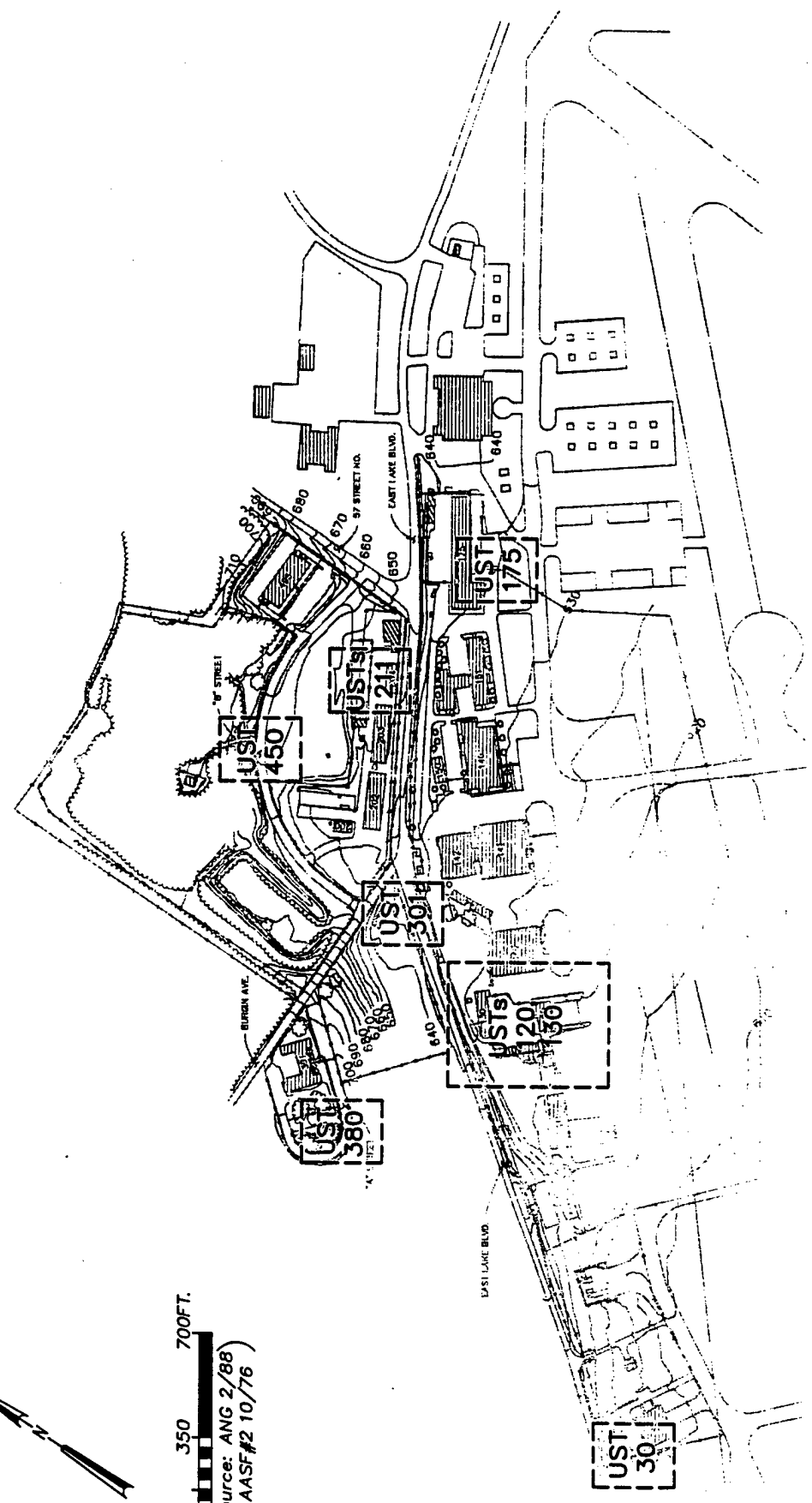
This memorandum presents the results of CH2M HILL's efforts to confirm the existence and evaluate the locations of eight (8) abandoned underground storage tanks (USTs) at the 117th Tactical Reconnaissance Wing, Alabama Air National Guard, Birmingham, Alabama (ANG) (Figure 1). Preliminary review of Base records and interviews with Base personnel by the NGB identified the eight areas suspected to contain the abandoned USTs. The eight locations are identified and the outline for activities reported in this memo is contained in CH2M HILL's Site Investigation Work Plan, July 1989, Sections 3.1 through 3.3.

## **EVALUATION OF AERIAL PHOTOGRAPHS**

Aerial photographs that include the ANG site were obtained from the Agricultural Stabilization and Conservation Service, Salt Lake City, Utah. Prints were obtained for six years between 1951 and 1980. Because of the scale, no evidence to substantiate the presence of USTs could be obtained from review of these photos. However, the 1951 and 1956 photographs contained images of bermed areas and aboveground tanks, respectively, north of the Lake Shore Drive at Building 30. This evidence suggests that the POL area during the 1940s was served by aboveground tanks north of the suspected UST 30 site. Drawings from the 1940s showed the aboveground tanks north of East Lake Boulevard.



0 350 700FT.  
(Source: ANG 2/88  
AASF #2 10/76)



## FIELD PROCEDURES

During the week of September 25, 1989, geophysical surveys were conducted at the eight suspected UST sites. Ground Penetrating Radar (GPR) and magnetics surveys were performed at each location. Each site was divided into a rectangular grid with the perpendicular grid lines spaced 10 feet apart in one direction and 5 feet apart in the other direction. GPR and magnetics traverses were conducted along the grid lines, which were centered on the suspected tank locations and extended approximately three times the size of the anticipated pit size.

### MAGNETICS

Two instruments were used to survey the locations for the USTs:

- Geometrics G-846 portable proton procession magnetometer
- Schontedt Model GA52-B Line Locator (metal detector)

The magnetometer, which reads in gammas, measures the strength of the total magnetic field. This instrument proved too sensitive to surrounding structures and utilities to provide any useful information at the UST survey locations. Readings were taken at the intersections of the grid lines, but variations in the readings were obviously caused by buildings, fences, utility lines, and other interferences.

The metal detector also was affected by interferences. This device indicates disturbances in a magnetic field by producing an audio signal. Fragments of metal contained in the asphalt and concrete overlying the UST sites and the presence of fences, etc. provided almost continual audio signals of varying intensities. The operator was unable to discriminate the origin of the signals to the degree required to "zero in" on specific boundaries for objects buried at the depths of USTs.

### GROUND PENETRATING RADAR (GPR)

GPR proved to be the most useful tool in locating the USTs. Red-R Services, Inc. conducted the GPR survey as a subcontractor to CH2M HILL. Reflections of electromagnetic waves off of materials with different transmission characteristics were monitored on an oscilloscope and recorded on a strip-chart by a graphic recorder. As the transducer (transmittal receiver) was pulled at constant speed along the grid lines, a record was produced that the operator was able to interpret based on his knowledge, experience, and local baseline traverses.

Anomalies that were judged to be either tanks or tank pits were identified at sites 120, 130, 380, and 211. The existing fill or vent lines at 120 and 380 verified the accuracy of the interpretations. Hand-augering confirmed a hollow metal structure where predicted at site 130. Site 211 could not be confirmed because of overlying concrete. Conclusions for all the sites will be discussed in more detail later.

Buried utilities were noted during the evaluation of the GPR data. The location of utilities on Red-R's maps and maps included in this memorandum do not necessarily show all utilities or the correct locations. Any investigation or removal activities at these sites must include a location of utilities by the proper authorities.

## **SAMPLING OF TANK CONTENTS**

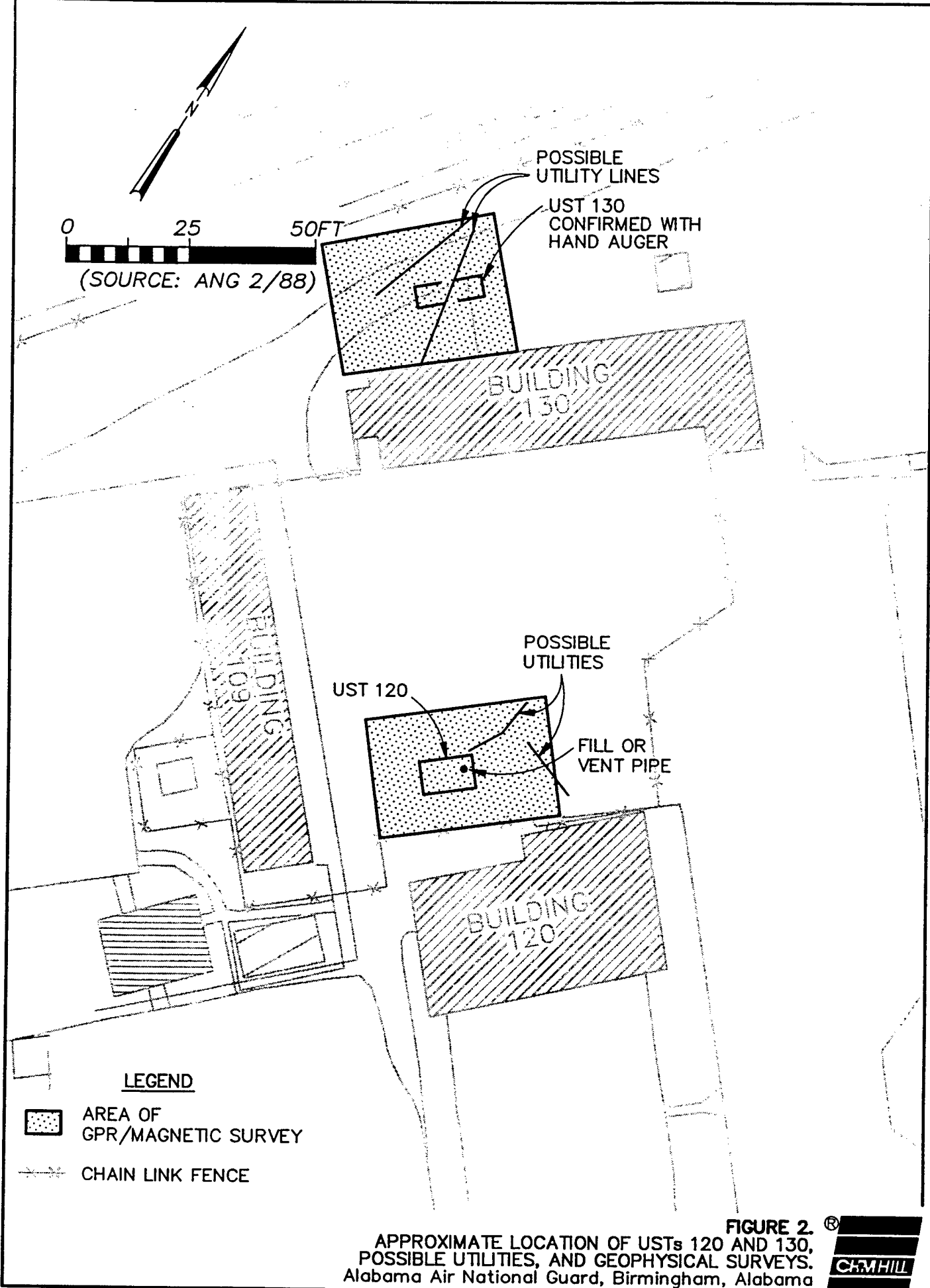
On November 9, 1989, samples of the contents of USTs 120 and 380 were collected for chemical analysis. These were the only tanks accessible for sampling. Tank 120 was sampled through a 1½-inch pipe that extends to the surface of the asphalt parking lot. Tank 380 was sampled through the 3-inch fill-line which is flush with the ground above the tank. The other tanks located by GPR could not be sampled because of a lack of access to the tanks.

Samples were collected by extending Teflon tubing into the tank and pumping the contents through a peristaltic pump directly into certified clean sample containers. A new piece of silicon tubing approximately 12 inches long was mounted in the pump and new Teflon tubing was used at each site. Equipment blanks were collected by pumping ASTM Type II distilled water through the system. The samples, including duplicates for site 380, were submitted along with travel and equipment blanks to CH2M HILL's Montgomery, Alabama, environmental laboratory along with chain-of-custody forms.

## **RESULTS**

### **UST 120**

Figure 2 presents the results of the investigation at UST 120. An anomaly was identified in this study area. A 1½-inch vent line is present at the surface within the area overlying the subsurface anomaly. The tank pit area is approximately 6 ft x 4 ft, with the long axis parallel to and 8 ft north of the chain-link fence surrounding Building 120. Two apparent utility lines were located in the study area but did not extend into the tank pit. According to Base personnel, the major tower communications trunk passes 8-15 ft east of the tank. Samples were obtained of the liquid in the tank and results of those analyses are contained in Appendix B. The water samples were collected and analyzed for VOCs (EPA Method 601 and 602), total lead (EPA Method 239.2), Flashpoint (EPA Method 1010), and polynuclear aromatics (EPA 610). The results for UST 120 indicate that it contains an aqueous solution with dilute levels of lead, xylenes, fluorene and naphthalenes, and the flashpoint indicates that it is ignitable. These results are indicative of diesel or fuel oil which has been diluted by water.



**FIGURE 2.** APPROXIMATE LOCATION OF USTs 120 AND 130, POSSIBLE UTILITIES, AND GEOPHYSICAL SURVEYS. Alabama Air National Guard, Birmingham, Alabama



### **UST 130**

Figure 2 shows UST 130. A subsurface anomaly was detected with GPR approximately 10 ft north of Building 130. The anomalous zone is approximately 4 ft x 10 ft and runs parallel to the north wall of the building. It is in the path of vehicle traffic through this area, but enough space may be available to route around it. There is no associated surface piping, and no sampling was possible. However, hand augering was performed to verify the interpretation of GPR data, and at a depth of 3 ft a metal tank was encountered. An anomaly, representing a possible utility, runs across the tank. There is no information on the use of this possible utility.

### **UST 380**

Figure 3 depicts UST 380. This UST was confirmed before geophysical studies by the presence of a fill line that is still functional and allows direct observation of tank contents. The GPR was calibrated to local soil conditions and used to establish the size of the tank pit and locate surrounding utilities. Tank contents were sampled and the analytical results are contained in Appendix B. The water samples were collected and analyzed for VOCs (EPA Method 601 and 602), total lead (EPA Method 239.2), Flashpoint (EPA Method 1010), and polynuclear aromatics (EPA 610).

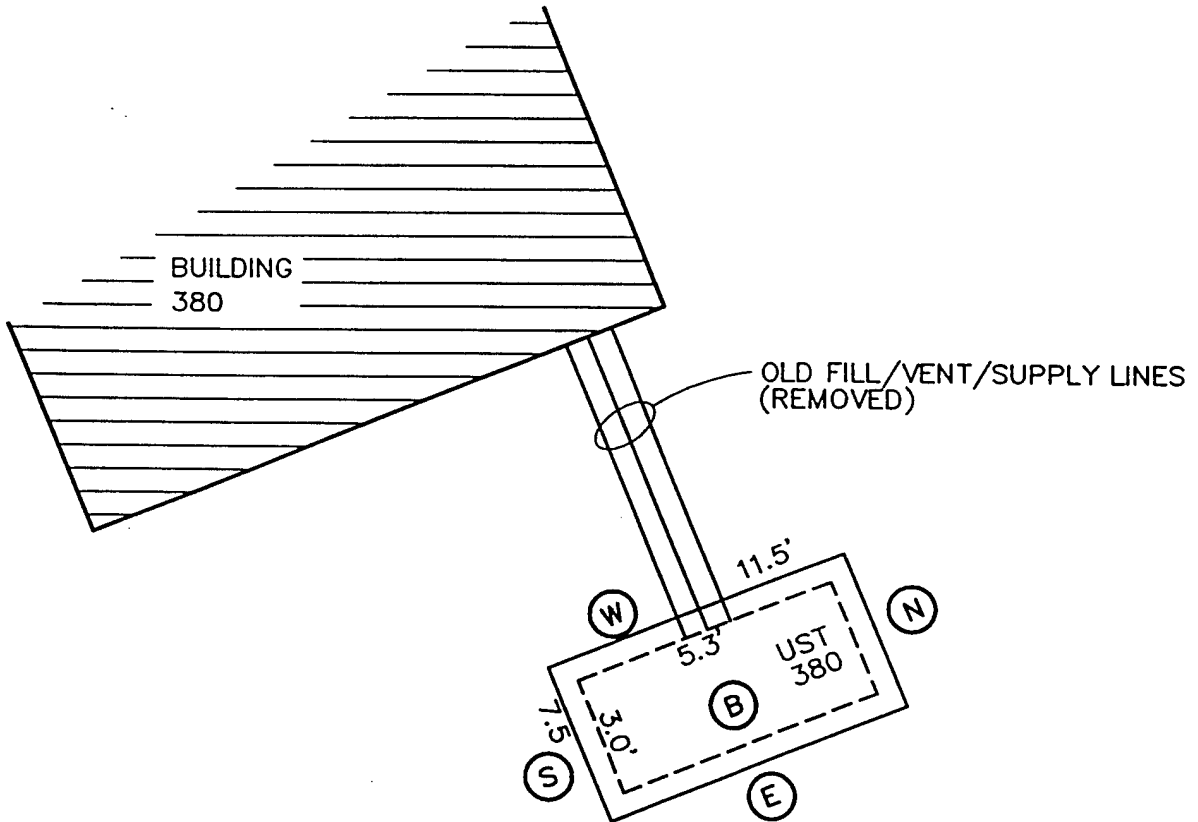
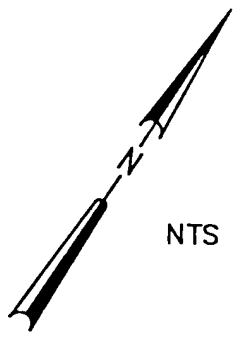
The results for UST 380 indicate high levels of lead, xylenes and naphthalenes and a low flashpoint. This indicates that relatively undiluted diesel or fuel oil is still present in the tank.

### **UST 211**

Figure 4 depicts the USTs detected near Building 211. GPR identified two anomalous areas at this location. The areas are overlain by asphalt and concrete, and no associated plumbing is present at the surface. This area was identified as a gasoline dispensing facility during the 1940s and was suspected to contain 2 tanks. The GPR evidence indicates the presence of two tanks or tank pits. Hand augering to verify the tanks was not possible because of the overlying concrete. This location is now used to store trucks and heavy equipment, and investigating excavation or removal will require relocation of this equipment.

### **UST 30**

The area south of East Lake Boulevard near Building 30 was identified as an abandoned POL tank. Figure 5 depicts this area. The remnants of an asphalt apron where fuel trucks were filled is still present at this location. Base personnel were not clear about the location of the tanks. These facilities were not used after 1946 and were suspected of containing aviation gasoline. Although no tank sizes were reported because of the volume of fuel that would be handled by this type operation, these tanks are estimated to be 10,000 gallons minimum. This estimation was based on



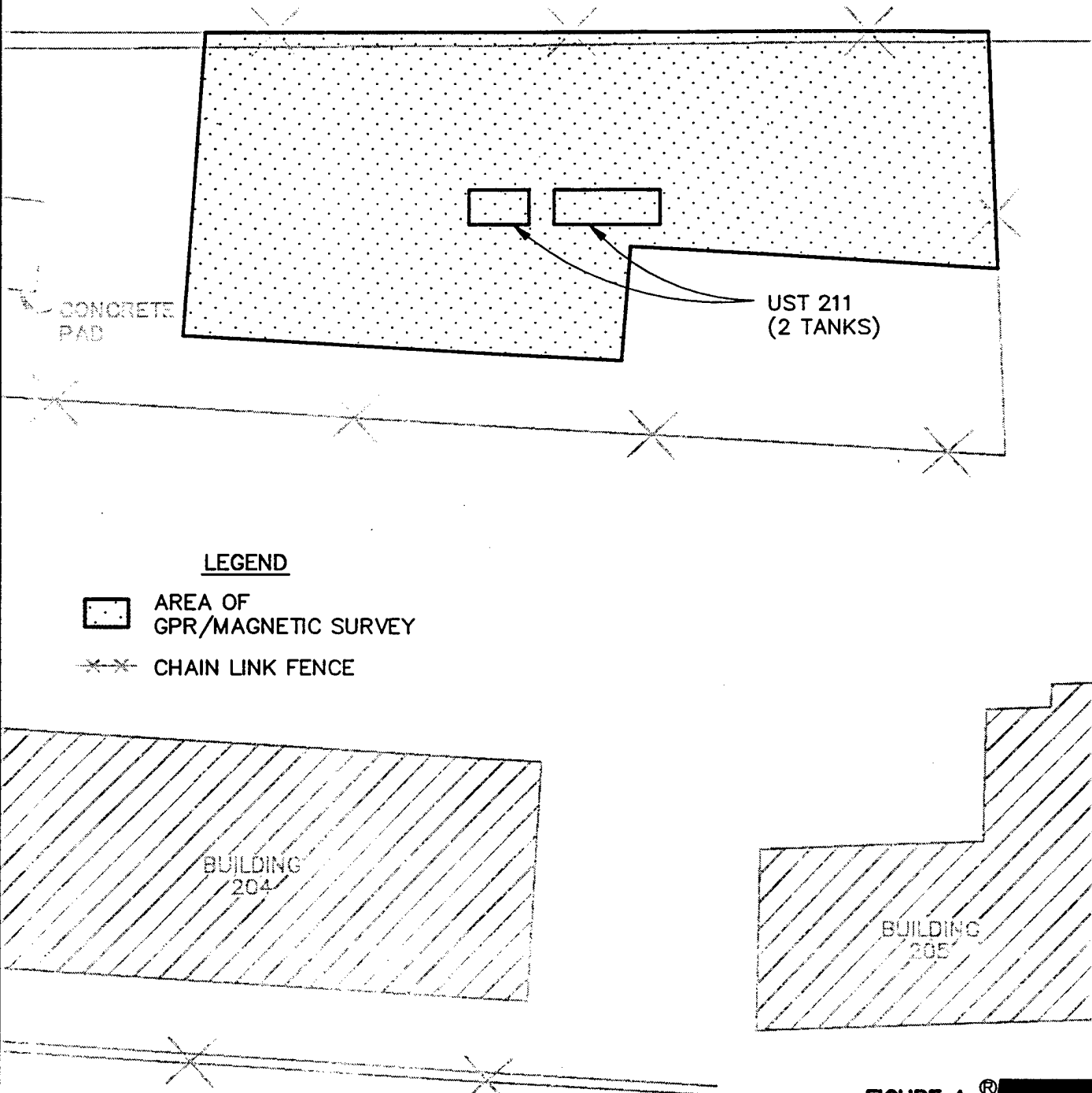
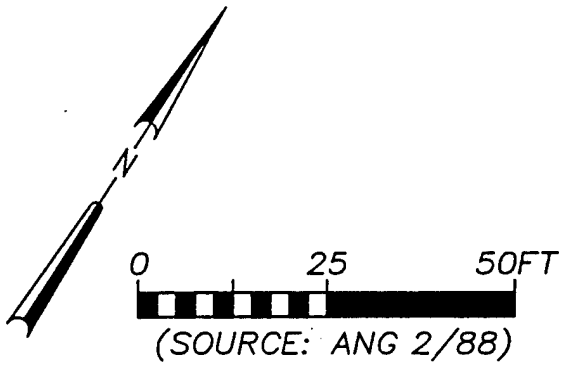
HNu HEADSPACE READING	
LOCATION	(ppm)
380-N	0
380-S	0
380-E	0
380-W	0
380-B	0
380-SP	0

○ DENOTES SAMPLE LOCATION

--- FORMER TANK PERIMETER

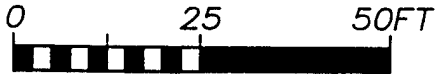
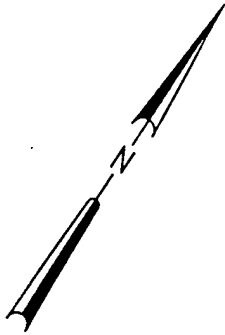
Alabama Air National Guard, Birmingham, Alabama





**FIGURE 4**  
 APPROXIMATE LOCATION OF 211, GEOPHYSICAL SURVEYS  
 AND TANK LOCATION UST 211.  
 Alabama Air National Guard, Birmingham, Alabama





(SOURCE: ANG 2/88)

EAST LAKE BLVD.

S.C. BELL CABLE AND BOXES

TELEPHONE POLE

HAND AUGERED LIMESTONE @ 3'

NO TANK LOCATED

ANG PROPERTY

AIRPORT AUTHORITY  
PROPERTY LEASED TO  
DRUMMOND

LEGEND

 AREA OF  
GPR/MAGNETIC SURVEY

 CHAIN LINK FENCE

BUILDING  
30

**FIGURE 5**  
APPROXIMATE LOCATION OF HAND AUGER  
BORINGS AND GEOPHYSICAL SURVEYS UST SITE 30  
Alabama Air National Guard, Birmingham, Alabama



information obtained from Base personnel familiar with past fueling operations. The frequency of filling and emptying of the tanks would suggest the tanks had to be large enough to contain approximately 10,000 gallons.

This site adjoins Airport Authority property currently leased to the Drummond Corporation. In order to expand the geophysical study area, permission was obtained from the Airport Authority and Drummond to conduct GPR and hand auger exploratory holes. The GPR traverses were conducted south of the fence along East Lake Boulevard. This area is steeply graded and bound on the south by concrete walls that serve as borders to parking lots and storage areas for aircraft external fuel tanks.

GPR interpretation suggested three anomalous areas on the Drummond property. When hand augers were sunk at these locations, saturated clays were encountered at 1-3 ft and limestone pinnacles or boulders at 3-3½ ft. Similar limestone features were outcropping downgrade. It was concluded that bedrock was too shallow in this area to have accommodated tanks of the size required by such a facility. An electrical drawing (1943) was reviewed that showed the POL and specifically the fuel loading area where the study was centered. Structures that appeared to be aboveground tanks were noted across East Lake Boulevard and approximately 500 ft upgrade. Areal photographs from 1951 and 1956 confirmed the aboveground tank locations. The weight of this evidence and the presence of undisturbed bedrock in the UST 30 study area leads to the conclusion that no tanks were buried at this site and further investigation is not recommended.

#### **UST 175**

The suspected UST area around Building 175 is shown in Figure 6. This site was included in the study because of a raised area in the asphalt underlain by a concrete slab. No piping is visible and no information was available about the UST. GPR indicated an area of irregular slope that was interpreted as possible construction debris or abandoned, truncated utilities. The possible existence of the debris suggests that if there was a tank at this location, it was removed and the area backfilled. One former Base employee remembered an aboveground tank at this location. Because of the lack of specific recollections by base personnel of this tank and the information from the GPR report, no further investigation is recommended at this location.

#### **UST 301**

It was indicated that a UST for butane was located in the area of Building 301, which is shown in Figure 7. Discussions with personnel familiar with former operations in this area limited the tank location to the north end of the building, which was the site of a small boiler room. GPR traverses indicated one anomaly that was interpreted to be a possible tank. Hand augering found no tank in the area. Numerous utilities exist in this area and some would have been placed either overlying or very near the pre-existing tank. A slab on which a large air conditioning unit is mounted is also in

BUILDING  
175

POSSIBLE  
UTILITY

POSSIBLE UNDERGROUND  
CULVERT

NO TANK LOCATED

**LEGEND**

 AREA OF  
GPR/MAGNETIC SURVEY

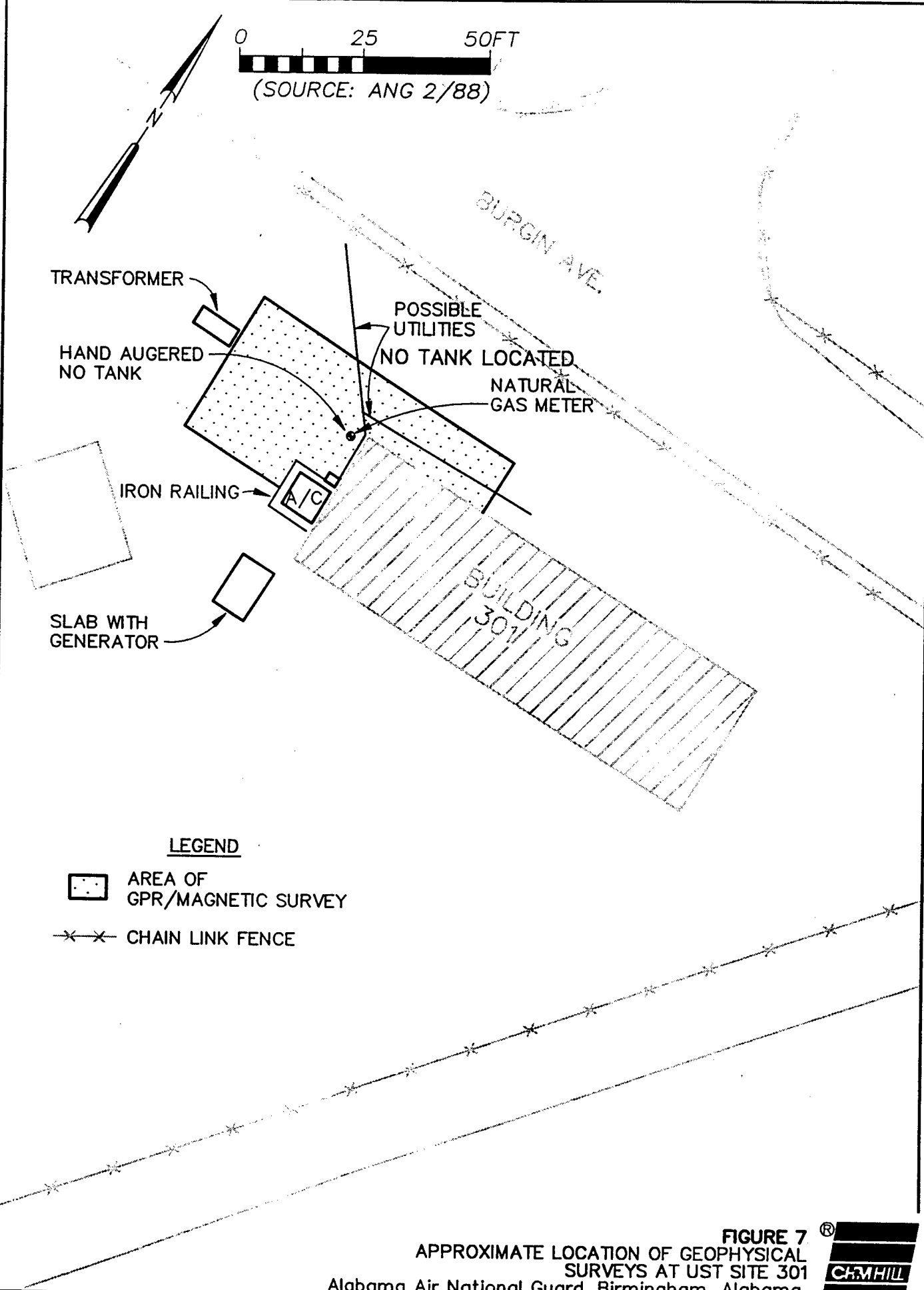
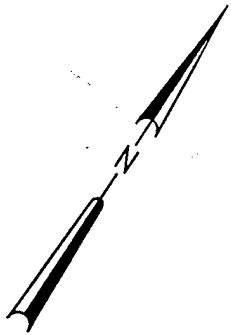
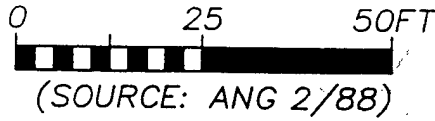
 CHAIN LINK FENCE

0 25 50FT

(SOURCE: ANG 2/88)

**FIGURE 6**  
APPROXIMATE LOCATION OF UST SITE 175,  
POSSIBLE UTILITIES, AND GEOPHYSICAL SURVEYS.  
Alabama Air National Guard, Birmingham, Alabama

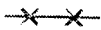




LEGEND



AREA OF GPR/MAGNETIC SURVEY



CHAIN LINK FENCE

**FIGURE 7**  
 APPROXIMATE LOCATION OF GEOPHYSICAL SURVEYS AT UST SITE 301  
 Alabama Air National Guard, Birmingham, Alabama.

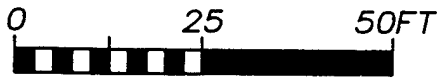
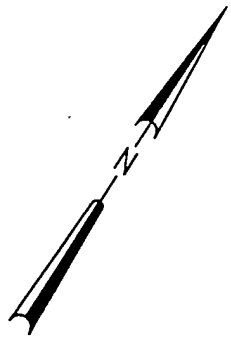


the area of concern. It is probable that if a tank was located here, it is 1) under the A/C slab, 2) was removed when the boiler was decommissioned, or 3) was removed during the burial of utility lines or construction of the A/C slab. Because this tank was known to contain butane, which is gaseous at atmospheric temperatures and pressures, the possibility of contamination resulting from degradation of the tank is minimal. It is recommended, therefore, that no further study of this site be performed.

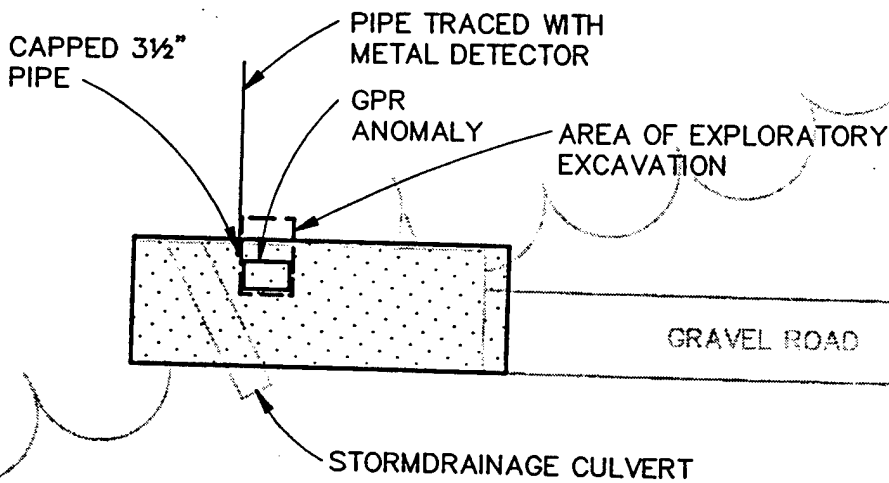
#### **UST 450**

The last area suspected of containing a UST was located northwest of B Street and is shown in Figure 8. A large concrete slab is present there on an unused roadbed. The center of the slab contains a box culvert. A raised 3-inch pipe that was at one time suspected of being a fill pipe located just to the east of the culvert has been removed. The pipe elbowed just below ground surface and ran up the hill. The total length of the pipe was approximately 8 ft in length and was not connected to any other structure. Several pipes of similar size surround this pipe and were cut flush with the concrete slab and filled with concrete. GPR indicated an anomaly east of the culvert near the surface pipes.




On May 18, 1990, an attempt to locate the suspected UST 450 was made. A trench and tunnel were excavated to approximately 7-1/2 feet underneath the pad that, based on the GPR data, indicated the presence of UST 450. The trench and tunnel were more than sufficient to locate the tank if it existed. There was no indication that the tank existed. The soils had no petroleum staining, and HNu readings were 0 ppm.



(SOURCE: ANG 2/88)



**LEGEND**

-  AREA OF GPR/MAGNETIC SURVEY
-  CHAIN LINK FENCE
-  TREES

**FIGURE 8**  
 APPROXIMATE LOCATION OF UST SITE 450,  
 POSSIBLE UTILITIES, AND GEOPHYSICAL SURVEYS.  
 Alabama Air National Guard, Birmingham, Alabama



## UST REMOVAL COST ESTIMATE

Based on the information available from the Geophysical Surveys, it is estimated that five USTs (UST 120, 130, 380, and two at 211) will be decommissioned. All but one of these tanks (UST 380) is located in a parking lot under asphalt. Information about the depth of the tanks and the use of anchor slabs, utilities not located by GPR, and backfill area and material is unknown.

Because of these and other uncertainties, the cost estimate for removal of the USTs is considered an order-of-magnitude cost estimate, emphasizing differential costs. These costs are defined by the American Association of Cost Engineers as approximated estimates made without detailed engineering data. Examples include estimates from cost capacity curves and estimates using scale-up and scale-down factors and/or approximate ratio estimates. It is normally expected that an estimate of this type is accurate to +50 to -30 percent, assuming that unit quantities are fairly well established.

Costs were estimated based on the following assumptions about the tank decommissioning effort:

- Size of the tanks is as specified in Base records
- Two feet of soil is removed around the sides and bottom of the tank, then soil is transported to a stockpile area on the Base. Soil will then be sampled by CH2M HILL and the soil placed on and under triple-lined visqueen
- Placement of tank contents in drums will be done by the contractor and subsequent disposal of the contents by the Base.
- Restoration of the excavation will be by backfill with gravel, then placement of concrete (if asphalt is over the tank) or reseeded.
- Disposal of the tank by the contractor will be through a scrap metal dealer, after decontamination of the tank.
- Contractor transport to and disposal of excavation water will be through the Base's oil/water separator.
- The contractor will transport contaminated soil to an on-Base treatment area and will aerate the soil to remove total petroleum hydrocarbons.
- The contractor performing the physical removal of the USTs will be responsible for the disposal of any UST contents according to ADEM regulations.

This general information was provided to five UST tank removal contractors in the Birmingham area to develop a preliminary cost estimate. Costs from these contractors ranged from approximately \$40,000 to \$80,000. Based on CH2M Hill experience, the estimated cost for tank removal under the above conditions is between \$10,000 and \$20,000 per tank. Because of the compact nature of the Base, and potential difficulties with underground utilities in the areas of the tank excavations, it is estimated that tank removal will cost approximately \$20,000 per tank, for a total of \$100,000 for the effort.

**Appendix B**  
**Data Validation Memorandum**

**TO:** J. P. Martin  
**FROM:** Ann Castleberry  
**DATE:** June 17, 1991  
**SUBJECT:** Data Review for the Birmingham ANG UST Removal Report  
**PROJECT:** MGM27232.UB.RP

## 1. INTRODUCTION

Soil samples were collected as part of the Birmingham Air National Guard Underground Storage Tank (UST) Removal project. This memorandum summarizes the criteria used for review and the results of the review. The data results are discussed in the UST Removal Report and are not included in this memorandum. All the soil samples were analyzed for Total Petroleum Hydrocarbons using EPA Method 418.1. Selected samples also were analyzed for:

- Volatile organic compounds, SW-846/8010 and 8020
- Poly-aromatic hydrocarbons, SW-846/8100
- Lead, SW-846/7421
- Ignitability, SW-846/1010
- TCLP for lead, SW-846/1311 and 7421

All the samples were submitted to the CH2M HILL laboratory located in Montgomery, Alabama. All analyses were performed in the Montgomery laboratory with the exception of the volatile organic compounds, which were analyzed in the Gainesville, Florida, laboratory.

## 2. DATA PACKAGE DELIVERABLES

When samples were submitted to the laboratory, they were assigned unique 8-digit numerical sample identifiers. The first five digits of the laboratory sample number identify the sample batch, and the last 3 numbers indicate each unique field sample. The sample delivery groups for this project are:

- 14841
- 17570
- 17587
- 17593

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- 17618
- 17634
- 18134

All samples were analyzed using HAZWRAP Level E QC as defined by the HAZWRAP Guidance Manual, HWP-65, *Requirements for Quality Control of Analytical Data*. Data package deliverables included:

- Sample results
- Method blank results
- Initial calibration data
- Continuing calibration data
- Spiked sample results--i.e., surrogate recoveries for organic analyses and Laboratory Control Sample (LCS) results for inorganic analyses.

### 3. REVIEW PARAMETERS AND CRITERIA

Listed below are the parameters chosen for review and the criteria used for the review.

#### HOLDING TIME

Holding time is defined as the time in days, from sample collection to extraction or analysis. Holding time for each analysis is:

<u>Analysis</u>	<u>Extraction</u>	<u>Analysis</u>
TPH	-	28 days
Lead	-	6 months
Ignitability	-	None
Volatile organic compounds	-	14 days
Poly-aromatic hydrocarbons	14 days	40 days
TCLP for lead	6 months	6 months

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## CALIBRATION

Initial calibration data are used to demonstrate that the analytical instrument is performing satisfactorily and is capable of producing acceptable quantitative data at the beginning of the analytical period. Continuing calibration checks document that the instrument continues to produce acceptable data. Specific calibration criteria are included in each method, and these criteria were used for review.

## SPIKED SAMPLE RESULTS

For organic analyses, each sample was spiked with a surrogate compound. Surrogate spike recoveries are used to demonstrate laboratory performance and to evaluate matrix interference. Surrogate compounds are the structural homologs of target list compounds (TCL) (for example, they are often TCL compounds with deuterium substituted for hydrogen; therefore, they are expected to behave in a manner similar to TCL compounds during analysis. Spike recoveries may also be used to estimate accuracy, which is a measure of the agreement between an experimental determination and the true value of the parameter being measured. Surrogate spike recovery limits are defined either in the method or by laboratory-specific control charts.

## LABORATORY CONTROL SAMPLE (LCS) RESULTS

For inorganic analyses, an LCS was analyzed with each batch of samples. The LCS analysis is designed to monitor the efficiency of the digestion process. Analyte recoveries must fall within 90 to 110 percent; if not, the data are qualified.

## COMPLETENESS

Completeness can have two meanings. One, it can mean that all the data package deliverables are present and reviewed. Two, completeness can be expressed as the percentage of measurements made that are judged to be valid.

## 4. SUMMARY AND CONCLUSIONS

When sample batch 17587 was shipped, the previously dry soil samples arrived with water floating in three of the sample containers (17587-003, 004, and 005, which corresponds to samples 120-W, 120-E, and 120-SD). As noted in the cover letter, it was suspected that the water resulted from melted ice; the laboratory confirmed that

**M E M O R A N D U M**

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suspicion with the project field team. The laboratory decanted the water from these three samples into a separatory funnel and analyzed the composite water sample for TPH, which yielded a result of 208 mg/l TPH. The TPH for the three corresponding soil samples was 9.2, 28.6, and 472 mg/l, respectively.

Otherwise, the data are acceptable for use without any further qualifications.

**Appendix C**  
**Investigation-Derived Waste Disposition**



April 26, 1991

MGM27232.UB.RP

Captain Waylon Blakeley  
117th CES  
Birmingham MAP (ANG)  
Birmingham, AL 35217-3595

Dear Captain Blakeley:

Subject: Air National Guard--Abandoned UST Removal Project

This letter is written to inform you of the analytical results for the second round soil sampling of the spoil piles generated during the UST removal project. The samples were collected on March 22, 1991, and delivered to the CH2M HILL Laboratory in Montgomery on the same date.

Samples were collected from each spoil pile for a TCLP Lead analysis. The spoil pile generated from UST 130 removal was sampled twice because of its size and physical variation. All other spoil piles were sampled only once for TCLP lead.

Spoil piles generated from the removal of USTs 120 and 130 were above the ADEM criteria of 100 ppm for Total Petroleum Hydrocarbons (TPHs) on the first round sampling. These spoil piles were sampled for TPHs to determine if the aeration to date had been sufficient to remediate the soils below the ADEM criteria. Spoil Pile 120 was sampled once. Spoil pile 130 was sampled twice.

Six drums of ignitable fluids were determined to exist from the first round sampling of the investigation-derived wastes. Two of these drums also were sampled to determine if the wastes were also characteristically toxic as measured by the TCLP for Lead. Drums 57 and 62 were sampled for this parameter.

The results of the second round sampling are shown in the table on the following page. The results for each sample show that none of the fluids or soils tested are Characteristically Toxic for Lead as measured by the TCLP. The sample for TPH for spoil pile 120 was well beyond the ADEM limit of 100 ppm, and these soils should be remediated by the method shown in the UST Removal Technical Specifications.

SECOND ROUND SAMPLING RESULTS

Sample Designation	TCLP--Lead (ppb)	TPH (ppm)
D-57	26	-
D-62	6	-
120-SP	22	1,360
130N-SP	14	281
130S-SP	4	57.5
211-SP	4	-
380-SP	7	-

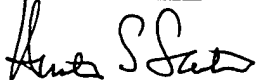
ppb            parts per billion  
ppm           parts per million  
-               Not Analyzed

The samples for the north portion of spoil pile 130 resulted in a level of TPHs above the 100 ppm level. The sample for the south portion of spoil pile 130 resulted in a level less than the 100 ppm limit. The north portion of these soils should be remediated along with spoil pile 120. The enclosed figure shows where these soils are located in the soil staging area. Approximately 80 cubic yards of materials need to be remediated.

The drummed wastes tested do not exhibit the toxicity characteristic for lead. These wastes have already been sampled for other characteristics during the first round sampling and are ready to be manifested as outlined in our letter dated March 25, 1991. If you have any questions or need further assistance, please do not hesitate to call.

Sincerely,

CH2M HILL



Hunter S. Sartain, EIT  
Project Engineer

mgmBANG/042691.let  
enclosure

cc: J.P. Martin(w/encl)  
Mark Corey/PA  
Tom Shope/HAZWRAP



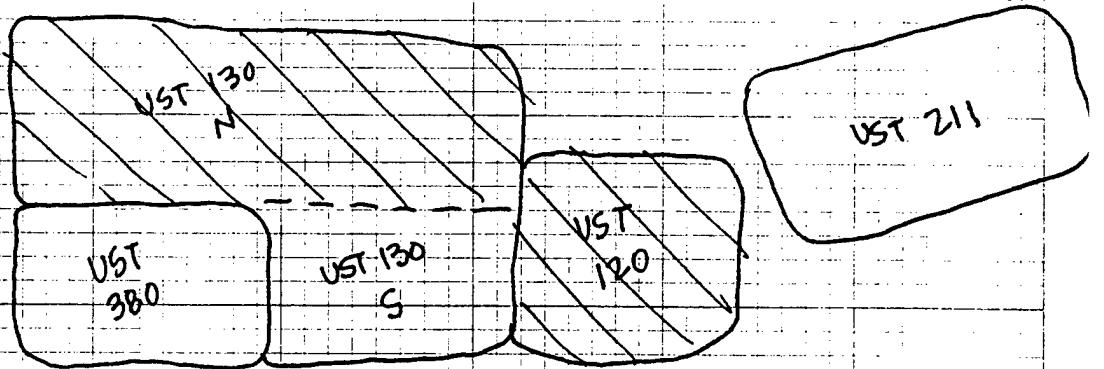
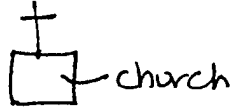
SUBJECT UST REMOVAL PROJECT  
SOIL REMEDIATION

BY H. Sertain DATE 4/26/91

SHEET NO. 1 of 1

PROJECT NO. H&M 27232.03.RP

AA  
TOWER



INDICATES SOIL WHICH NEED REMEDIATION  
DUE TO EXCESSIVE TPH CONCENTRATION



March 25, 1991

MGM27232.UB.RP

Captain Waylon Blakeley  
 117th CES  
 Birmingham MAP (ANG)  
 Birmingham, Alabama 35217-3595

Dear Captain Blakeley:

Subject: Air National Guard--Abandoned UST Removal Project

This letter is written to advise you that the second round soil and drum contents sampling was conducted on March 22, 1991. The results are scheduled to be complete in late April. We will advise you of the spoil pile disposition at that time.

During sampling of the drummed wastes, an error was noted in the number and disposition of drums reported in our letter dated March 18, 1991. The table below and the attached drawing reflect the correct number and disposition of the drummed wastes.

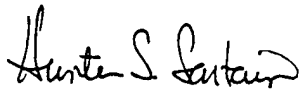
Drum Number	Origin	RCRA Hazardous	Disposition
1-40	UST 130	No	Sewer System*
41-46	UST 130	No	Smitherman Oil**
47-50	UST 130	No	Sewer System*
51-52	UST 130	No	Smitherman Oil**
53-56	UST 130	No	Sewer System*
57-60, 62,64	UST 120/380	Yes	Manifest-Analytical***
* Provided the Jefferson County Sewer System accepts the wastes. ** These drums of nonhazardous wastes already have been taken offsite by a recycler. *** Dispose as hazardous waste after final analytical results are obtained and transmitted.			

Captain Waylon Blakeley  
Page 2  
March 25, 1991  
MGM27232.UB.RP

If you have any questions or need further assistance, please do not hesitate to call.

Sincerely,

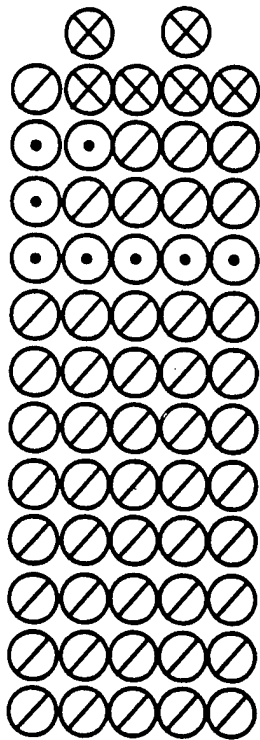
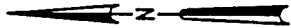
CH2M HILL

  
Hunter S. Sartain

mgmCR38/037.51

enclosures

cc: J. P. Martin (w/encl)  
Mark Corey  
Tom Shope (w/incl)

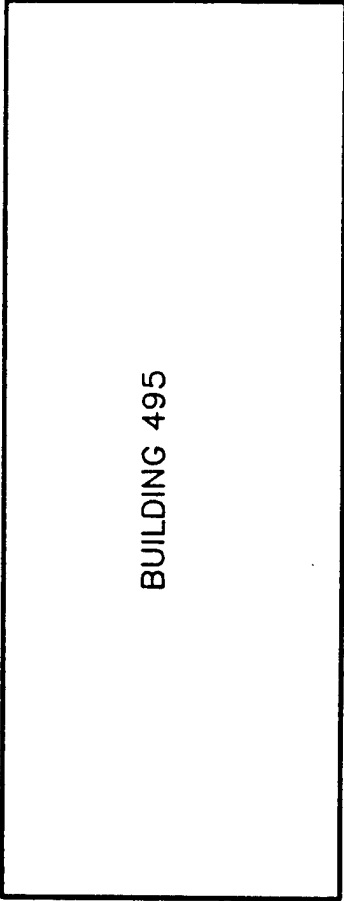


**LEGEND:**


 NON-HAZARDOUS  
 WASTES  
 (1-40, 47-50, 53-56)


 CONTENTS WERE  
 REMOVED BY  
 SMITHERMAN OIL CO.  
 (41-46, 51-52)


 CONTAINS IGNITABLE  
 WASTES  
 (57-60, 62,64)



**TEMPORARY DRUM STORAGE**  
 Alabama Air National Guard, Birmingham, Alabama



March 21, 1991

MGM27232.UB.SD

Captain Waylon Blakely  
117th CES  
Birmingham MAP (ANG)  
Birmingham, AL 35217-3595

Dear Captain Blakely:

**Subject:** Air National Guard USPFO Project BRKR 902016  
Abandoned UST Removal Project

The purpose of this letter is to advise you of the status of the fluids that were removed from the abandoned USTs and to transmit the ADEM UST Reports for you to submit to ADEM.

Fluids pumped from the USTs before their removal were placed in 61 drums. The drums were grouped according to origin, and a representative drum from each group was sampled for various organic compounds and for ignitability.

Based on knowledge of the drums' contents, corrosivity and reactivity characteristics of the fluids were not investigated. TCLP analyses were not conducted on the fluids because organic fuel components (DO16 through DO43) that exhibit toxicity characteristics currently are exempt from hazardous waste classification by 40 CFR 261.4(b)(10). Furthermore, these wastes are not a listed hazardous waste as set forth in 40 CFR 261 Subpart D.

Drums 56 through 60 and 62 are considered hazardous under RCRA because they exhibit the hazardous characteristic of ignitability. These drums also contain total lead levels higher than the level that is considered hazardous by the Toxicity Characteristic (TC). We intend to sample these drums for TCLP lead on March 22, 1991, to evaluate whether they exhibit the hazardous waste characteristic toxicity for lead.

Captain Waylon Blakely  
Page 2  
March 21, 1991  
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Based on these findings, we recommend disposal of the drummed wastes now located at the temporary storage area behind Building 495 as shown in the following table:

<b>Drum Number</b>	<b>Origin</b>	<b>RCRA Hazardous</b>	<b>Disposition</b>
1-40	UST 130	No	Sewer System*
41-46	UST 130	No	Smitherman Oil**
47-50	UST 130	No	Sewer System*
51-52	UST 130	No	Smitherman Oil**
53-55	UST 130	No	Sewer System*
56-60, 62	UST 120/380	Yes	Manifest-Analytical***

\* Provided the Jefferson County Sewer System accepts the wastes.  
\*\* These drums of nonhazardous wastes already have been taken offsite by a recycler.  
\*\*\* Dispose as hazardous waste after final analytical results are obtained and transmitted.

The Jefferson County Sewer Board should be contacted before disposal of nonhazardous Drums 1 through 40, 47 through 50, and 53 through 55. The analytical results for these drums are enclosed. We understand that the ADEM-proposed criteria for discharge to a POTW is set at 500 ppb for BTEX. The enclosed analytical results show that the average concentration of degradable organics found in these drums is 570 ppb. We think that the organics present in the drum wastes would be easily degraded and could be released to the sewer system without detriment to the Jefferson County Sewer System based on the ADEM limits. You will need to review these results with Jefferson County representative before disposal.

The four enclosed ADEM UST Closure Reports have been completed for the USTs removed from the ANG facility. These reports are required to be completed and returned to ADEM. The reports need the signature of the Air National Guard's (owner's) representative on page 5.

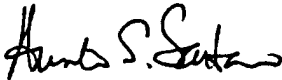
Captain Waylon Blakely  
Page 3  
March 21, 1991  
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The four spoil piles generated from the UST removal project have been sampled once. High total lead concentrations were obtained for each of the spoil piles but are suspected to indicate background concentrations. These soils will be sampled for TCLP lead based on guidance from ADEM. Also two spoil piles resulted in TPH concentrations higher than the 100 ppm level for remedial action. These spoil piles have since been aerated in the soil staging area. Three samples will be collected from these areas on March 22, 1991 for subsequent TPH analyses.

If you have any questions or need further information, please do not hesitate to call.

Sincerely,

CH2M HILL



Hunter S. Sartain  
Project Engineer

Enclosures

mgmCR38/031.51

cc: J.P. Martin (w/encl)  
Mark Corey  
Tom Shope/HAZWRAP (w/encl)