INSTALLATION RESTORATION PROGRAM

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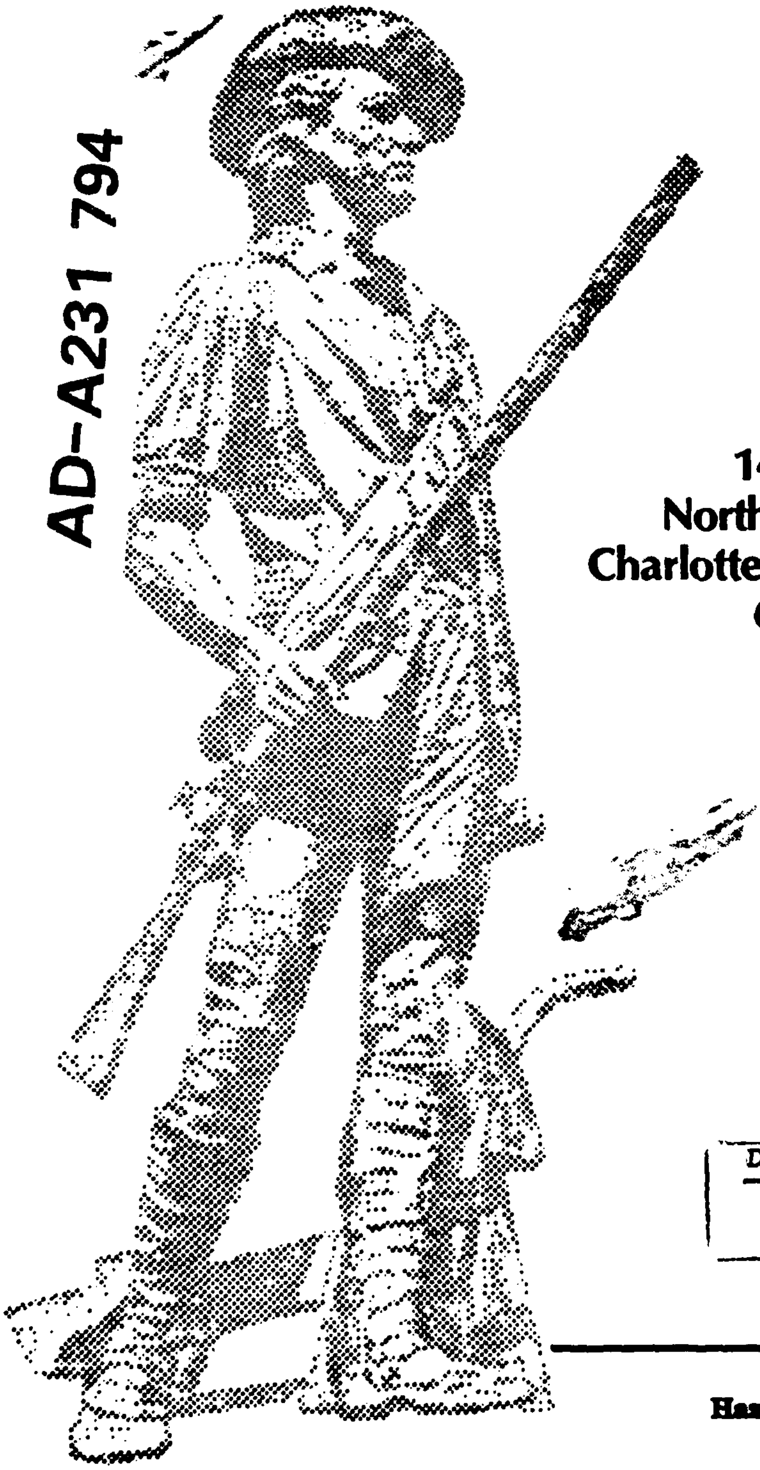
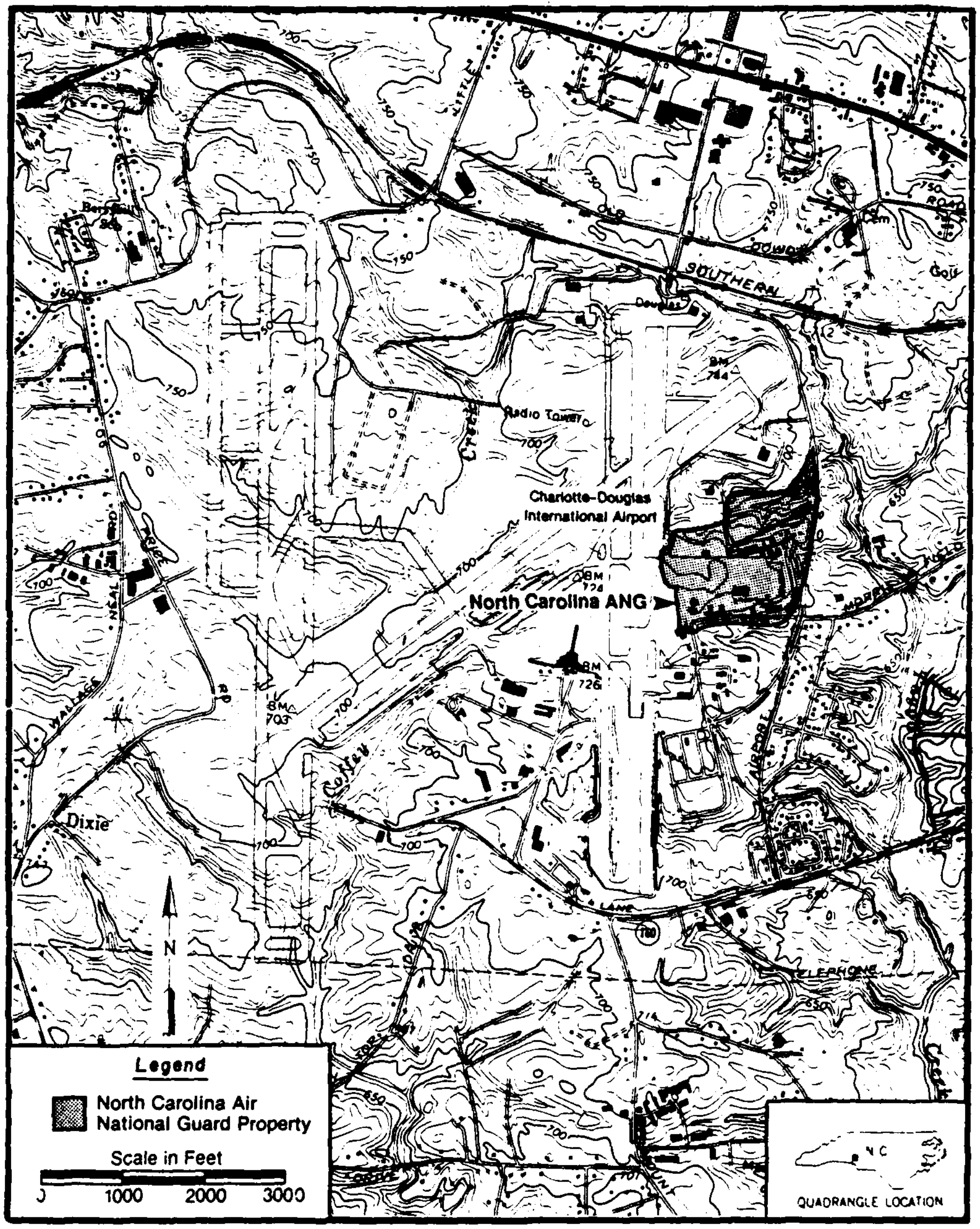


Preliminary Assessment

145th Tactical Airlift Group
North Carolina Air National Guard
Charlotte - Douglas International Airport
Charlotte, North Carolina

Hazardous Materials Technical Center

October 1988



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Preliminary Assessment for suspected hazardous waste sites on the North Carolina Air National Guard Base at the Charlotte-Douglas International Airport. The study was conducted under the Air National Guard's Installation Restoration Program.

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INSTALLATION RESTORATION PROGRAM
PRELIMINARY ASSESSMENT

145th TACTICAL AIRLIFT GROUP
NORTH CAROLINA AIR NATIONAL GUARD
CHARLOTTE-DOUGLAS INTERNATIONAL AIRPORT
CHARLOTTE, NORTH CAROLINA

December 1988

Prepared for

National Guard Bureau
Andrews Air Force Base, Maryland 20310

Prepared by

Hazardous Materials Technical Center
The Dynamac Building
11140 Rockville Pike
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EXECUTIVE SUMMARY

A. Introduction

The Hazardous Materials Technical Center (HMTC) was retained in November 1987 to conduct the Installation Restoration Program (IRP) Preliminary Assessment (PA) of the 145th Tactical Airlift Group, North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina (hereinafter referred to as the Base), under Contract No. DLA-900-82-C-4426. The Preliminary Assessment included:

- Base coordination with Airport personnel for an onsite visit, including interviews with 22 past and present Base employees conducted by HMTC personnel, during 16-19 November 1987;
- the acquisition and analysis of pertinent information and records on hazardous material use and hazardous waste generation and disposal at the Base;
- the acquisition and analysis of available geologic, hydrologic, meteorologic, and environmental data from pertinent Federal, State, and local agencies; and
- the identification of sites on the Base that may be potentially contaminated with hazardous materials/hazardous wastes (HM/HW).

B. Major Findings

Past Base operations involved the use and disposal of materials and wastes that were subsequently categorized as hazardous. The major operations of the Base that have used and disposed of HM/HW include aircraft maintenance; ground maintenance; and petroleum, oil, and lubricant (POL) management and distribution. Varying quantities of waste oils, recovered fuels, spent cleaners, strippers, and solvents were generated and disposed of by these activities.

Interviews with 22 past and present Base personnel and a field survey resulted in the identification of two disposal and/or spill sites at the Base which are potentially contaminated with hazardous materials. Where possible, these sites were assigned a Hazard Assessment Score (HAS) according to the U.S. Air Force Hazard Assessment Methodology (HARM).

Site No. 1 - Old Fire Training Area (HAS-55)

From the early 1960s to the mid 1970s, the Base used this fire training area (FTA), which is under lease by the Base and located on property belonging to the Charlotte-Douglas International Airport. Substances including JP-4, solvents, and used oils from various Base shops were used in periodic fire training exercises. It is estimated that approximately 4,000 to 20,000 gallons of flammable material was used per year throughout the FTA's history. The FTA was used primarily by the Base and principal access was through Base property.

Site No. 2 - Pond Area and Drainage Basin (HAS-57)

The pond has received surface runoff from areas to the north, east, and west, including where the old POL facilities were located. The pond was drained in 1987 and sampling of surface soil from the pond bed has shown this soil to be contaminated with hydrocarbons. Storm water drainage from the northern part of the Base drains from the pond into an intermittent creek which flows to the east towards a shallow creek bed in the northeastern corner of the Base property. In 1978, approximately 1,000 to 8,000 gallons of JP-4 were spilled at the old POL area. Base fuel inventory records show a loss of 8,500 gallons of JP-4. Although the majority of this fuel was recovered by cleanup activities, any residual fuel that was not recovered would eventually have reached the northeastern drainage area. For purposes of assigning a HAS according to HARM, it was assumed that this is a small quantity hazardous waste site.

C. Conclusions

Information obtained through interviews with past and present Base personnel resulted in the identification of two areas on the Base that are potentially contaminated with HM/HW. Evidence at both of the identified sites suggests they may be contaminated, and the potential for contaminant migration exists; therefore, both sites were assigned a HAS according to HARM.

D. Recommendations

Further IRP investigation at each of the sites is recommended.

I. INTRODUCTION

A. Background

The 145th Tactical Airlift Group (TAG) is located at the North Carolina Air National Guard at the Charlotte-Douglas International Airport, Charlotte, North Carolina (hereinafter referred to as the Base). The unit was established in 1942. Past operations at the Base have involved the use and disposal of materials and wastes that subsequently have been categorized as hazardous. Consequently, the Air National Guard (ANG) has implemented its Installation Restoration Program (IRP). The IRP consists of the following:

- Preliminary Assessment (PA) - to identify past spill or disposal sites posing a potential and/or actual hazard to public health or the environment.
- Site Investigation/Remedial Investigation/Feasibility Study (SI/RI/FS) - to acquire data via field studies, for the confirmation and quantification of environmental contamination that may have an adverse impact on public health or the environment and to select a remedial action through preparation of a feasibility study.
- Research, Development and Demonstration (RD & D) - if needed, to develop new technology for accomplishment of remediation.
- Remedial Design/Remedial Action (RD/RA) - to prepare designs and specifications and to implement site remedial action.

B. Purpose

The purpose of this IRP Preliminary Assessment is to identify and evaluate suspected problems associated with past hazardous waste handling procedures, disposal sites, and spill sites on the Base. Personnel from the Hazardous Materials Technical Center (HMTC) visited the Base, reviewed existing environmental information, analyzed Base records concerning the use and generation of hazardous materials/hazardous wastes (HM/HW), and conducted interviews with past and present Base personnel who are familiar with past hazardous materials management activities. A physical inspection was made of the suspected sites. Relevant information collected and analyzed as a part of the Preliminary Assessment included the history of the Base, with special emphasis on the history of the shop operations and their past HM/HW management procedures; local geological, hydrological, and meteorological conditions that may affect migration of contaminants; local land use and public utilities that could affect the potential for exposure to contaminants; and the ecological settings that indicate environmentally sensitive habitats or evidence of environmental stress.

C. Scope

The scope of this Preliminary Assessment is limited to the Base and includes:

- An onsite visit;
- The acquisition of pertinent information and records on hazardous materials use and hazardous wastes generation and disposal practices at the Base;
- The acquisition of available geologic, hydrologic, meteorologic, land use, critical habitat, and utility data from various Federal, State, and local agencies;
- A review and analysis of all information obtained; and
- The preparation of a report to include recommendations for further actions.

The onsite visit and interviews with past and present Base personnel were conducted during the period 16-19 November 1987. The HMTC Preliminary Assessment was conducted by Mr. Raymond G. Clark, Jr., P.E. Manager/P.E.; Mr. Mark Johnson, P.G./Program Manager; Ms. Kathryn A. Gladden, Chemical Engineer; Mr. Jeffrey D. Fletcher, Geologist; and Ms. Caroline Dietrich, Environmental Scientist (resumes are included as Appendix A). Individuals from the Air National Guard who assisted in the Preliminary Assessment include: Captain Daniel Beck (Base Civil Engineer), SMS James Craig (Assistant Project Officer) and selected members of the 145th TAG. The Point of Contact (POC) at the Base was Lt. David K. Steyers (Environmental Coordinator).

D. Methodology

A flow chart of the Preliminary Assessment Methodology is presented in Figure 1. This methodology ensures a comprehensive collection and review of pertinent site specific information and is used in the identification and assessment of potentially contaminated hazardous waste spill/disposal sites.

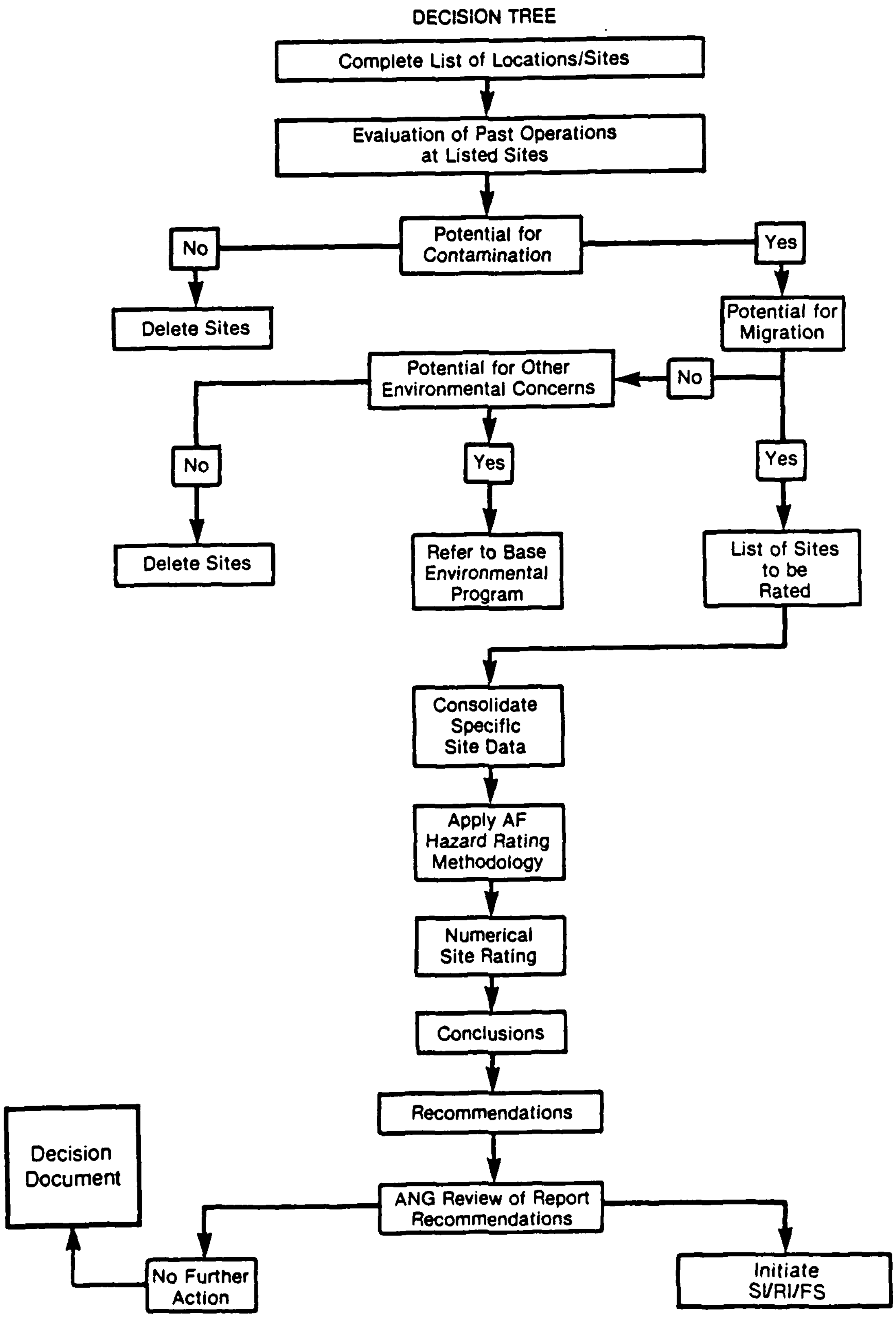
The Preliminary Assessment begins with a site visit to the Base to identify all shop operations or activities on the installation that may have used hazardous materials or generate hazardous wastes. Next, an evaluation of past and present HM/HW handling procedures is made to determine whether any environmental contamination has occurred. The evaluation of past HM/HW handling practices is facilitated by extensive interviews with past and present employees familiar with the various operating procedures at the Base. These interviews also define the areas on the Base where any HM/HW, either intentionally or inadvertently, may have been used, spilled stored, disposed of, or otherwise released into the environment.

Historic records contained in the Base files are collected and reviewed to supplement the information obtained from interviews. Using this information, a list of past waste spill/disposal sites on the Base is identified for further evaluation. A general survey tour of the identified spill/disposal sites, the Base, and the surrounding area is conducted to determine the presence of visible contamination and to help assess the potential for contaminant migration. Particular attention is given to locating nearby drainage ditches, surface water bodies, residences, and wells.

Detailed geologic, hydrologic, meteorologic, land use, and environmental data for the area of study is also obtained from the POC, and from appropriate Federal, State, and local agencies. A list of outside agencies contacted is in Appendix B. Following a detailed analysis of all the information obtained, areas

PRELIMINARY ASSESSMENT
INSTALLATION
RESTORATION PROGRAM

Figure 1.
Preliminary Assessment Methodology Flow Chart.



are identified as suspect areas where HM/HW disposal and/or spills may have occurred. Where sufficient information is available, sites are assigned a Hazard Assessment Score (HAS) using the U.S. Air Force Hazard Assessment Rating Methodology (HARM) (Appendix C). However, the absence of a HAS does not necessarily negate a recommendation for further IRP investigation, but rathermay indicate a lack of data. The HAS is computed from the data included in the Factor Rating Criteria (Appendix D).

II. INSTALLATION DESCRIPTION

A. Location

The 145th TAG of the North Carolina Air National Guard is located at the Charlotte-Douglas International Airport, Charlotte, North Carolina in Mecklenburg County. Commercial and residential property is located on the eastern and southern sides of the Base. Figure 2 shows the location and current boundaries of the Base property covered by this Preliminary Assessment.

B. History of Base Operations

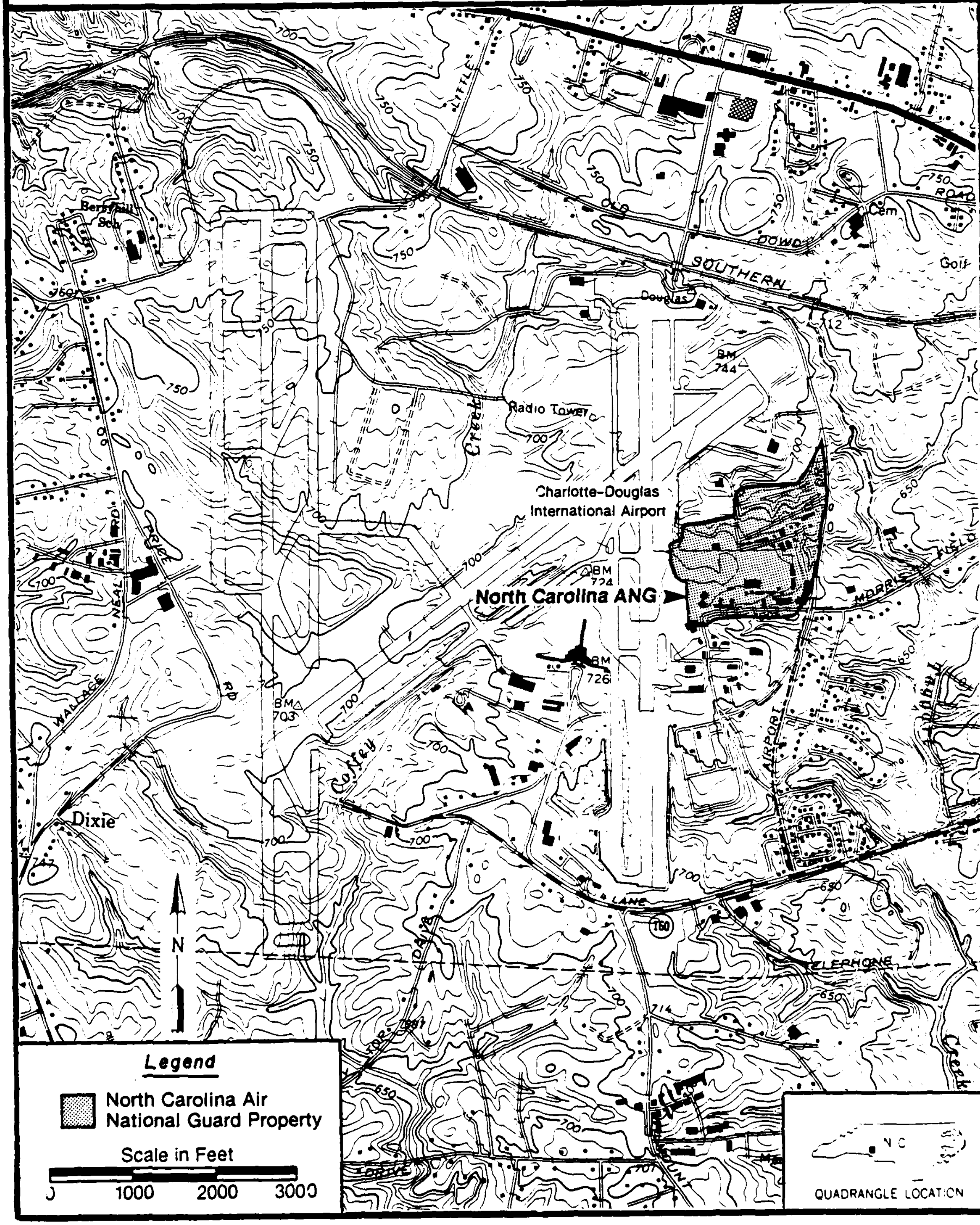
The present North Carolina Air National Guard began as the 360th Fighter Squadron of the U.S. Army Air Corps. It was initially activated at Westover Field, Massachusetts on 12 December 1942. In August 1943, the 360th was transferred to Europe where they participated in the European Theatre Operations of World War II until 11 November 1945 when they were placed on inactive status.

On 24 May 1946, the 360th was redesignated the 156th Fighter Squadron and allocated to the National Guard. Two years later, the 156th was extended Federal Recognition and transferred to Morris Field, Charlotte, North Carolina. At this time, the 156th had 13 officers and 50 airmen. Mission aircraft was the P-47 Thunderbolt. When the Korean Conflict broke out in 1950, the 156th was assigned to the 123rd Fighter Bomber Wing located at Godman Air Force Base and later at Manston Royal Air Force Station in England. After the Korean Conflict, the unit was assigned as part of the North Carolina Air National Guard and was reequipped with F-51 North American Mustang Fighters. In October 1953, the 156th received its first jets, the T-33 Trainer and later the F-86A Sabrejet. By 1959, the unit had converted to the F-86L, an all weather fighter interceptor.

In 1960, the 145th's mission was changed to Aeromedical Transport and the unit was equipped with the C-119C Flying Boxcar. This aircraft was replaced by

Source: U.S.G.S.
Charlotte West,
North Carolina
Revised, 1980.

Figure 2.
Location Map of North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina.



the C-121 Super-Constellation in 1962. In 1966, the mission was redesignated Military Airlift Command and the 156th became the 145th Military Airlift Group. By 1967, the C-121 Super-Constellation had been phased out in favor of the Newer C-124 Globemaster.

From mid-1971 to early 1973, personnel of the 145th converted to a new aircraft (C-130B) and a new Tactical Airlift mission.

III. ENVIRONMENTAL SETTING

A. Meteorology

The meteorological data presented below is from local climatological data for the Charlotte, North Carolina area compiled by the National Oceanic and Atmospheric Administration (NOAA).

Charlotte has a moderate climate, characterized by cool winters and warm summers. Temperatures fall as low as the freezing point on a little over one-half of the days in the winter months. Winter weather is changeable, with occasional cold periods, but extreme cold is rare. Snow is infrequent, with the first snowfall of the season coming in late November or December. Summers are long and quite warm with the afternoon temperatures frequently in the low 90s. Mean yearly temperature is about 60° F; average minimum temperature in the winter is 43° F and average maximum temperature in the summer is 78° F. ?

Precipitation is generally rather evenly distributed throughout the year, the driest weather usually coming in the fall. Summer rainfall comes principally from thunderstorms with occasional dry spells of one to three weeks duration. Precipitation averages 45 inches per year. Net precipitation is a minimum of + 4 inches per year, according to the method outlined in the Federal Register (47 FR 31224, 16 July 1982). Maximum rainfall intensity based on 1-year, 24-hour rainfall is 3 inches (calculated according to the 47 FR 31235, 16 July 1982).

B. Geology

The Base is located in the south central Piedmont Physiographic Province in North Carolina. The Piedmont Province generally consists of well rounded hills and ridges which are dissected by a well-developed system of draws and streams. The Piedmont Province is predominantly underlain by metamorphic rock composed of altered igneous rocks which were initially formed during the

Precambrian and Paleozoic eras, and sedimentary rocks. The volcanic and sedimentary rocks deposited in the Piedmont Province during the Precambrian era were the host for the metamorphism and were changed to gneiss and schist. The more recent Paleozoic era had periods of igneous implacement, with at least several episodes of regional metamorphism resulting in the majority of the rock types seen today.

The topography and relief of the Piedmont Province has developed from differential weathering of the igneous and metamorphic rock. Ridges and hills have been developed on the more resistant rock, whereas gently rolling, subdued topography has developed on the more easily weathered and eroded rock. Because of the continued chemical and physical weathering, the rocks in the Piedmont Province are now generally covered with a mantle of soil that has weathered in place from the parent bedrock. These soils have variable thicknesses and are referred to as residuum or residual soils. The residuum is typically finer grained and has a higher clay content near the surface because of the advanced weathering. Similarly, the soils typically become coarser grained with increasing depth because of decreased weathering. As the degree of weathering decreases, the residual soils generally retain the overall appearance, texture, gradation, and foliations of the parent rock (Allen and Hoshall, Inc., 1987). Figure 3 is a bedrock geologic map of the Base and vicinity. The bedrock underlying the Base consists of metamorphosed quartz diorite, diorite, and tonalite.

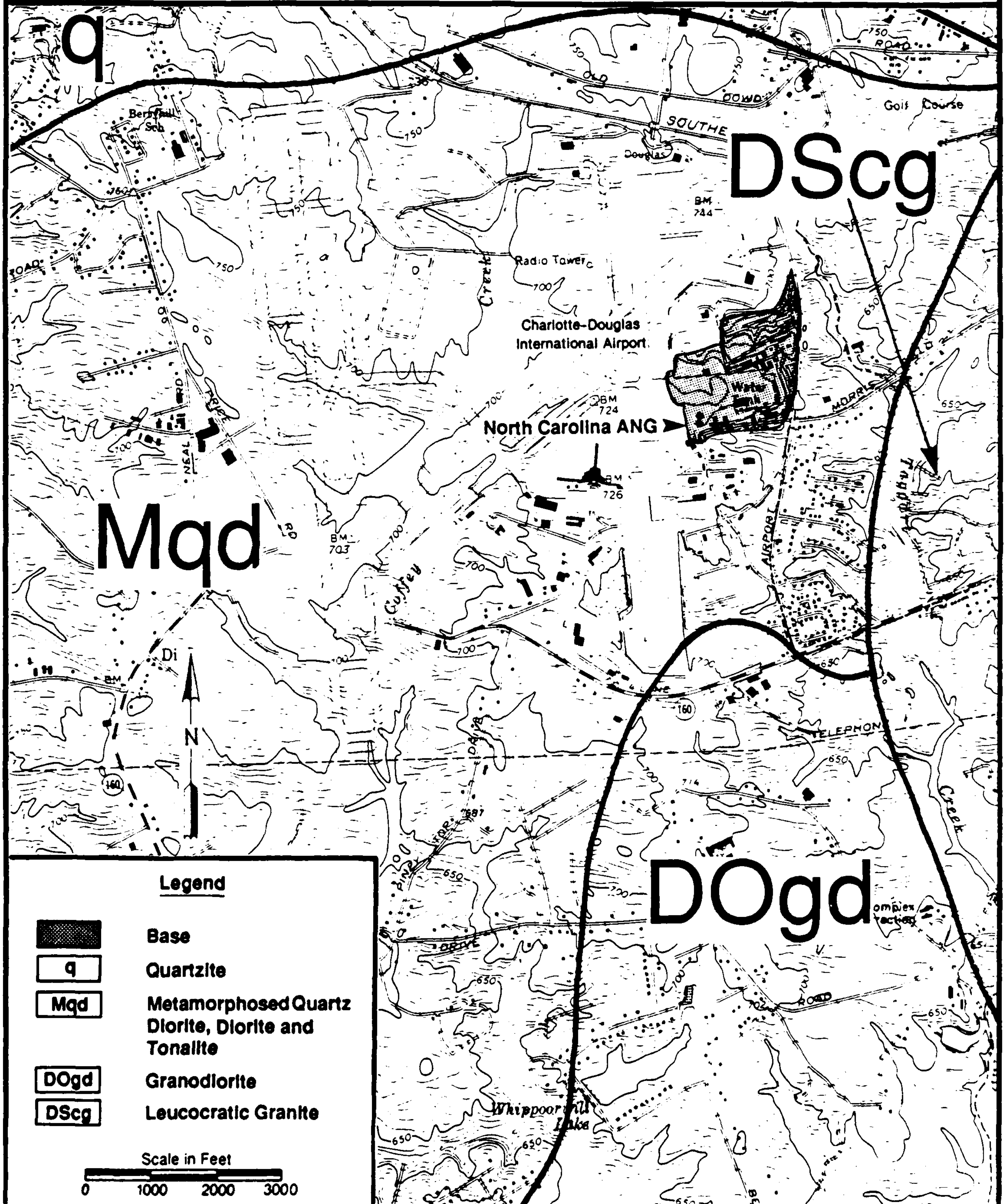
The Base is located on an interfluve between two eastwardly flowing drainageways which are tributaries to Taggart Creek. As a result, the topography of the Base slopes predominantly to the east. The northern perimeter of the Base, however, slopes to the north toward one drainageway, and the southern perimeter slopes to the south toward the other drainageway. Elevation of the Base ranges from 760+ feet above mean sea level (MSL) in the west central portion of the Base to approximately 700 feet MSL at its eastern boundary. In the northern portion of the Base, elevation along the drainageway is approximately 680 feet MSL.

HMTC

Source: U.S.G.S
Miscellaneous Field
Studies Map MF-1793.

Figure 3.

Geologic Map of the North Carolina Air National Guard and Vicinity, Charlotte-Douglas International Airport, Charlotte, North Carolina.



C. Soils

According to the U.S. Soil Conservation Service Soil Survey of Mecklenburg County, North Carolina, the soils at the Base can be classified as urban land or as belonging to the Wilkes Loam Series. Figure 4 is a soils map of the Base and vicinity.

The majority of the Base is covered by soil classified as urban land. Most of the soil has been cut, filled, and graded, destroying the soil's natural characteristics. It is estimated that more than 85 percent of the surface is covered with asphalt, buildings, or other impervious covers.

A wooded area east of the pond and along the intermittent stream that drains the pond is underlain by the Wilkes Loam (15 to 25 percent slopes). This is a well drained soil, consisting of a surface layer that is a dark grayish-brown loam, about 4 inches thick. The subsurface layer is brown loam, 3 inches thick and the subsoil is 8 inches thick. The upper part is strong brown clay and the lower part is brown clay loam. The underlying material, to a depth of 48 inches, is olive brown, green, and black sandy loam. Below this depth is dark colored hard rock. Permeability of the Wilkes Loam is moderately slow to moderately rapid (from 1.41×10^{-4} to 4.24×10^{-3} cm/sec) (McCachren, 1980).

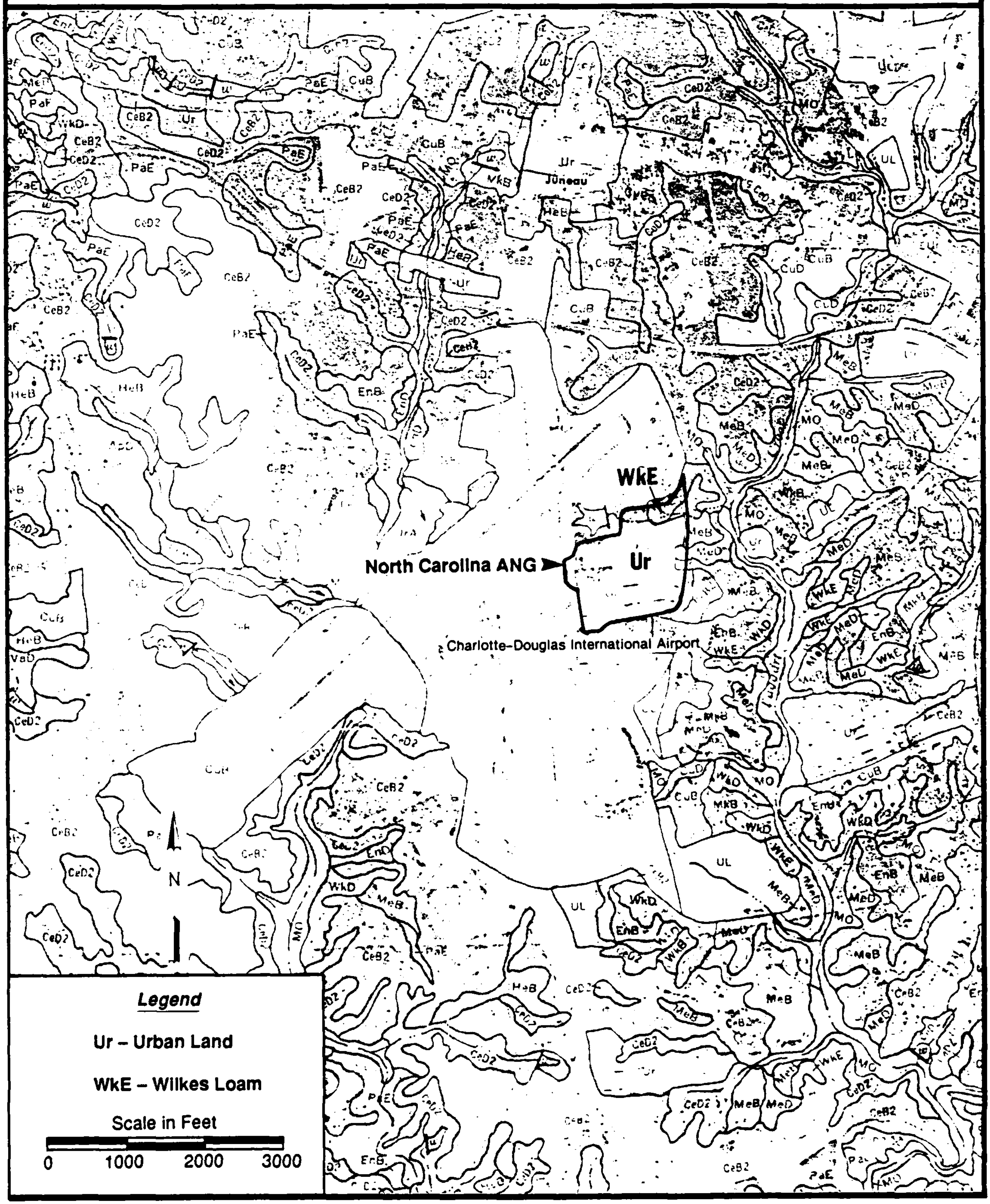
D. Hydrology

Surface Water

Most water used for municipal or industrial purposes in the Charlotte area, including the Base, is supplied by the Charlotte-Mecklenburg Utility Department from the Catawaba River. The Catawaba River flows from the southeastern slopes of the Blue Ridge Mountains. The population served by surface water supplies within 3 miles downstream of the Baes is zero. Three large creeks, Irwin, Little Sugar, and Briar, drain most of the urban Charlotte area. These tributaries flow southward through the county and converge into Sugar Creek before it enters the Catawaba River in Lancaster County, South Carolina. The Base is not within the 100-year flood plain of any of these drainages.

Source: USDA
Soil Survey of
Mecklenburg
County (1980)

Figure 4.
Soils Map of the North Carolina Air National Guard and Vicinity, Charlotte-Douglas International Airport, Charlotte, North Carolina.



Surface storm drainage exits Base property at six different points and several eventually drain into Taggart Creek, a tributary of Sugar Creek. The direction of surface water flow and the outfall locations are shown in Figure 5. A pond (also sometimes referred to as a lake) lies on the northwestern corner of the Base and drains surface water runoff from areas immediately to its north, west, and south. The pond is drained by an intermittent stream which flows to the east and eventually into Taggert Creek.

Groundwater

Groundwater in the Charlotte area is derived from infiltration of precipitation as rain or snow. The surficial materials at many places are relatively impermeable clays, and the fraction of precipitation that reaches the water table may be somewhat less than one-third. Recharge to the groundwater system is probably between 10 to 15 inches per year.

The depth to the groundwater in the Charlotte area depends primarily on topography. In valleys, the water table generally is at or near the surface; on higher elevations, however, the water table may be more than 100 feet below the surface. Wells in the area are reported to range from 17 to 100 feet in depth, with the majority from 25 to 60 feet in depth (LeGrand and Mundorff, 1952). No residences within a 3-mile radius of the Base use well water as a source of drinking water.

E. Critical Environments

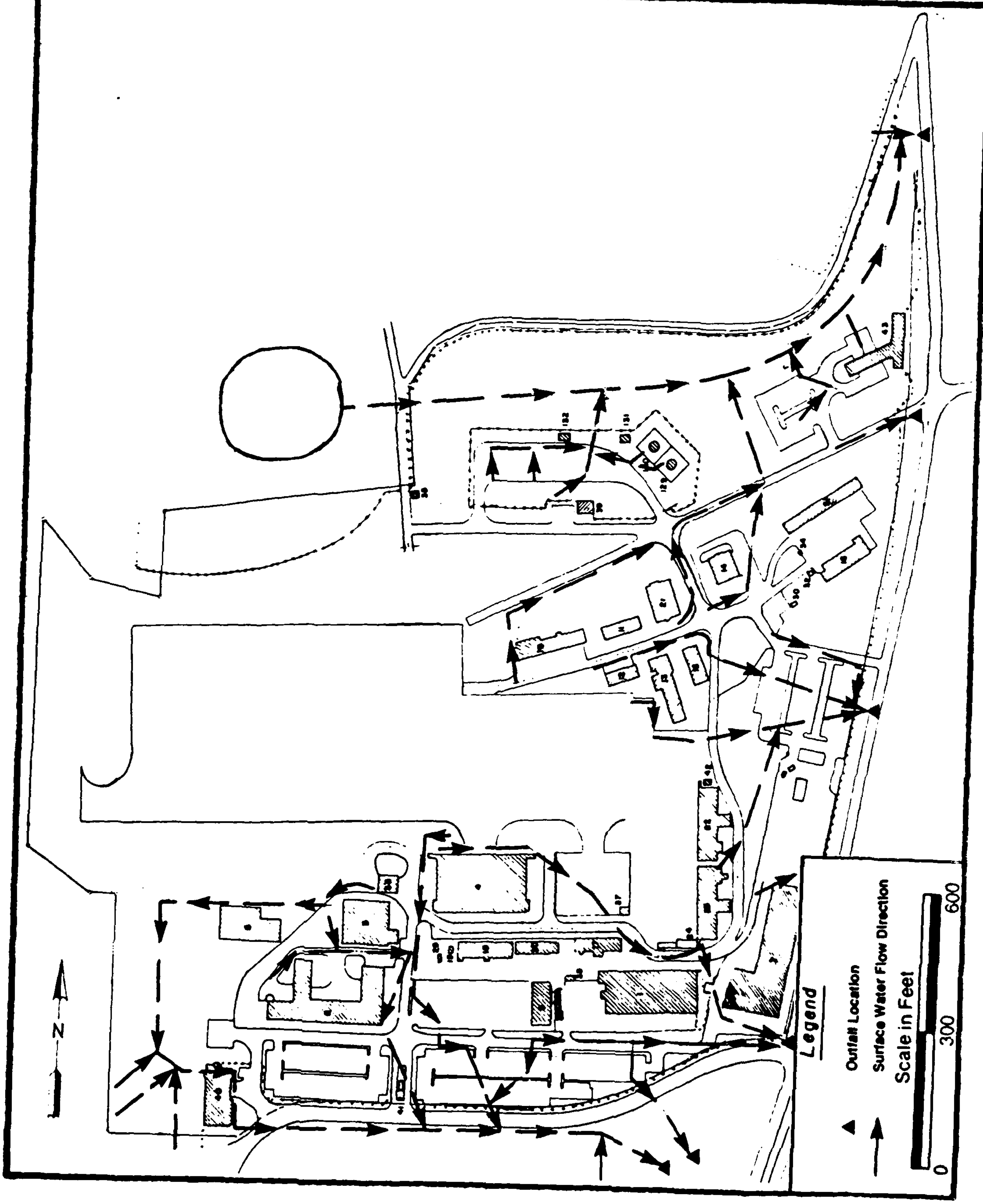
According to the North Carolina Fish Wildlife Resources Commission, there are no endangered or threatened species of flora or fauna within a 1-mile radius of the Base. Furthermore, there are no critical habitats, wetlands, or wilderness areas within a 1-mile radius of the Base.

HMTC

Source: North Carolina Air National Guard Base.

Figure 5 .

Surface Drainage Map of North Carolina Air National Guard, Charlotte–Douglas International Airport, Charlotte, North Carolina.



IV. SITE EVALUATION

A. Activity Review

A review of Base records and interviews with 22 past and present personnel at the Base resulted in the identification of specific operations within each activity in which the majority of industrial chemicals are handled and hazardous wastes are generated. Table 1 summarizes the major operations associated with each activity, provides estimates of the quantities of waste currently being generated by these operations, and describes the past and present disposal practices for the wastes. Based on information gathered, any operation that is not listed in Table 1 has been determined to produce negligible quantities of wastes requiring disposal.

B. Disposal/Spill Site Identification, Evaluation, and Hazard Assessment

Interviews with 22 past and present Base personnel (Appendix B) and subsequent site inspections resulted in the identification of two potentially contaminated waste disposal/spill sites. It was determined that they are potentially contaminated with HM/HW and have a potential for migration. Both of these sites were scored using HARM (Appendix D). Figure 6 illustrates the locations of the sites. Copies of the completed Hazardous Assessment Rating Forms are found in Appendix E. Table 2 summarizes the HAS for Sites 1 and 2. Descriptions of all the sites follow. The objective of this assessment is to provide a relative ranking of sites suspected of contamination from hazardous substances. The final rating score reflects specific components of the hazard posed by a specific site: possible receptors of the contamination (e.g., population within a specified distance of the site and/or critical environments within a 1-mile radius of the site); the waste and its characteristics; and the potential pathways for contaminant migration (e.g., surface water, groundwater, flooding).

Table 1. Hazardous Material/Hazardous Waste Disposal Summary: North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina

Shop Name and Location	Hazardous Waste/ Used Hazardous Material	Current Estimated Quantities (Gallons/Year)	Method of Treatment/Storage/Disposal 1950 — 1960 — 1970 — 1980 — 1988
Aircraft Maintenance Bldgs 4, 7	JP-4	500	|----------- -----FTA-----------------|---CONTR---|
	Paint Stripper	400	|-------------rTA-----------|---CONTR----|---DRMO----|
	7808 Oil	375	|----FTA----|
	Synthetic Turbine Oil	375	|------------------FTA-----------------|---CONTR---|
	Varsol	300	|------------------FTA-----------------|
	Hydraulic Oil	185	|------------------FTA-----------------|---CONTR---|
	AVGAS	150	|----------FTA--------|
	Sulfuric Acid	30	|----------------------NEUTR SAN--------------------|
	Penetrant	25	|-------CONTR-------|---DRMO----|
Aerospace Ground Equipment Maintenance (AGE) Bldg 18	Engine Oil	150	|------------------FTA-----------------|---DRMO----|
	Varsol	130	|------------STORM----------|------OWS/SAN-----------|
	PD-680	30	|---CONTR---|
	Gasoline	20	|-----------------FTA-------------------|

KEY:

DRMO - Disposed of through the Defense Reutilization and Marketing Office.
CONTR - Disposed of through Hazardous Waste Contractor.
FTA - Burned at Fire Training Area.
NEUTR SAN - Neutralized and disposed of through sanitary sewer.
STORM - Disposed of in drains leading to storm sewer.
SAN - Disposed of in drains leading to sanitary sewer.
EVAP - Disposed of by evaporation.
OWS/SAN - Oil water separator/sanitary sewer

Table 1. Hazardous Material/Hazardous Waste Disposal Summary: North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina (Continued)

Shop Name and Location	Hazardous Waste/ Used Hazardous Material	Current Estimated Quantities (Gallons/Year)	Method of Treatment/Storage/Disposal 1950 1960 1970 1980 1988
Aerospace Ground Equipment Maintenance (AGE) Bldg 18 (Continued)	Turbine Oil	20	(c. 1955–1980) FTA; (1980–1988) DRMO
	JP-4	15	(1980–1988) FTA
	Hydraulic Oil	5	(1950–1980) FTA; (1980–1988) DRMO
Non-Destructive Inspection (NDI) Bldg 7	Penetrant Developer	50	(1980–1988) SAN
	Penetrant	25	(1980–1988) DRMO
	Emulsifier	25	(1980–1988) SAN
	Developer X-Ray	15	(1980–1988) DRMO
	Fixer	15	(1980–1988) DRMO
	Trichloroethane	7	(1980–1988) EVAP
Fuels Management Bldg 39	JP-4	800	(1960–1988) FTA

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Table 1. Hazardous Material/Hazardous Waste Disposal Summary: North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina (Continued)

Shop Name and Location	Hazardous Waste/ Used Hazardous Material	Current Estimated Quantities (Gallons/Year)	Method of Treatment/Storage/Disposal 1950 — 1960 — 1970 — 1980 — 1988
Corrosion Control Bldg ????	Varsol	1,200	1970–1988: OWS/SAN
	PD-680	650	1970–1988: OWS/SAN
	Thinners	250	1970–1980: EVAP; 1980–1988: DRMO
	Paint Stripper	100	1970–1980: CONTR; 1980–1988: DRMO
	Lacquer	50	1970–1980: CONTR; 1980–1988: DRMO
Photo Lab Bldg 10	Developer	15	1970–1988: SAN
	Fixer	10	1970–1988: DRMO
	Color Developer	10	1980–1988: SAN
	Bleach	5	1970–1988: SAN
	Bleach Color	5	1980–1988: NEUTR SAN

KEY:

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FTA	- Burned at Fire Training Area.
NEUTR SAN	- Neutralized and disposed of through sanitary sewer.
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EVAP	- Disposed of by evaporation.
OWS/SAN	- Oil water separator/sanitary sewer

Table 1. Hazardous Material/Hazardous Waste Disposal Summary: North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina (Continued)

Shop Name and Location	Hazardous Waste/ Used Hazardous Material	Current Estimated Quantities (Gallons/Year)	Method of Treatment/Storage/Disposal 1950 – 1960 – 1970 – 1980 – 1988
Hangar Spaces Bldgs 4, 7	JP-4	150	1950–1980: FTA; 1980–1988: CONTR
	Thinners	50	1950–1980: FTA; 1980–1988: DRMO
	Varsol	35	1950–1980: FTA; 1980–1988: DRMO
	Trichloroethane	25	1950–1970: FTA
Battery Shop Bldg ????	Used Batteries	15-20	
	Battery Acid	6	1950–1988: NEUTR SAN
Paint Shop Bldg ????	Stripper (Methyl-Ethyl-Ketone)	100	1970–1980: EVAP; 1980–1988: DRMO
	Paint Containers (Residual)	4	1970–1988: CONTR
Vehicle Maintenance (Motor Pool) Bldg 16	Engine Oil	300	1950–1980: FTA; 1980–1988: CONTR
	Sulfuric Acid	65	1950–1988: NEUTR SAN
	Varsol	60	1970–1980: FTA
	Ethylene Glycol	55	1950–1988: CONTR
	JP-4	20	1950–1988: FTA

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NEUTR SAN - Neutralized and disposed of through sanitary sewer.
STORM - Disposed of in drains leading to storm sewer.
SAN - Disposed of in drains leading to sanitary sewer.
EVAP - Disposed of by evaporation.
OWS/SAN - Oil water separator/sanitary sewer

Table 1. Hazardous Material/Hazardous Waste Disposal Summary: North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina (Continued)

Shop Name and Location	Hazardous Waste/ Used Hazardous Material	Current Estimated Quantities (Gallons/Year)	Method of Treatment/Storage/Disposal 1950 1960 1970 1980 1988
Vehicle Maintenance (Motor Pool) Bldg 16 (Continued)	Hydraulic Oil	20	|--------------------FTA---------------|---CONTR----|
	Transmission Fluid	10	|--------------------FTA---------------|---CONTR----|
	Paint Thinner	10	|-------------------CONTR--------------|----DRMO----|
	Brake Fluid	5	|-------------------------CONTR---------------------|
Battery Shop Bldg 16	Used Batteries	35	|-------------------CONTR--------------|----DRMO----|
	Battery Acid	65	|------------------------NEUTR SAN------------------|

KEY:

DRMO - Disposed of through the Defense Reutilization and Marketing Office.
CONTR - Disposed of through Hazardous Waste Contractor.
FTA - Burned at Fire Training Area.
NEUTR SAN - Neutralized and disposed of through sanitary sewer.
STORM - Disposed of in drains leading to storm sewer.
SAN - Disposed of in drains leading to sanitary sewer.
EVAP - Disposed of by evaporation.
OWS/SAN - Oil water separator/sanitary sewer

HMTC

Source: North Carolina Air National Guard Base.

Figure 6.
Location of Sites at North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina.

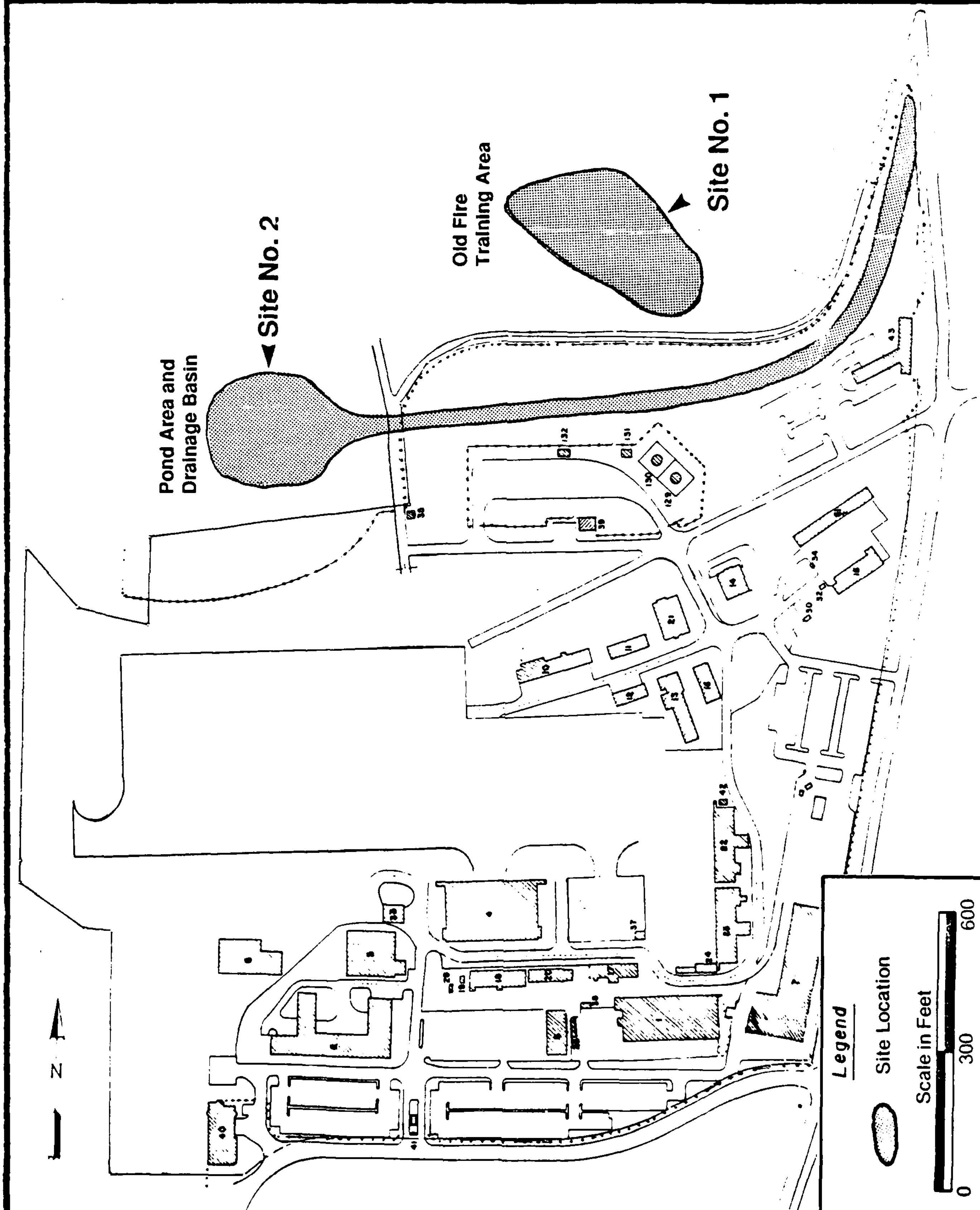

Table 2. Site Hazard Assessment Score as derived from HARM: North Carolina Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina

Site Priority	Site No.	Site Description	Receptors	Waste Characteristics	Pathway	Waste Mgmt. Practices	Overall Score
1	2	Pond Area and Drainage Basin	22	48	100	1.0	57
2	1	Old Fire Training Area	22	80	63	1.0	55

Site No. 1 - Old Fire Training Area (HAS-55)

An old fire training area (FTA) that has been used by the Base was located on property belonging to Charlotte-Douglas International Airport and under lease by the Base. Primary access to the FTA is through Base property. The FTA was constructed with a clay base approximately 6 to 8 inches thick. Efforts were made to maintain the clay base periodically by compacting it. The FTA was used by both the Base and airport personnel for fire training exercises from 1961 to 1974. AVGAS was the primary fuel used at the FTA until 1974 when JP-4 became the primary fuel. Fire training activities were discontinued in 1974. The Base conducted about 40 training exercises per year using approximately 100 to 500 gallons of liquid per exercise. In addition to AVGAS and JP-4, waste oils and solvents were reportedly burned at the FTA. The airport used the FTA less frequently, conducting training exercises in conjunction with the Base approximately once every 3 months. Over the years, a total of 56,000 to 280,000 gallons of flammable liquids were released by the Base at this location. Assuming 70 percent of these liquids were burned, between 16,800 and 84,000 gallons may have seeped into the soil at this site.

No signs of former fire training activities were noticed during the visual inspection of the area where the FTA was located. However, regular use of this area for fire training activities creates a potential for ground and surface water contamination and, therefore, a HAS was applied. Additionally, from experience, old unlined FTAs lacking proper containment structures often present troublesome sites of contamination on ANG and Air Force Bases. Therefore, a higher priority for additional investigation is warranted at this site.

Site No. 2 - Pond Area and Drainage Basin (HAS-57)

The water source for the pond is surface water runoff from areas to the north, west, and south of the pond. The pond is also receiving water from several culverts located around its perimeter. The pond would have received runoff from the old POL area, located to its south. The pond was originally constructed in 1958 or 1959. The pond was drained in mid-April of 1987 so that a subsurface exploration could be performed as part of the apron expansion project. As part of this evaluation, sampling was performed to determine if hydrocarbons were present in the near surface soils. This study (performed by Allen and Hoshall, Inc., 1987) concluded that four shallow subsurface soil samples from 18 locations had organic vapor concentrations in excess of 10 parts per million. Surface water drainage from the northern part of the Base eventually drains from the pond into an intermittent creek running eastwardly towards the shallow creek bed just inside the northeastern corner of the Base property (Figure 6). In August 1978, a major spill of JP-4 occurred at the old POL area when 1,000 to 8,000 gallons of fuel was lost down storm drains into the small stream behind the bulk storage system. Base fuel inventory records showed a 8,500-gallon loss of JP-4. However, efforts were made by the Base and a contractor to recover the fuel, and Base personnel estimate that the actual quantity of fuel reaching the northeastern drainage area to be approximately 1,000 gallons. For the purposes of assigning a HAS according to HARM, it was assumed that this is a small quantity hazardous waste site.

C. Other Pertinent Facts

- There are twenty-three underground storage tanks (USTs) at the Base containing MOGAS, diesel and fuel oil. The USTs range from 500 to 12,000 gallons in capacity, two of which are empty and abandoned. Eleven USTs, including the two abandoned tanks, are scheduled for removal in 1989 during Base construction.
- No landfills exist on the Base property.
- No disposal of radioactive material has occurred on Base property.
- Sewage from the Base is received by the Irwin Creek Municipal Sewage Treatment Facility and there are no septic tanks on the Base.
- There are seven oil/water separator (OWS) tanks on the Base which also discharge to the Irwin Creek Municipal Sewage Treatment Facility.

V. CONCLUSIONS

Information obtained through interviews with 22 past and present Base personnel, review of Base records, and field observations has resulted in the identification of two potential HM/HW disposal and/or spill sites on Base property. These sites consist of the following:

Site No. 1 - Old Fire Training Area (HAS-55)
Site No. 2 - Pond Area and Drainage Basin (HAS-57)

Each of these sites is potentially contaminated with HM/HW and each exhibits the potential for contaminant migration to groundwater and surface water. Therefore, these sites were assigned a HAS according to HARM.

VI. RECOMMENDATIONS

In accordance with applicable regulations, further IRP investigation is recommended at both identified sites.

GLOSSARY OF TERMS

AQUIFER - A geologic formation, or group of formations, that contains sufficient saturated permeable material to conduct groundwater and to yield economically significant quantities of groundwater to wells and springs.

CONTAMINANT - As defined by Section 101(f)(33) of Superfund Amendments and Reauthorization Act of 1986 (SARA) shall include, but not be limited to any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformation in such organisms or their offspring; except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under:

(a) any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,

(b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,

(c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress),

(d) any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,

(e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, and

(f) any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act;

and shall not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

CRITICAL HABITAT - The specific areas within the geographical area occupied by the species, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management consideration or protection.

DIORITE - A group of plutonic rocks intermediate in composition between acidic and basic, characteristically composed of dark-colored amphibole, acid plagioclase, pyroxene, and sometimes a small amount of quartz.

DISCHARGE - The release of any waste stream or any constituent thereof to the environment which is not covered.

ENDANGERED SPECIES - Any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the secretary to constitute a pest whose protection would present an overwhelming and overriding risk to man.

GNEISS - A foliated rock formed by regional metamorphism, in which bands or lenticles of granular materials.

GROUNDWATER - Refers to the subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

HARM - Hazard Assessment Rating Methodology - A system adopted and used by the United States Air Force to develop and maintain a priority listing of potentially contaminated sites on installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981.)

HAS - Hazard Assessment Score - The score developed by utilizing the Hazardous Assessment Rating Methodology (HARM).

HAZARDOUS MATERIAL - Any substance or mixture of substances having properties capable of producing adverse effects on the health and safety of the human being. Specific regulatory definitions also found in OSHA and DOT rules.

HAZARDOUS WASTE - A solid or liquid waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

a. cause, or significantly contribute to, an increase in mortality or an increase in serious or incapacitating reversible illness, or

b. pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

IGNEOUS - Said of a rock or mineral that solidified from molten or partially molten material.

MIGRATION (Contaminant) - The movement of contaminants through pathways (groundwater, surface water, soil, and air).

PALEOZOIC - An era of geologic time, from the end of the Precambrian to the beginning of the Mesozoic.

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

PIEDMONT PHYSIOGRAPHIC PROVINCE - The area between the Blue Ridge Mountains and the Fall Line.

PRECAMBRIAN - All geologic time, and its corresponding rocks, before the beginning of the Paleozoic; it is equivalent to about 90% of geologic time.

QUARTZ DIORITE - A group of plutonic rocks having the composition of diorite, but with appreciable amounts of quartz.

SCHIST - A strongly foliated crytalline rock, formed by a dynamic metamorphism, that can be readily split into thin flakes or slabs due to the well developed parallelism of more than 50 percent of the minerals present.

SEDIMENTARY - Pertaining to or containing sediment; or formed by the deposition of sediment.

SURFACE WATER - All water exposed at the ground surface, including streams, rivers, ponds, and lakes.

THREATENED SPECIES - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

TONALITE - A plutonic rock with Q between 20 and 60, and P/(A + P) greater than 90.

TOPOGRAPHY - The general conformation of a land surface, including its relief and the position of its natural and manmade features.

VOLCANIC - Pertaining to the activities, structures or rock types of a volcano.

WATER TABLE - The upper limit of the portion of the ground that is wholly saturated with water.

WETLANDS - Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

WILDERNESS AREA - An area unaffected by anthropogenic activities and deemed worthy of special attention to maintain its natural condition.

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Allen and Hoshall, Inc. Report of Subsurface Exploration Aircraft Parking Apron Expansion, Air National Guard, Charlotte-Douglas International Airport, Charlotte, North Carolina, 1987.

Bundy, William T. and Billy J. Reide. History of the North Carolina Air National Guard, 1973.

D'Augintino, John P. and William D. Rowe, Jr. Mineral Occurrences of the Charlotte 1x2 Quandrangle, North Carolina, U.S.G.S. Miscellaneous Field Studies Map MF-1793, United States Geological Survey, 1986.

LeGrand, H.E., and Mundorff, M.J. Geology and Groundwater in the Charlotte Area, North Carolina. North Carolina Department of Conservation and Development, 1952.

McCachren, C.M. Soil Survey of Mecklenburg County, North Carolina. U.S. Department of Agriculture Soil Conservation Survey, 1980.

National Oil and Hazardous Substances Contingency Plan. 47 Federal Register 31224-31235, 16 July 1982.

APPENDIX A

Resumes of HMTC Preliminary Assessment Team

RAYMOND G. CLARK, JR.

EDUCATION

Completed graduate engineering courses, George Washington University, 1957
B.S., Mechanical Engineering, University of Maryland, 1949

SPECIALIZED TRAINING

Grad. European Command Military Assistance School, Stuttgart, 1969
Grad. Army Psychological Warfare School, Fort Bragg, 1963
Grad. Sanz School of Languages, D.C., 1963
Grad. DOD Military Assistance Institute, Arlington, 1963
Grad. Defense Procurement Management Course, Fort Lee, 1960
Grad. Engineer Officer's Advanced Course, Fort Belvoir, 1958

CERTIFICATIONS

Registered Professional Engineer: Kentucky (#4341); Virginia (#8303); Florida (#36228)

EXPERIENCE

Thirty-one years of experience in engineering design, planning and management including construction and construction management, environmental, operations and maintenance, repair and utilities, research and development, electrical, mechanical, master planning and city management. Over six years' logistical experience including planning and programming of military assistance materiel and training for foreign countries, serving as liaison with American private industry, and directing materiel storage activities in an overseas area. Over two years' experience as an engineering instructor. Extensive experience in personnel management, cost reduction programs, and systems improvement.

EMPLOYMENT

Dynamac Corporation (1986-present): Program Manager/Department Manager

Responsible for activities relating to Preliminary Analysis, Site Investigations, Remedial Investigations, Feasibility Studies, and Remedial Action for the Installation Restoration Program for the U.S. Air Force, Air National Guard, Bureau of Prisons, and the U.S. Coast Guard, including records search, review and evaluation of previous studies; preparation of statements of work, feasibility studies; preparation of remedial action plans, designs and specifications; review of said studies/plans to ensure that they are in conformance with requirements; review of environmental studies and reports; preparation of Air Force Installation Restoration Program Management Guidance; and preparation of Part B permits.

Howard Needles Tammen & Bergendoff (HNTB) (1981-1986): Manager

Responsible, as Project Manager, for: design of a new concourse complex at Miami International Airport to include terminal building, roadway system, aircraft apron, drainage channel relocation, satellite building with underground pedestrian tunnel, and associated underground utility corridors, to include subsurface aircraft fueling systems, with an estimated construction cost of $163 million; a cargo vehicle tunnel under the crosswind runway with an estimated construction cost of $15 million; design and construction of two large corporate jet aircraft hangars; and for the hydrocarbon recovery program to include investigation, analysis, design of recovery systems, monitoring of recovery systems, and planning and design of residual recovery systems utilizing biodegradation. Participated, as sub-consultant, in Air Force IRP seminar.

HNTB (1979-1981): Airport Engineer

Responsibilities included development of master plan for Iowa Air National Guard base; project initiation assistance for a new regional airport in Florida; engineering assistance for new facilities design and construction for Maryland Air National Guard; master plan for city maintenance facilities, Orlando, Florida; in-country master plan and preliminary engineering project management for Madrid, Spain, International Airport; and project management of master plan for Whiting Naval Air Station and outlying fields in Florida.

HNTB (1974-1979): Design Engineer

Responsibilities included development of feasibility and site selection studies for reliever airports in Cleveland and Atlanta; site selection and facilities requirements for the Office of Aeronautical Charting and Cartography, NOAA; and onsite mechanical and electrical engineering design for terminal improvements at Baltimore-Washington International Airport, Maryland.

HNTB (1972-1974): Airport Engineer

Responsible for development of portions of the master plan and preliminary engineering for a new international airport for Lisbon, Portugal, estimated to cost $250 million.

Self-employed (1971-1972): Private Consultant

Responsible for engineering planning and installation of a production line for multimillion-dollar contract in Madrid, Spain, to fabricate transmissions and differentials for U.S. Army vehicles.

U.S. Army, Corps of Engineers (1969-1971): Chief, Materiel & Programs

Directed materiel planning and military training programs of military assistance to the Spanish Army. Controlled arrival and acceptance of materiel by host government. Served as liaison/advisor to American industry interested in conducting business with Spanish government. Was Engineer Advisor to Spanish Army Construction, Armament and Combat Engineers, also the Engineer Academy and Engineer School of Application.

Corps of Engineers (1968-1969): Chief, R&D Branch, OCE

Directed office responsible to Chief of Engineers for research and development. Developed research studies in new concepts of bridging, new explosives, family of construction equipment, night vision equipment, expedient airfield surfacing, expedient aircraft fueling systems, water purification equipment and policies, prefabricated buildings, etc. Achieved Department of Army acceptance for development and testing of new floating bridge. Participated in high-level Department Committee charged with development of a Tactical Gap Crossing Capability Model.

Corps of Engineers (1967-1968): Division Engineer

Facilities engineer in Korea. Was fully responsible for management and maintenance of 96 compounds within 245 square miles including 6,000+ buildings, 1 million linear feet of electrical distribution lines, 18 water purification and distribution systems, sanitary sewage disposal systems, roads, bridges, and fire protection facilities with real property value of more than $256 million. Planned and developed the first five-year master plan for this area. Administered $12 million budget and $2 million engineer supply operation. Was in responsible charge of over 500 persons. Developed and obtained approval for additional projects worth $9 million for essential maintenance and repair. Directed cost reduction programs that produced more than $500,000 savings to the United States in the first year.

Corps of Engineers (1963-1967): Engineer Advisor

Engineer and aviation advisor to the Spanish Army. Developed major modernization program for Spanish Army Engineers, including programming of modern engineer and mobile maintenance equipment. Directed U.S. portion of construction, testing and acceptance of six powder plants, one shell loading facility, an Engineer School of Application, and depot rebuild facilities for engineer, artillery, and armor equipment. Planned and developed organization of a helicopter battalion for the Spanish Army. Responsible for sales, delivery, assembly and testing of 12 new helicopters in country. Provided U.S. assistance to unit until self-sufficiency was achieved. Was U.S. advisor to Engineer Academy, School of Application and Polytechnic Institute.

Corps of Engineers (1960-1963): Deputy District Engineer

Responsible for planning and development of extensive construction projects in the Ohio River Basin for flood control and canalization, including dam, lock, bridge, and building construction, highway relocation, watershed studies, real estate acquisitions and dispositions. Was contracting officer for more than $75 million of projects per year. Supervised approximately 1,300 personnel, including 300 engineers. Planned and directed cost reduction programs amounting to more than $200,000 per year. Programmed and controlled development of a modern radio and control net in a four-state area.

Corps of Engineers (1959-1960): Area Engineer

Directed construction of a large airfield in Ohio as Contracting Officer's representative. Assured that all construction (runway, steam power plant, fuel transfer and loading facilities, utilities, buildings, etc.) complied with terms of plans and specifications. Was onsite liaison between Air Force and contractors.

Corps of Engineers (1958-1959): Chief, Supply Branch

Managed engineer supply yard containing over $21 million construction supplies and engineer equipment. Directed in-storage maintenance, processing and deprocessing of equipment. Achieved complete survey of items on hand, a new locator system and complete rewarehousing, resulting in approximately $159,000 savings in the first year.

Corps of Engineers (1957-1958): Student

U.S. Army Engineer School, Engineer Officer's Advanced Course.

Corps of Engineers (1954-1957): Engineer Manager

Managed engineer construction projects and was assigned to staff and faculty of the Engineer School. Was in charge of instruction on engineer equipment utilization, management and maintenance. Directed Electronic Section of the school. Coordinated preparation of five-year master plan for the Department of Mechanical and Technical Equipment.

Corps of Engineers (1949-1954): Engineer Commander

Positions of minor but increasing importance and responsibility in engineering management, communications, demolitions, construction administration and logistics.

PROFESSIONAL AFFILIATIONS

Member, National Society of Professional Engineers
Fellow, Society of American Military Engineers
Member, American Society of Civil Engineers
Member, Virginia Engineering Society
Member, Project Management Institute

HARDWARE

IBM PC

SOFTWARE

Lotus 1-2-3, D Base III Plus, Framework, Project Scheduler 5000, Harvard Project Manager, Volkswriter, Microsoft Project

MARK D. JOHNSON

EDUCATION

B.S., Geology, James Madison University, 1980

EXPERIENCE

Eight years' technical and management experience including geologic mapping, subsurface investigations, foundation inspections, groundwater monitoring, pumping and observation well installation, geotechnical instrumentation, groundwater assessment, preparation of Air Force Installation Restoration Program Guidance, preparation of statements of work for environmental field monitoring and feasibility studies for the Air Force and the Air National Guard, development of environmental field monitoring programs, and preparation of Preliminary Assessments for the Air National Guard.

EMPLOYMENT

Dynamac Corporation (1984-present): Senior Staff Scientist/Geologist

Primarily responsible for developing and managing technical support programs relevant to CERCLA related activities for the Air Force, Air National Guard, Department of Justice and Coast Guard. These activities include Statements of Work for Site Investigations (SI), Remedial Investigations (RI), and Feasibility Studies (FS); assessing groundwater at hazardous waste disposal/spill sites for the purpose of determining rates and extents of contaminant migration and for developing SI and RI programs and identifying remedial actions; reviewing SI, RI and FS contractor work plans for various government clients, developing technical and contractual requirements for SI, FI and FS projects, managing the development and preparation of Preliminary Assessments, and assisting clients in the development of their environmental management programs, which included preparation of the Air Force's Installation Restoration Program Management Guidance document.

Bechtel Associates Professional Corporation (1981-1984): Geologist

Performed the following duties in conjunction with major civil engineering projects including subways, nuclear power plants and buildings: prepared geologic maps of surface and subsurface facilities in rock and soil including tunnels, foundations and vaults; assessed groundwater conditions in connection with construction activities and groundwater control systems; monitored the installation of permanent and temporary dewatering systems and observation wells; monitored surface and subsurface settlement of tunnels; and participated in subsurface investigations.

Schnabel Engineering Associates (1981): Geologist

Inspected foundations and backfill placement.

PROFESSIONAL CREDENTIALS

Registered Professional Geologist, South Carolina, #116, 1987

PROFESSIONAL AFFILIATIONS

Association of Engineering Geologists
National Water Well Association/Association of Ground Water Scientists and Engineers

KATHRYN A. GLADDEN

(Version A)

EDUCATION

Graduate coursework in Engineering, University of Washington, 1980-1982
B.S., Chemical Engineering (minor in Biological Sciences), University of Washington, 1978

SPECIALIZED TRAINING

OSHA Hazardous Waste Site Health and Safety Training Course

SECURITY CLEARANCE

Secret DOD clearance

EXPERIENCE

Nine years of chemical engineering experience specializing in hazardous waste management and industrial process engineering. Experience includes conducting CERCLA Preliminary Assessments and RCRA hazardous waste minimization projects at DOD facilities, developing Background Documents for listing of hazardous waste streams under RCRA, and performing environmental audits and process optimization projects at manufacturing plants.

EMPLOYMENT

Dynamac Corporation (1985-present): Senior Staff Engineer

Provides technical support to federal clients for CERCLA Preliminary Assessments (PA), Site Investigations (SI), Remedial Investigations (RI), and Feasibility Studies (FS). Responsibilities include inspection of suspected hazardous waste sites, analyses of risks from exposure to site contaminants, and development of technical and contractual requirements for SI/RI/FS programs.

Principal Investigator for the development of industrial solvent use, storage, and disposal guidance for the U.S. Army Materiel Command. Conducted onsite audits at seven U.S. Army facilities, recommended modifications in operating procedures and product substitutions for reducing waste solvent generation, and developed a computerized model for selecting the most economical methods of reclamation for various categories of solvents.

Conducted analysis of public comments on Advanced Notice of Public Rulemaking to establish National Primary Drinking Water Regulations for radionuclide contaminants.

<u>Peer Consultants (1984-1985)</u>: Staff Engineer

Developed Background Documents for listing under RCRA of hazardous waste streams from the plastics industry. Responsible for developing test programs; and evaluating analytical, industrial process questionnaire, health, and environmental effects data.

<u>Engineering Science (1983-1984)</u>: Staff Engineer

Conducted regulatory policy review and technology assessment of transportation and decontamination procedures for acutely hazardous wastes. Project engineer for development of a cost analysis methodology for the U.S. Army Toxic and Hazardous Materials Agency Installation Restoration Program.

<u>Weyerhaeuser Company (1978-1983)</u>: Project Chemical Engineer

Chemical engineer responsible for process optimization projects at pulp and paper manufacturing facilities including:

- Conducted environmental audits at pulp manufacturing facilities to establish in-plant effluent loads.
- Developed capital alternatives and improved operating procedures for in-plant effluent load reduction.
- Responsible for development and implementation of recommendations for plant energy conservation programs, including optimization of a pulp dryer steam supply and condensate removal system that resulted in a two percent increase in plant production capacity.
- Member of a team starting up and operating a pulp manufacturing facility for five months.

PROFESSIONAL AFFILIATIONS

Tau Beta Pi Engineering Honorary
Society of Women Engineers

JEFFREY D. FLETCHER

EDUCATION

B.S., geology, Millersville University, 1984

EXPERIENCE

Technical and field experience includes geologic mapping, water well site location, and construction of water table maps. Expertise in hazardous waste management including site evaluations and preparation of records searches for the Phase I portion of the Installation Restoration Program for the Air Force and the Phase II Preliminary Assessment of the Hazardous Waste Site Investigation Program for the Federal Bureau of Prisons. Experience also includes principal investigator in charge of a Hazardous Waste Survey/Historical Records Search for the U.S. Coast Guard.

EMPLOYMENT

Dynamac Corporation (1986-present): Junior Staff Scientist/Geologist

Responsibilities include site evaluations and preparation of records searches for Phase I of the Installation Restoration Program for the Air National Guard and Phase II - Preliminary Assessments of the Hazardous Waste Site Investigation Program for the Federal Bureau of Prisons. Efforts include assessment of hazardous waste disposal/spill sites for the purpose of determining rates and extents of contaminant migration and for identifying remedial actions.

Fletcher-Lowright and Assoc., Consulting Geologists (1984-1985): Geohydrology Assistant

Primary duties included site location of water wells, analysis of well yield data through the use of computers, and construction of water table maps.

TECHNICAL REPORTS

Hazardous Waste Survey/Historical Records Search for the United States Coast Guard in Conjunction with the Pier 35 Property, Seattle, Washington. May 1987.

Phase II - Preliminary Assessment for the Allenwood Federal Prison Camp at Allenwood, Pennsylvania. December 1986.

Phase II - Preliminary Assessment for the Englewood Federal Correctional Institution at Englewood, Colorado. June 1987.

Phase II - Preliminary Assessment for the Atlanta Federal Penitentiary at Atlanta, Georgia. May 1987.

Phase II - Preliminary Assessment for the Ashland Federal Correctional Institution at Ashland, Kentucky. June 1987.

Phase II - Preliminary Assessment for the Sandstone Federal Correctional Institution at Sandstone, Minnesota. July 1987.

CAROLYN K. DIETRICH

EDUCATION:

B.S., animal sciences, University of Maryland, 1980

EXPERIENCE:

Five years of experience in laboratory animal research and clinical veterinary medicine. Conducted basic research with small animals for the purpose of finding potential human antidotes to organophosphate nerve agents. Responded to technical inquiries regarding various aspects of hazardous materials/waste management. Currently developing training materials for Air Force and Navy personnel dealing with the Installation Restoration Program (IRP).

EMPLOYMENT:

Dynamac Corporation, HMTC (1985-present): Junior Staff Scientist

For the Hazardous Materials Technical Center is: responsible for development and presentation of a four day Air Force IRP Workshop developed for base level personnel, including monitoring subcontractors, coordination with Air Force, pr . aration of course workbooks, and assisting with preparation of text on program and site management, from PA, through RI/FS, to RD/RA; principle investigator for development of a National Priorities List (NPL) briefing for Naval Facilities Engineering Command to consist of presentations for executive and technical level personnel; and, principle investigator for State-of-the-Art report evaluating various sludges and describing present and potential disposal methods for DOD. Previous duties included answering technical inquiries from all branches of the Department of Defense concerning hazardous materials and hazaroous waste handling, storage, transportation, treatment, and disposal. Work involved identification and interpretation of applicable state and federal DOT and RCRA regulations. Contacted manufacturers and technical experts and performed literature searches to provided need information on hazardous chemicals. Provided initial telephone response and detailed written response to inquiries.

Tegeris Laboratories/Borriston Laboratories (1983-1985): Senior Technician

Conducted all phases of animal work and biochemistry analysis on organophosphate nerve agent chemical defense research contract. Animal work included special surgical procedures, administering anesthetics, dosing with agent, performing clinical observations and necropsies. Biochemistry analysis included preparation of animal tissues, performing enzyme assays and data analysis. Participated in protocol development and prepared technical reports.

CAROLYN K. DIETRICH (Continued)

Page--2

Fox Hall Veterinary Clinic (1981-1983): Assistant Supervisor

Responsibilities included assisting during survey, administering in-patient treatment and clinical analysis.

APPENDIX B

Outside Agency Contact List

OUTSIDE AGENCY CONTACT LIST

1. Charlotte Mecklenburg Utility Department
   5100 Brookshire Boulevard
   Charlotte, North Carolina 28216

2. National Oceanic and Atmospheric Administration
   6001 Executive Boulevard
   Rockville, Maryland 20853

3. North Carolina Wildlife Resources Commission
   512 North Salisbury Street
   Raleigh, North Carolina 27611

4. U.S. Fish and Wildlife Service
   P.O. Vox 7617
   Raleigh, North Carolina 27695

5. U.S. Geological Survey
   12201 Sunrise Valley Drive
   Reston, Virginia 22092

APPENDIX C

USAF Hazard Assessment Rating Methodology

USAF HAZARD ASSESSMENT RATING METHODOLOGY

The Department of Defense (DoD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DoD facilities. One of the actions required under this program is to:

> develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Preliminary Assessment phase of its Installation Restoration Program (IRP).

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air National Guard in setting priorities for follow-on site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD program needs.

The model uses data readily obtained during the Preliminary Assessment portion of the IRP. Scoring judgment and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1 of this report). The site rating form and the rating factor guideline are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: possible receptors of the contamination, the waste and its characteristics, the potential pathways for contaminant migration, and any efforts that were made to contain the wastes resulting from a spill.

The receptors category rating is based on four rating factors: the potential for human exposure to the site, the potential for human ingestion of contaminants should underlying aquifers be polluted, the current and anticipated uses of the surrounding area, and the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1,000 feet of the site, and the distance between the site the the base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the groundwater use of the uppermost aquifer, and population served by the groundwater supply within 3 miles of the site. The uses of the surrounding area are determined by the zoning within a 1-mile radius. Determination of whether or not critical environments exist within a 1-mile radius of the site predicts the potential for adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors subscore computed as follows: receptors subscore = (100 x factor score subtotal/maximum score subtotal).

The waste characteristics category is scored in three stages. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways: surface-water migration, flooding, and groundwater migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned, and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/Zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence or economically important natural resources susceptible to contamination	Major habitat of an endangered or threatened species; presence of recharge area major wetlands	10
F. Water quality/use designation of nearest surface water body	Agricultural or Industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G. Ground-water use of uppermost aquifer	Not used, other sources readily available	Commercial, industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1-50	51-1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records
- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records

  Logic based on the knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Factors	Rating Scale Levels 0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200° F	Flash point at 140° F to 200° F	Flash point at 80° F to 140° F	Flash point less than 80° F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
	L	C	M
80	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
	L	S	M
50	L	C	L
	M	S	H
	S	C	M
	S	S	H
40	M	S	M
	M	C	L
	L	S	L
	S	C	L
30	M	S	L
	S	S	M
20	S	S	L

Notes:

For a site with more than one hazardous waste, the waste quantities may be added using the following rules:

Confidence Level

- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating

- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the following
Liquid	1.0
Sludge	0.75
Solid	0.50

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (including drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year 24-hour rainfall (Number of thunderstorms)	<1.0 inch (0-5)	1.0 to 2.0 inches (6-35)	2.1 to 3.0 inches (36-49)	>3.0 inches (>50)	8

B-2 Potential for Flooding

Rating Factors	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Ground Water Contamination

Rating Factors	0	1	2	3	Multiplier
Depth to groundwater	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	8
Soil permeability	Greater than 50% clay ($<10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($>10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally sub merged	Bottom of site frequently submerged	Bottom of site located below mean ground water level	8

B 3 Potential for Ground Water Contamination Continued

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Direct access to groundwater (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1, or III 6-3, then leave blank for calculation of factor score and maximum possible score.

APPENDIX D

Site Factor Criteria and Hazardous Assessment Rating Forms

145th Tactical Airlift Group
North Carolina Air National Guard
Charlotte-Douglas International Airport
Charlotte, North Carolina

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria

1. RECEPTORS CATEGORY	RATING SCALE LEVELS	NUMERICAL VALUE
Population within 1,000 feet of site:		
Site No. 1	Less than 25	1
Site No. 2	Less than 25	1
Distance to nearest well:		
Site No. 1	Greater than 3 miles	0
Site No. 2	Greater than 3 miles	0
Land use/zoning within 1 mile radius:		
Site No. 1	Industrial/Residential	3
Site No. 2	Industrial/Residential	3
Distance to Base boundary:		
Site No. 1	Zero to 1,000 feet	3
Site No. 2	Zero to 1,000 feet	3
Critical environments within 1 mile:		
Site No. 1	None	0
Site No. 2	None	0
Water quality of nearest surface water body:		
Site No. 1	Agricultural/Industrial	0
Site No. 2	Agricultural/Industrial	0

145th Tactical Airlift Group
North Carolina Air National Guard
Charlotte-Douglas International Airport
Charlotte, North Carolina

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria (Continued)

1. RECEPTORS CATEGORY (Continued)	RATING SCALE LEVELS	NUMERICAL VALUE
Groundwater use of uppermost aquifer:		
Site No. 1	Used for commercial, industrial, or irrigation	1
Site No. 2	Used for commercial, industrial or irrigation	1
Population served by surface water supply within 3 miles downstream of site:		
Site No. 1	None	0
Site No. 2	None	0
Population served by groundwater supply within 3 miles of site:		
Site No. 1	None	0
Site No. 2	None	0
2. WASTE CHARACTERISTICS CATEGORY		
Quantity:		
Site No. 1	Large quantity (an estimated 84,000 gallons)	L
Site No. 2	Small quantity (an estimated 1,000 gallons)	S
Confidence Level:		
Site No. 1	Confirmed	C
Site No. 2	Confirmed	C

145th Tactical Airlift Group
North Carolina Air National Guard
Charlotte-Douglas International Airport
Charlotte, North Carolina

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria (Continued)

2. WASTE CHARACTERISTICS CATEGORY (Continued)	RATING SCALE LEVELS	NUMERICAL VALUE
Hazard Rating:		
Site No. 1	Sax's Level 3	3
Site No. 2	Sax's Level 3	3
Persistence:		
Site No. 1	Straight chain hydrocarbons	0.8
Site No. 2	Straight chain hydrocarbons	0.8
Physical State		
Site No. 1	Liquid	1.0
Site No. 2	Liquid	1.0
3. PATHWAYS CATEGORY		
Surface Water Migration		
Distance to nearest surface water:		
Site No. 1	About 200 feet	3
Site No. 2	Zero feet	3
Net Precipitation:		
Site No. 1	+4 inches/year	1
Site No. 2	+4 inches/year	1
Surface erosion:		
Site No. 1	Moderate	2
Site No. 2	Moderate	2

145th Tactical Airlift Group
North Carolina Air National Guard
Charlotte-Douglas International Airport
Charlotte, North Carolina

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria (Continued)

3. PATHWAYS CATEGORY (Continued)	RATING SCALE LEVELS	NUMERICAL VALUE
Surface Water Migration (Continued)		
Surface permeability:		
Site No. 1	10^{-3} to 10^{-4} cm/sec	1
Site No. 2	10^{-3} to 10^{-4} cm/sec	1
Rainfall intensity:		
Site No. 1	3 inches	2
Site No. 2	3 inches	2
Flooding:	Beyond 100-year floodplain	0
Groundwater Migration		
Depth to groundwater:		
Site No. 1	11 to 50 feet	2
Site No. 2	11 to 50 feet	2
Net precipitation:		
Site No. 1	+4 inches/year	1
Site No. 2	+4 inches/year	1
Soil permeability:		
Site No. 1	10^{-3} to 10^{-4} cm/sec	2
Site No. 2	10^{-3} to 10^{-4} cm/sec	2
Subsurface flow:		
Site No. 1	Bottom of site greater than 5 feet above high groundwater level	0
Site No. 2	Bottom of site occasionally submerged	1

145th Tactical Airlift Group
North Carolina Air National Guard
Charlotte-Douglas International Airport
Charlotte, North Carolina

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria (Continued)

3. PATHWAYS CATEGORY (Continued)	RATING SCALE LEVELS	NUMERICAL VALUE
Groundwater Migration (Continued)		
Direct access to groundwater:		
Site No. 1	No evidence of risk	0
Site No. 2	No evidence of risk	0

4. WASTE MANAGEMENT PRACTICES CATEGORY

Site No. 1	No containment	1.0
Site No. 2	No containment	1.0

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE OLD FIRE TRAINING AREA (SITE 1)
LOCATION NORTH CAROLINA AIR NATIONAL GUARD, CHARLOTTE
DATE OF OPERATION/OCCURRENCE 1961 TO 1974
OWNER/OPERATOR 145TH TAG
COMMENTS/DESCRIPTION
RATED BY HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	1	4	4	12
B. DISTANCE TO NEAREST WELL	:	0	10	0	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	3	3	9	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVIRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	0	10	0	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	0	6	0	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	1	9	9	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
DOWN STREAM SURFACE WATER	:	0	6	0	18
GROUND WATER	:	0	6	0	18
		SUBTOTALS		40	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 22

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (L)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (100)
(FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX)

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A x PERSISTENCE FACTOR SUBSCORE B
(100)(0.8) = (80)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B x PHYSICAL STATE MULTIPLIER = WASTE CHARACTERISTICS SUBSCORE
(80)(1) = (80)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF (100 POINTS FOR DIRECT EVIDENCE) OR (80 POINTS FOR INDIRECT EVIDENCE). IF DIRECT EVIDENCE (100) EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE (LESS THEN 80) EXISTS, PROCEED TO B.

(0)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHEST RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
DISTANCE TO NEAREST SURFACE WATER	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SURFACE EROSION	:	2	8	16	24
SURFACE PERMEABILITY	:	1	6	6	18
RAINFALL INTENSITY	:	2	8	16	24
SUBTOTALS				68	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					63

2. FLOODING

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:				0

3. GROUND WATER MIGRATION

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
DEPTH TO GROUND WATER	:	2	8	16	24
NET PRECIPITATION	:	1	6	6	18
SOIL PERMEABILITY	:	2	8	16	24
SUBSURFACE FLOWS	:	0	8	0	24
DIRECT ACCESS TO GROUND WATER	:	0	8	0	24
SUBTOTALS				38	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					33

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

(63)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(22)
WASTE CHARACTERISTICS	(80)
PATHWAYS	(63)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(55)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x		FINAL SCORE
(55)(	1)	=	55
			=========

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: POND AREA AND DRAINAGE BASIN (SITE 2)
LOCATION: NORTH CAROLINA AIR NATIONAL GUARD, CHARLOTTE
DATE OF OPERATION/OCCURRENCE: 1958 TO 1987
OWNER/OPERATOR: 145TH TAG
COMMENTS/DESCRIPTION
RATED BY: HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	1	4	4	12
B. DISTANCE TO NEAREST WELL	:	0	10	0	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	3	3	9	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVIRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	0	10	0	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	0	6	0	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	1	9	9	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
DOWN STREAM SURFACE WATER	:	0	6	0	18
GROUND WATER	:	0	6	0	18
		SUBTOTALS		40	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 22

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (S)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (60)
(FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX)

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A x PERSISTENCE FACTOR = SUBSCORE B
(60)(0.8) = (48)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B x PHYSICAL STATE MULTIPLIER = WASTE CHARACTERISTICS SUBSCORE
(48)(1) = (48)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF (100 POINTS FOR DIRECT EVIDENCE) OR (80 POINTS FOR INDIRECT EVIDENCE). IF DIRECT EVIDENCE (100) EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE (LESS THEN 80) EXISTS, PROCEED TO B.

(100)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHEST RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
DISTANCE TO NEAREST SURFACE WATER	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SURFACE EROSION	:	2	8	16	24
SURFACE PERMEABILITY	:	1	6	6	18
RAINFALL INTENSITY	:	2	8	16	24
SUBTOTALS				68	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					63

2. FLOODING

		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:				0

3. GROUND WATER MIGRATION

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
DEPTH TO GROUND WATER	:	2	8	16	24
NET PRECIPITATION	:	1	6	6	18
SOIL PERMEABILITY	:	2	8	16	24
SUBSURFACE FLOWS	:	1	8	8	24
DIRECT ACCESS TO GROUND WATER	:	0	8	0	24
SUBTOTALS				46	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					40

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

(100)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(22)
WASTE CHARACTERISTICS	(48)
PATHWAYS	(100)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(57)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x		FINAL SCORE
(57)	(1)	=	57

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