INSTALLATION RESTORATION PROGRAM

PHASE I - RECORD SEARCH

NIAGARA FALLS AIR FORCE RESERVE FACILITY, NEW YORK

PREPARED FOR

UNITED STATES AIR FORCE
HEADQUARTERS
AIR FORCE RESERVE
Robins Air Force Base, Georgia

DECEMBER 1983

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Prepared By

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EXECUTIVE SUMMARY

The Department of Defense (DOD) has developed a program to identify and evaluate past hazardous material disposal sites on DOD property, to control the migration of hazardous contaminants, and to control hazards to health or welfare that may result from these past disposal operations. This program is called the Installation Restoration Program (IRP). The IRP has four phases consisting of Phase I, Initial Assessment/Records Search; Phase II, Confirmation and Quantification; Phase III, Technology Base Development; and Phase IV, Operations/Remedial Measures. Engineering-Science (ES) was retained by the United States Air Force to conduct the Phase I, Initial Assessment/Records Search for Niagara Falls Air Force Reserve Facility (AFRF) under Contract No. F08637-806-0009.

INSTALLATION DESCRIPTION

Niagara Falls AFRF is located in Niagara County, New York, approximately six miles northeast of the City of Niagara Falls and approximately fifteen miles north of Buffalo. The installation is currently comprised of 985 acres with a base population of approximately 2,560. The installation, activated on March 1, 1951, was established adjacent to the Niagara Falls Airport to utilize the airports' existing facilities. The installation was initially used by the Army Air Corps from November 1942 to 1946. In 1947, the installation ownership was transferred to the City of Niagara Falls as part of the municipal airport. When activated, the 136th Fighter Interceptor Squadron of the New York National Guard and the 76th Air Base Squadron were the tenants. From 1951 to 1971 various Air Force units have been assigned to Niagara Falls AFRF. On January 1, 1971, the 914th Tactical Airlift Group, of the Air Force Reserve assumed host duties. In addition to the Air Force Reserve the New York Air National Guard's 107th Fighter Interceptor Group is also a current tenant (NFAFRF, Real Property Study, 1983).

ENVIRONMENTAL SETTING

The environmental setting data for Niagara Falls AFRB indicate the following data are important when evaluating past hazardous waste disposal practices.

1. The mean annual precipitation is 35.58 inches; the net precipitation is +8.6 inches and the one-year 24-hour precipitation is two inches. These data indicate an abundance of rainfall in excess of evaporation plus a potential for storms to create excessive runoff.

2. The soils on base are typically silty clay loam with low permeabilities and are poorly drained. In areas where the natural soils have been disturbed and/or removed as in landfills, the soil texture and permeability would be altered. Sand and gravel deposits exist just north of Cayuga Creek and exhibit relatively high permeabilities. Ground-water levels are as high as two feet below ground. These data indicate high water tables within relatively impermeable soils underlie most of the base, but permeable sand and gravel is present in local areas.

3. The top surface of the glacial till, a confining bed above the Lockport Dolomite, occurs over most of the base at depths ranging from 10 to 20 feet below ground. This fact indicates that ground water will normally discharge into Cayuga Creek, its tributaries or local springs.

4. The Lockport Dolomite, the major aquifer in the area, outcrops in the stream bed of Cayuga Creek. Vertical fractures and solution cavities may be present in the stream bed. Within the upper 40 feet of the dolomite relatively high permeabilities are common and interconnecting bedding planes are reportedly significant horizontal transmissive zones.

5. The lower zone of the Lockport Dolomite contains distinct permeable zones related to the occurrence of bedding planes. These bedding planes are not normally interconnected nor is the upper section of the dolomite normally hydraulically connected to the lower section. The

Rochester Shale underlies the Lockport Dolomite and acts as a lower confining bed.

6. Niagara Falls AFRF lies within the drainage basin of the Niagara River which is a source of drinking water for the City of Niagara Fal's.

7. There are no threatened or endangered species in permanent - sidence on Niagara Falls AFRF.

METHODOLOGY

During the course of this project, interviews were conducted with base personnel (past and present) familiar with past waste disposal practices; file searches were performed for past hazardous waste activities; interviews were held with local, state and federal agencies; and field and helicopter reconnaissance inspections were conducted at past hazardous waste activity sites. Thirteen sites were identified as potentially containing hazardous contaminants resulting from past activities (Figure 1). These sites have been assessed using a Hazard Assessment Rating Methodology (HARM) which takes into account factors such as site characteristics, waste characteristics, potential for contaminant migration and waste management practices. The details of the rating procedure are presented in Appendix G and the results of the assessment are given in Table 1. The rating system is designed to indicate the relative need for follow-on investigation.

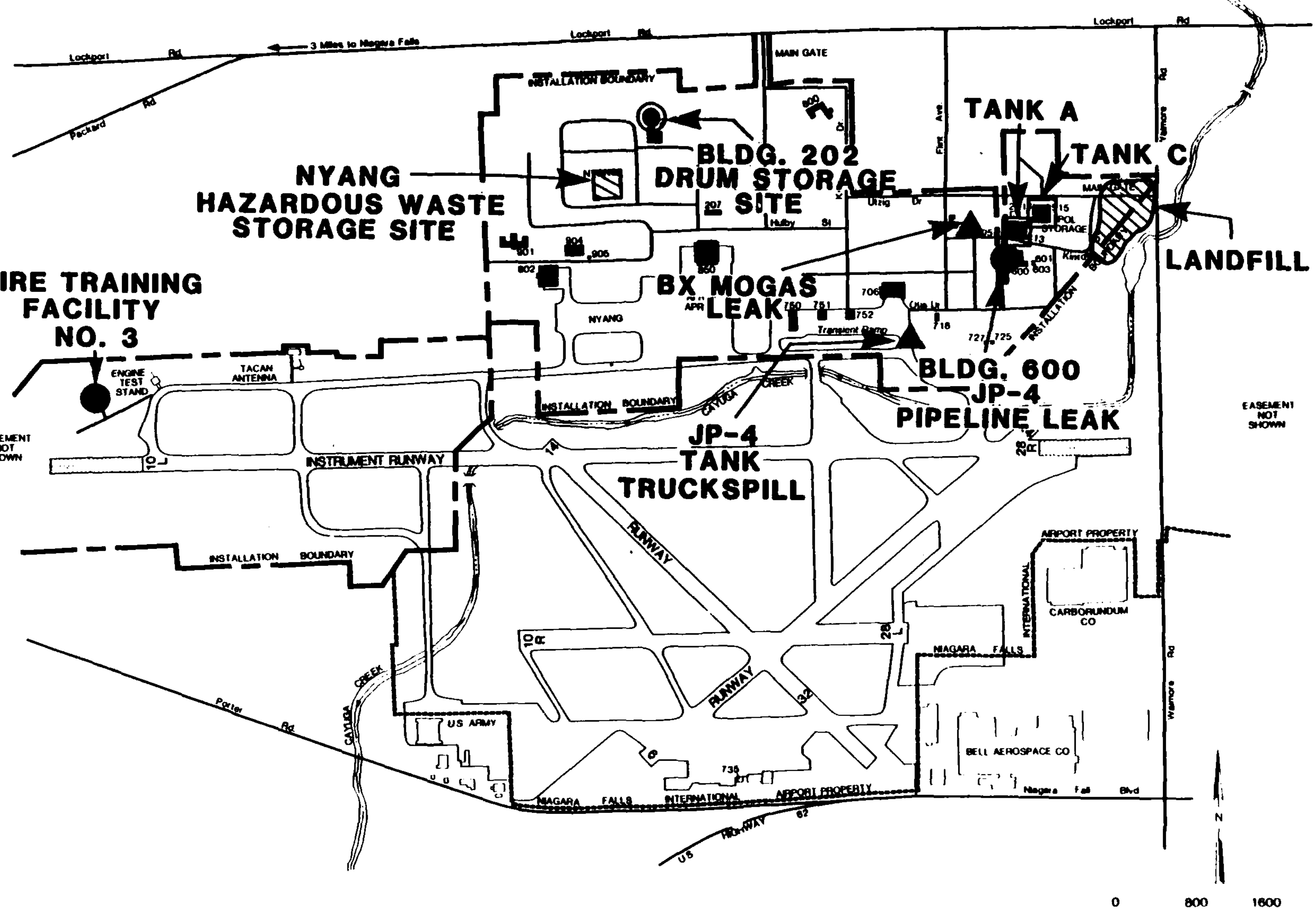
FINDINGS AND CONCLUSIONS

The following conclusions have been developed based on the results of the project team's field inspection, review of base records and files and interviews with base personnel.

The following areas were determined to have a sufficient potential to create environmental contamination and follow-on investigation is warranted: → to p. 5

NIAGARA FALLS AFRB

SITES OF POTENTIAL ENVIRONMENTAL CONTAMINATION



SOURCE: NIAGARA FALLS AFRB INSTALLATION DOCUMENTS

TABLE 1
SITES ASSESSED USING THE HARM METHODOLOGY
NIAGARA FALLS AFRF

Rank	Site Name	Date of Operation or Occurrence	Overall Total Score
1	Bldg. 600 JP-4 Pipeline Leak	1969	71
2	POL JP-4 Tank C	1982	71
3	Landfill	1952-1969	69
4	BX MOGAS Tank Leak	1981	69
5	NYANG Hazardous Waste Drum Storage	1983	67
6	POL JP-4 Tank A	1979	66
7	JP-4 Tank Truck Spill	1983	66
8	Bldg. 202 Drum Storage Yard	1978-1983	60
9	Fire Training Facility No. 3	1963-1983	57
10	Fire Training Facility No. 1	1955-1963	52
11	Fire Training Facility No. 2	early 1960's	51
12	Bldg. 850 Drum Storage Yard	1950's - early 1960's	48
13	AFRES Hazardous Waste Drum Storage	1979-1983	44

NOTE: This ranking was performed according to the Hazard Assessment Rating Methodology (HARM) described in Appendix G. Individual site rating forms are in Appendix H.

- Bldg. 600 JP-4 Pipeline Leak
- POL JP-4 Tank C
- The Landfill
- BX MOGAS Tank Leak
- NYANG Hazardous Waste Drum Storage
- POL JP-4 Tank A
- JP-4 Tank Truck Spill
- Bldg. 202 Drum Storage Yard
- Fire Training Facility No. 3

The following areas were determined to have an insufficient potential to create environmental contamination and no follow-on investigation is warranted:

- Fire Training Facility No. 1
- Fire Training Facility No. 2
- Bldg. 850 Drum Storage Yard
- AFRES Hazardous Waste Drum Storage

RECOMMENDATIONS

The detailed recommendations developed for further assessment of potential environmental contamination are presented in Section 6. The recommended actions are one-time geophysical survey or sampling programs to determine if contamination does exist at the site. If contamination is identified, the sampling program may need to be expanded to further define the extent of contamination.

Bldg. 600 JP-4 Pipeline Leak

Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells. Sample storm drainage. Observe explosimeter readings in wells.

POL JP-4 Tank C

Conduct geophysical surveys; install and sample 3 downgradient wells; sample storm drainage and standing water in berms. Observe explosimeter readings in wells.

Landfill

Conduct geophysical surveys; install and sample 5 downgradient wells and one upgradient well; sample Cayuga Creek and Narron's Pond water and sediment; observe explosimeter readings in wells.

BX MOGAS Tank Leak

Conduct geophysical surveys; install and sample 1 upgradient and 2 downgradient wells; sample storm drainage. Observe explosimeter readings in wells.

NYANG Hazardous Waste Drum Storage

Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells; sample storm drainage.

POL JP-4 Tank A

Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells; sample storm drainage and standing water inside berm. Observe explosimeter readings in wells.

JP-4 Tank Truck Spill

Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells; sample existing shallow well. Observe explosimeter readings in wells.

Bldg. 202 Drum Storage

Conduct geophysical surveys; install and sample 3 downgradient and 1 upgradient well; sample storm drainage.

Fire Training Facility No. 3

Conduct geophysical surveys; install and sample 3 downgradient and one upgradient well. Sample storm drainage. Observe explosimeter readings in wells.

OTHER RECOMMENDATIONS

There are three underground waste storage tanks located at Niagara Falls AFRF (refer to Figure 4.3). It is recommended that the Installation Environmental Program empty these tanks and pressure-test them for leaks. If leaks are detected, then a ground-water monitoring progam should be established around the relevant tanks.

SECTION 1
INTRODUCTION

BACKGROUND

The United States Air Force, due to its primary mission, has long been engaged in a wide variety of operations dealing with toxic and hazardous materials. Federal, state, and local governments have developed strict regulations to require that hazardous waste disposers identify the locations and contents of past disposal sites and take action to eliminate hazards in an environmentally responsible manner. The primary Federal legislation governing disposal of hazardous waste is the Resource Conservation and Recovery Act (RCRA) of 1976, as amended. Under Sections 6003 of the Act, Federal agencies are directed to assist the Environmental Protection Agency (EPA) and under Section 3012 state agencies to inventory past disposal sites and make the information available to the requesting agencies. To assure compliance with these hazardous waste regulations, DOD developed the Installation Restoration Program (IRP). The current DOD IRP policy is contained in Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, dated 11 December 1981 and implemented by Air Force message dated 21 January 1982. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program. DOD policy is to identify and fully evaluate suspected problems associated with past hazardous contamination, and to control hazards to health and welfare that resulted from these past operations. The IRP will be the basis for response actions on Air Force installations under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as clarified by Executive Order 12316.

PURPOSE AND SCOPE OF THE ASSESSMENT

The Installation Restoration Program has been developed as a four-phased program as follows:

Phase I	- Initial Assessment/Records Search
Phase II	- Confirmation/Quantification
Phase III	- Technology Base Development
Phase IV	- Operations/Remedial Measures

Engineering-Science (ES) was retained by the United States Air Force to conduct the Phase I Records Search at Niagara Falls Air Force Reserve Facility under Contract No. F08637-80-G-0009. This report contains a summary and an evaluation of the information collected during Phase I of the IRP. The land areas included as part of the Niagara Falls AFRF study are as follows:

Main installation	547.60 acres (owned)
Main installation	361.48 acres (easement)
Main installation	75.64 acres (leased)

The goal of the first phase of the program was to identify the potential for environmental contamination from past waste disposal practices at Niagara Falls AFRF, and to assess the potential for contaminant migration. The activities that were performed in the Phase I study included the following:

- Reviewed site records
- Interviewed personnel familiar with past generation and disposal activities
- Surveyed wastes
- Determined quantities and locations of current and past hazardous waste storage, treatment and disposal
- Defined the environmental setting at the base
- Reviewed past disposal practices and methods
- Conducted field and aerial inspection

- Gathered pertinent information from Federal, state and local agencies
- Reviewed storage tank inventory
- Assessed potential for contaminant migration.

ES performed the on-site portion of the records search during August 1983. The following team of professionals were involved:

- D. L. Gregory, Environmental Engineer and Project Manager, MS Environmental Engineering, 5 years of professional experience.
- H. D. Harman, Jr., Hydrogeologist, BS Geology, 9 years of professional experience.
- R. J. Reimer, Chemical Engineer, MSChE, 3 years of professional experience.

More detailed information concerning these individuals is presented in Appendix A.

METHODOLOGY

The methodology utilized in the Niagara Falls AFRB Records Search began with a review of past and present industrial operations conducted at the base. Information was obtained from available records such as shop files and real property files, as well as interviews with 29 past and present base employees from the various operating areas. Those interviewed included current and past personnel associated with roads and grounds, Base Fire Department, Base Supply, aircraft maintenance, vehicle maintenance, industrial hygiene and civil engineering. Experienced personnel from the New York Air National Guard were also interviewed. A listing of Air Force interviewees by position and approximate period of service is presented in Appendix B.

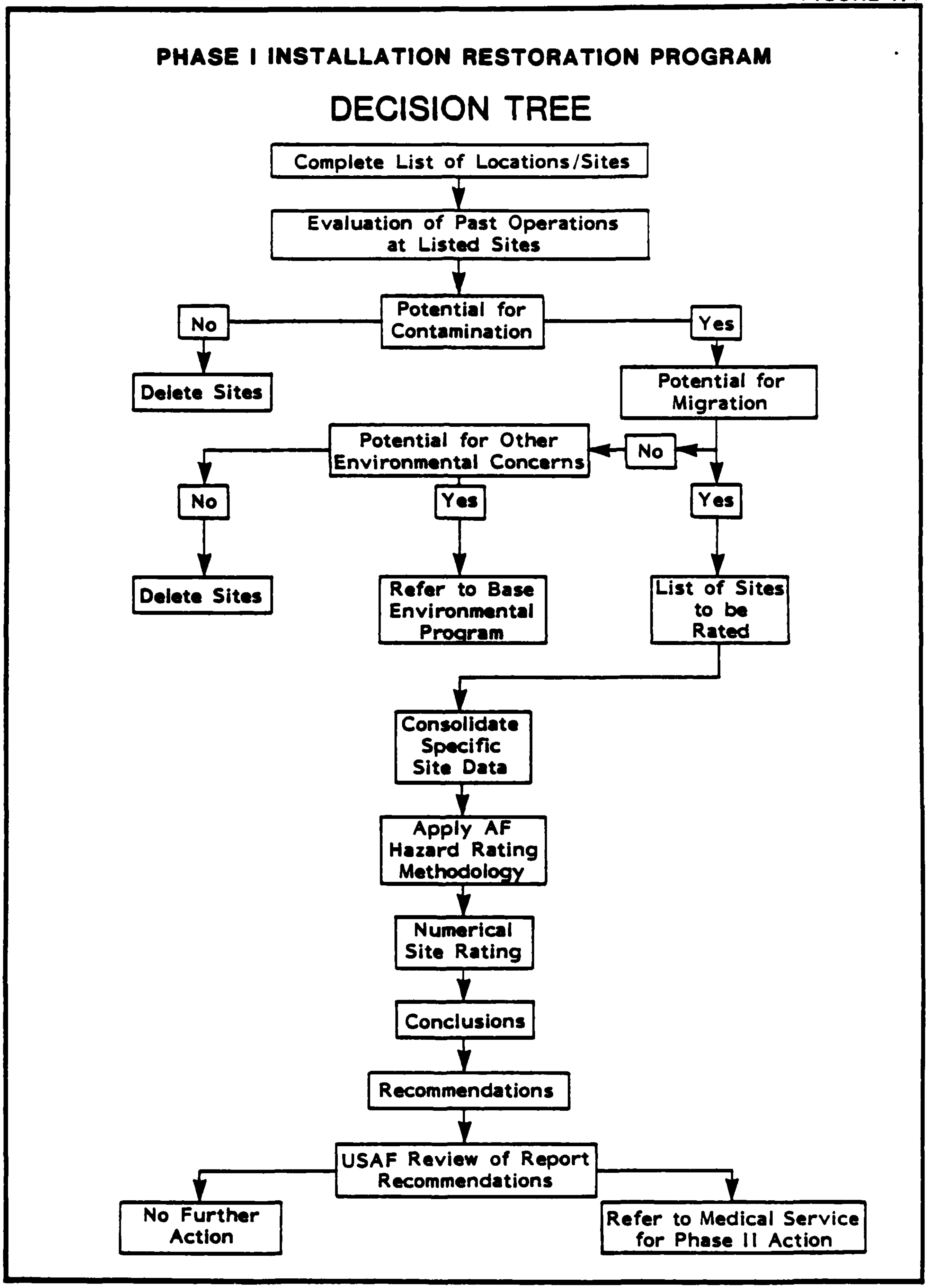
Concurrent with the installation interviews, the applicable Federal, state and local agencies were contacted for pertinent installation related environmental data. The twelve agencies contacted and interviewed are listed below as well as in Appendix B.

- U.S. Geological Survey, Water Resources Division
- U.S. Environmental Protection Agency, Region II
- U.S. Department of Agriculture, Soil Conservation Service
- New York Department of Environmental Conservation
- New York Geological Survey
- New York State Department of Transportation, Region 5
- Town of Wheatfield, New York
- Niagara Frontier Transportation Authority
- Niagara County Department of Public Health
- Niagara County Environmental Management Council
- Niagara County Economic Development and Planning
- Town of Niagara, New York

The next step in the activity review was to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from the Air Force operations on the installation. Included in this part of the activities review was the identification of past disposal sites and other possible sources of contamination such as spill areas.

A general ground tour and a helicopter overflight of the identified sites were then made by the ES Project Team to gather site-specific information including: (1) visual evidence of environmental stress; (2) the presence of nearby drainage ditches or surface water bodies; and (3) visual inspection of these water bodies for any obvious signs of contamination or leachate migration.

A decision was then made, based on all of the above information, whether a potential exists for hazardous material contamination at any of the identified sites using the Decision Tree shown in Figure 1.1. If no potential existed, the site was deleted from further consideration. For those sites where a potential for contamination was identified, a determination of the potential for migration of the contamination was made by considering site-specific conditions. Sites with no potential for migration but still with some other environmental concern were referred to the installation's environmental program. If there were no further environmental concerns, then the site was deleted. If the potential for contaminant migration was considered significant, then the


PHASE I INSTALLATION RESTORATION PROGRAM
DECISION TREE
Complete List of Locations/Sites
Evaluation of Past Operations at Listed Sites
Potential for Contamination
No
Yes
Delete Sites
Potential for Migration
Potential for Other Environmental Concerns
No
No
Yes
Yes
Delete Sites
Refer to Base Environmental Program
List of Sites to be Rated
Consolidate Specific Site Data
Apply AF Hazard Rating Methodology
Numerical Site Rating
Conclusions
Recommendations
USAF Review of Report Recommendations
No Further Action
Refer to Medical Service for Phase II Action

site was evaluated and prioritized using the Hazard Assessment Rating Methodology (HARM). A discussion of the HARM system is presented in Appendix G. The sites that were evaluated using the HARM procedures were also reviewed with regard to future land use restrictions.

SECTION 2

INSTALLATION DESCRIPTION

LOCATION AND SIZE

Niagara Falls Air Force Reserve Facility (NFAFRF) is located in Niagara County, New York, approximately six miles northeast of the City of Niagara Falls and approximately fifteen miles north of Buffalo. The installation is comprised of 985 acres with a full-time population of approximately 700. An additional 1860 reservists train at the installation for two days each month plus two full weeks each year. Figure 2.1 shows the regional location of Niagara Falls and Figure 2.2 shows the location of the installation within the Niagara Falls area. The installation site plan is shown in Figure 2.3. The Niagara Falls Frontier Transportation Authority and the Air Force share joint ownership of the runway.

BASE HISTORY

The history of Niagara Falls AFRF began in November 1942, when 468 acres of municipal airport land was leased by the U.S. Government for the use by the Army Air Corps. In 1946, 132.2 acres of leased land was returned to the city. On December 8, 1948, the 136th Fighter Squadron, New York Air National Guard, was established and occupied Old Camp Bell near the Bell Aircraft Plant. On February 1, 1952, the 76th Air Base Squadron was activated at the base as the host unit.

On February 16, 1953, the 518th Air Defense Group replaced the 76th Air Base Squadron and the 47th Fighter Interceptor Squadron replaced the 136th Fighter Interceptor Squadron.

In August 1955, Air Force reactivations brought the 15th Fighter Group out of "mothballs" to Niagara Falls AFB and replaced the 518th Air Defense Group. On July 1, 1960, the 15th was deactivated and the 4621st Support Group began operations at the base. On July 1, 1964, the 4621st was redesignated the 4621st Air Base Group.

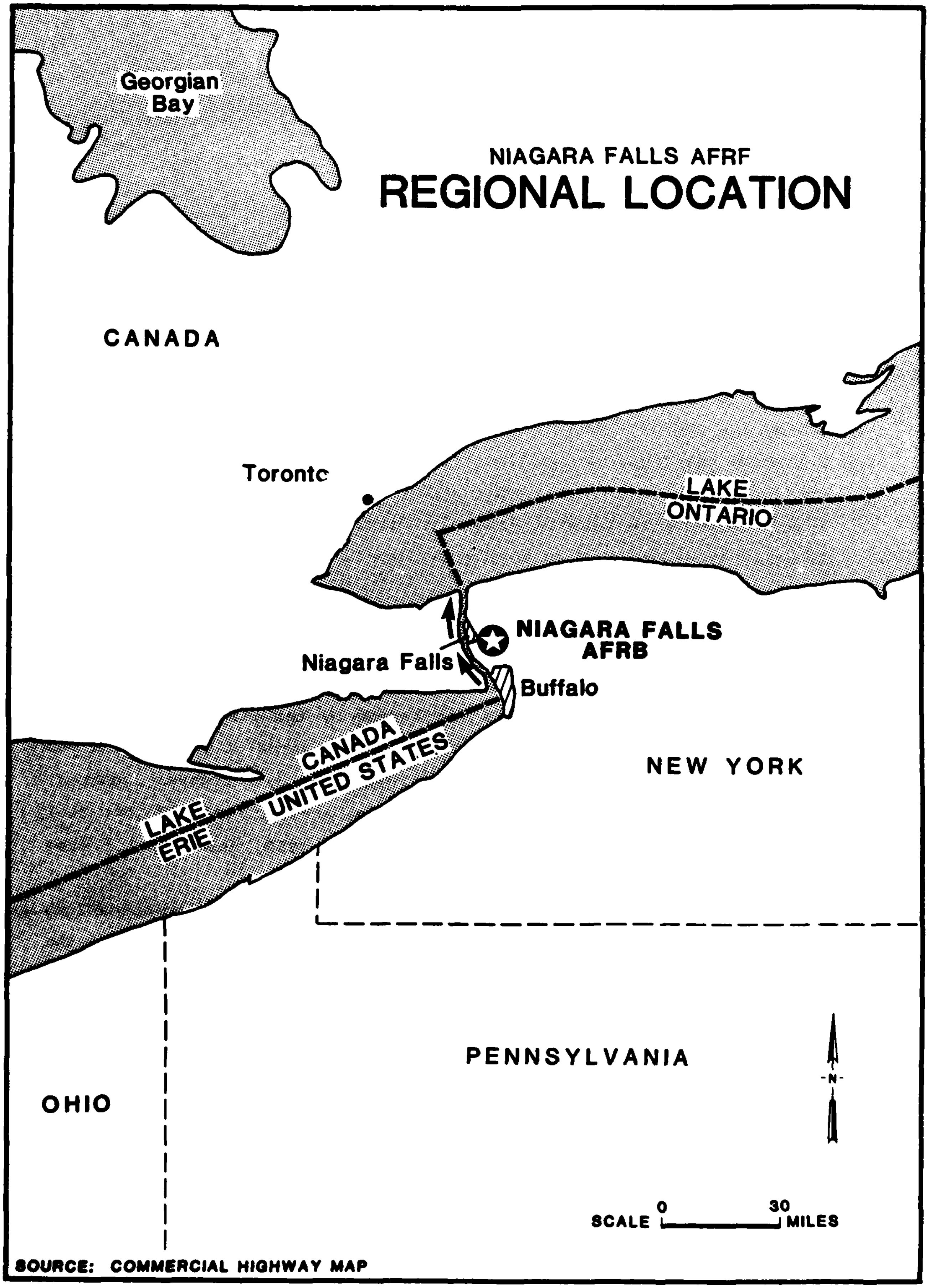

Georgian Bay
NIAGARA FALLS AFRF
REGIONAL LOCATION
CANADA
Toronto
LAKE ONTARIO
NIAGARA FALLS AFRB
Niagara Falls
Buffalo
CANADA
UNITED STATES
LAKE ERIE
NEW YORK
PENNSYLVANIA
OHIO
N
SCALE 0 30 MILES
SOURCE: COMMERCIAL HIGHWAY MAP

FIGURE 2.2

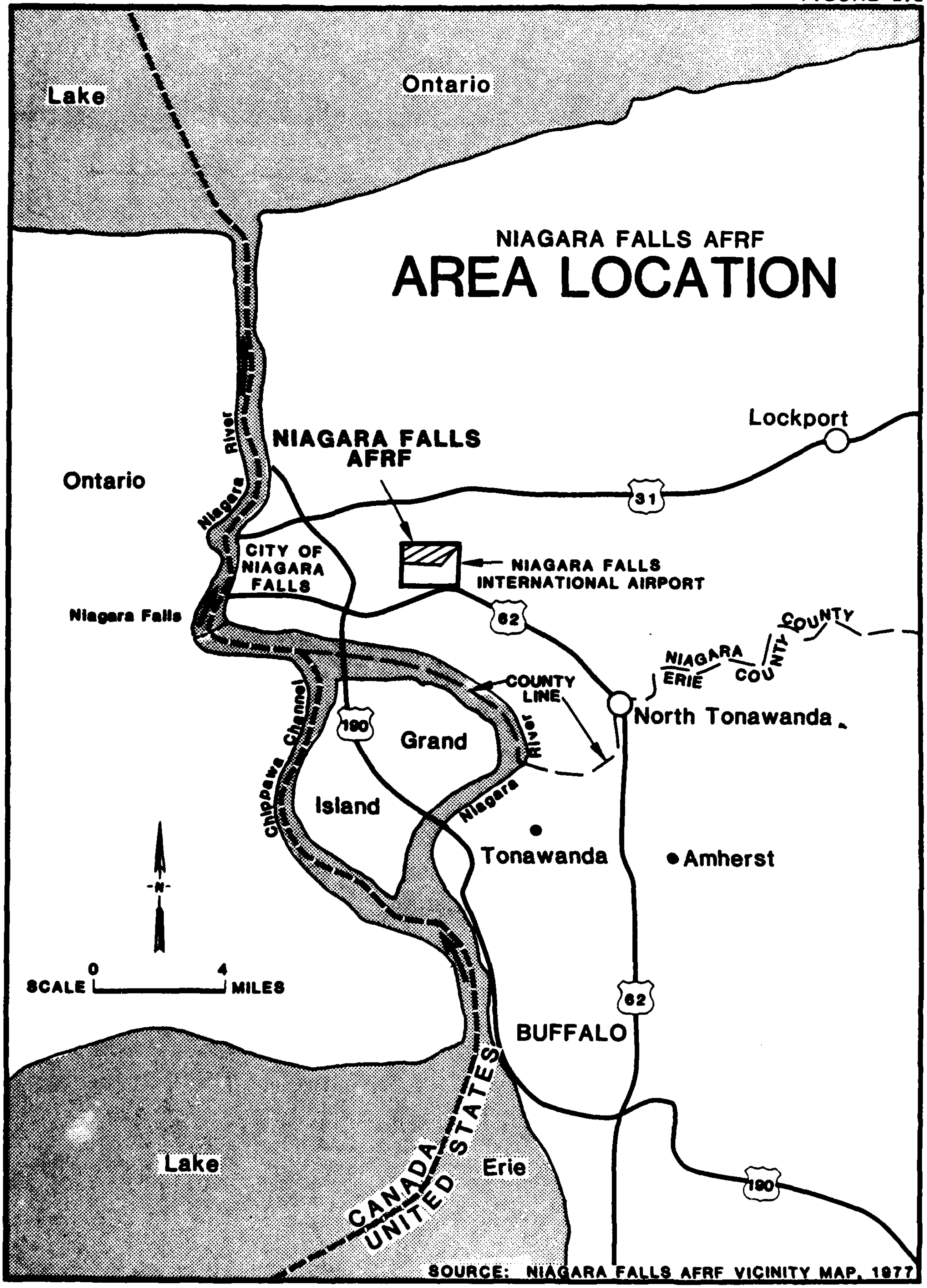
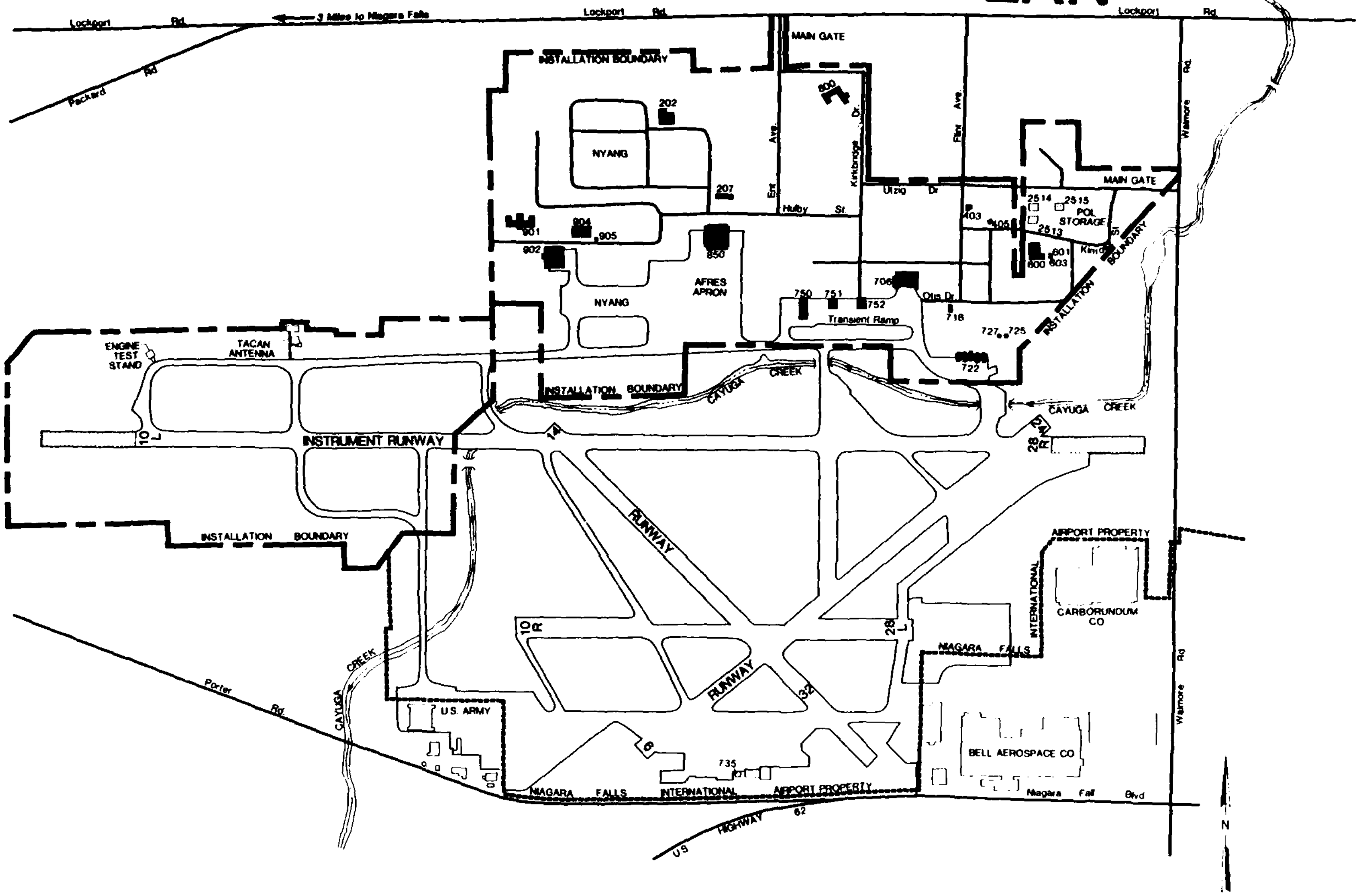

NIAGARA FALLS AFRF
AREA LOCATION
Lake
Ontario
Ontario
Lockport
31
NIAGARA FALLS AFRF
Niagara River
CITY OF NIAGARA FALLS
NIAGARA FALLS INTERNATIONAL AIRPORT
Niagara Falls
62
COUNTY
NIAGARA
ERIE
COUNTY
COUNTY LINE
North Tonawanda
Chippewa Channel
190
Grand
Island
Niagara River
Tonawanda
Amherst
-N-
SCALE 0 4 MILES
62
BUFFALO
Lake
Erie
CANADA
UNITED STATES
190
SOURCE: NIAGARA FALLS AFRF VICINITY MAP, 1977

FIGURE 2.3

NIAGARA AFRF
INSTALLATION SITE PLAN



SOURCE: NIAGARA AFRF INSTALLATION DOCUMENTS

In 1959, the NORAD Defense System CIM-10B BOMARC missile was brought to Niagara Falls AFB. The 35th Air Defense Missile Squadron was activated to maintain the BOMARC missiles. After the missile area deactivation in the late 1960's the 107th Tactical Fighter Group (Air National Guard) became the tenant organization occupying the western portion of the base.

In March 1970, DET 1, 49th FIS assumed base responsibility from the 4621st Air Base Group. In December 1970, C-130's replaced the C-119's "Flying Boxcars" which were on active duty during the Cuban Missile Crisis. Previous to the C-119's, the 445th Fighter Bomber Wing used F-80 "Shooting Stars" and F-51 "Mustangs".

The base was transferred from the Aerospace Defense Command to the Air Force Reserve Command on January 1, 1971. The 914th Tactical Airlift Group assumed "host" duties on this date. The F-4C "Phantom" jet fighters presently at the installation are operated by the New York Air National Guard, 107th Fighter Interceptor Group (NFAFB, Real Property Study, 1983).

ORGANIZATION AND MISSIONS

The 914th Tactical Airlift Group, the "host" unit at Niagara Falls AFRF, is tasked to train 1860 reserve officers and airmen to combat ready status for any national emergency that may develop. The installation is manned by civilian personnel and Air Reserve Technicians during normal duty hours. Reserve training is conducted during one weekend each month and during a 15-day duty tour each year. The unit's combat readiness requirements include airlifting troops, supplies, and equipment into prepared and unprepared landing zones, providing front line troops with personnel and logistical support and providing medical evacuations.

There are approximately ten people housed on installation property. They reside in 5 apartment units located in three different buildings.

Tenant and joint-use organizations at Niagara Falls AFRF are listed below. Descriptions of the base tenant and other organizations and their missions are presented in Appendix C.

- 107th Fighter Interceptor Group/NYANG
- DET 1, 1998th Communications Group (AFCC)
- OLD, DET 27, 12th Weather Squadron (AWS)
- 380th Combat Support Group (SAC)
- U.S. Coast Guard Reserve (USCCR)
- New England Area Exchange
- Niagara Falls Air Force Credit Union
- HQ Niagara Group, Civil Air Patrol
- Department of Transportation, Federal Aviation Agency (FAA)
- Niagara Frontier Transportation Authority (NFTA)
- State of New York, Army National Guard
- U.S. Army Corps of Engineering Construction Division

SECTION 3

ENVIRONMENTAL SETTING

The environmental setting of Niagara Falls Air Force Reserve Facility (NFAFRF) is described in this chapter with the primary emphasis on the identification of natural features that may promote the movement of hazardous waste contaminants. Environmental conditions pertinent to this study are summarized at the conclusion of this chapter.

METEOROLOGY

The climate of the Niagara Falls AFRF area is characterized by varied conditions caused by both warm and cold air masses. The area is located near the average position of the polar front. This front lies between the cold polar air masses and the warm tropical air masses. Lake Erie and Lake Ontario stabilize and temper the weather by warming the cold air masses in winter and cooling the warm air masses in summer. Precipitation is evenly distributed throughout the year, but heavy snowfalls are common during the winter. Temperature, precipitation and snowfall data are presented in Table 3.1. The data indicate that the mean annual precipitation for the 110-year period (1871-1981) was 35.58 inches. The estimated lake evaporation for the area is 27 inches per year (Weist, 1978).

Two climatic features of interest in the movement of contaminants are the net precipitation (precipitation minus evaporation) and the one-year 24-hour rainfall. The net precipitation is an indicator of the potential for leachate generation. The calculated net precipitation for the Niagara Falls AFRF is + 8.6 inches. The one-year 24-hour rainfall is an indicator of the potential for storms to cause excessive runoff and erosion. The one-year 24-hour rainfall for this area is estimated to be two inches (NOAA, 1968).

TABLE 3.1
CLIMATIC CONDITIONS FOR NIAGARA AFRF

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<u>TEMPERATURE (°F)</u> Mean Average Monthly (period: 1874-1981)	24.8	24.5	32.4	43.5	54.7	64.7	70.3	68.9	62.5	51.6	40.0	29.5
<u>PRECIPITATION (IN)</u> Mean Monthly (period: 1871-1981)	3.09	2.69	2.75	2.70	2.86	2.79	2.94	3.21	3.07	3.05	3.21	3.22
<u>SNOWFALL (IN)</u> Mean Monthly (period 1944-1981)	23.8	18.0	11.9	3.1	0.1	T	0.0	0.0	T	0.3	12.4	22.4

Note: T = Trace
Source: Local Climatological Data, 1981, Buffalo, New York, National Oceanic and Atmospheric Administration

GEOGRAPHY

Niagara Falls AFRF is located in the northwestern corner of the Huron Plain physiographic province (Figure 3.1). The plain is bordered on the north by the Niagara Escarpment and on the south by the Onondaga Escarpment (EPA, 1982).

Topography

The topography of the area surrounding Niagara Falls AFRF is governed by the Huron Plain. The Huron Plain is almost level with some uneven escalation introduced by irregular deposition of rock material by retreating glaciers. Low lying areas within the Plain are usually flat resulting from the deposition of clay material at the bottom of shallow lakes which covered the lowlands after the glaciers retreated. The relief on the Niagara Falls AFRF is low with land surface elevations ranging from 601 feet above the National Geodetic Vertical Datum (NGVD) in the northern section of the base to 585 feet NGVD in the southwestern corner of the base. The base is relatively flat with one small stream passing through the base and very few erosional features.

Soils

Niagara Falls AFRF soils consist of three soil units which are a cut and fill soil unit, the Lakemont unit and the Odessa unit (Higgins and others, 1972). The cut and fill soils exist in the extreme northeast corner of the base near the main gate. The soil is disturbed so the soil texture and permeability vary. The Lakemont soil unit exists along Cayuga Creek and the western area of Runway 10L/28R (Figure 3.2). The Lakemont consists of a surface layer of silty clay loam, a subsoil of silty clay and underlying material of clay and silt. The Odessa soil unit exists over most of the base and also consists of a surface layer of silty clay loam, a subsoil of silty clay and underlying material of silt and clay. The Odessa soils are a lighter red color than the Lakemont soils. Table 3.2 is a summary of the engineering properties of the Niagara Falls AFRF soils. Due to the clay content of the soils the permeability is low (less than 0.2 to 2.0 inches per hour), resulting in rapid saturation of surface soil layers following rains. During the

TABLE 3.2

NIAGARA FALLS AIR FORCE RESERVE FACILITY SOILS

Symbol on Figure 3.2	Unit Description	Depth to Bedrock (Feet)	Depth to Seasonal High Water Table (Feet)	Soil Depth (Inches)	Soil Permeability (Inch/Hour)	Septic Tank Use Limitations
Cu	[1]Cut and fill land	-	-	-	-	-
Lc	Lakemont silty clay loam	6+	0-1/2	0-8 8-26 26-50	0.2-0.63 <0.2 <0.2	Severe: high water table; ponding; slow permeability
OdA	Odessa silty clay loam; 0 to 2 percent slopes	6+	1/2-1	0-8 8-56	0.2-2.0 <0.2	Severe: high water table; slow permeability

Note: 1. Soil unit in which properties vary due to removal of top soil and some subsoil.

Source: USDA, Soil Conservation Service, 1972.

FIGURE 3.1

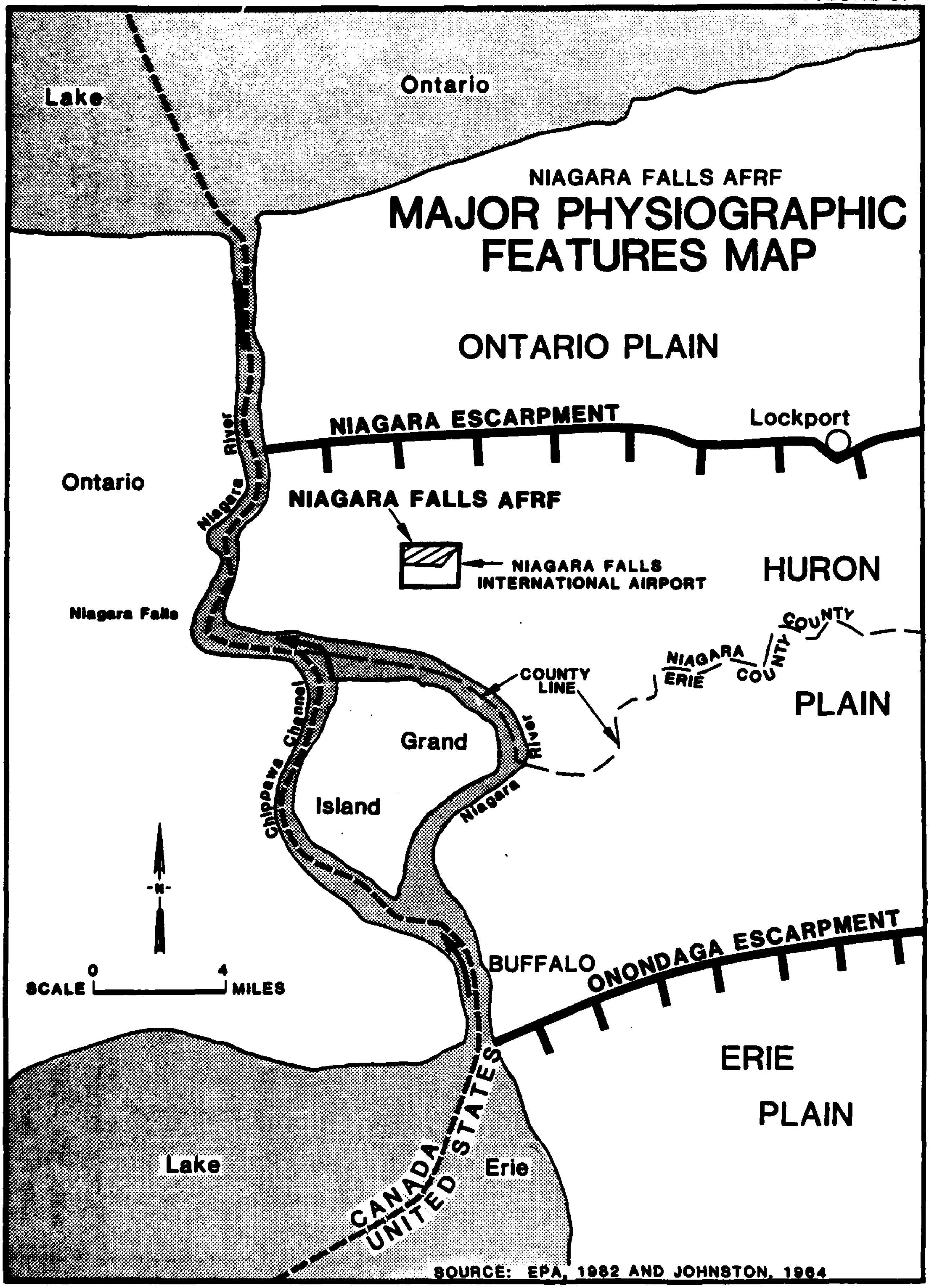
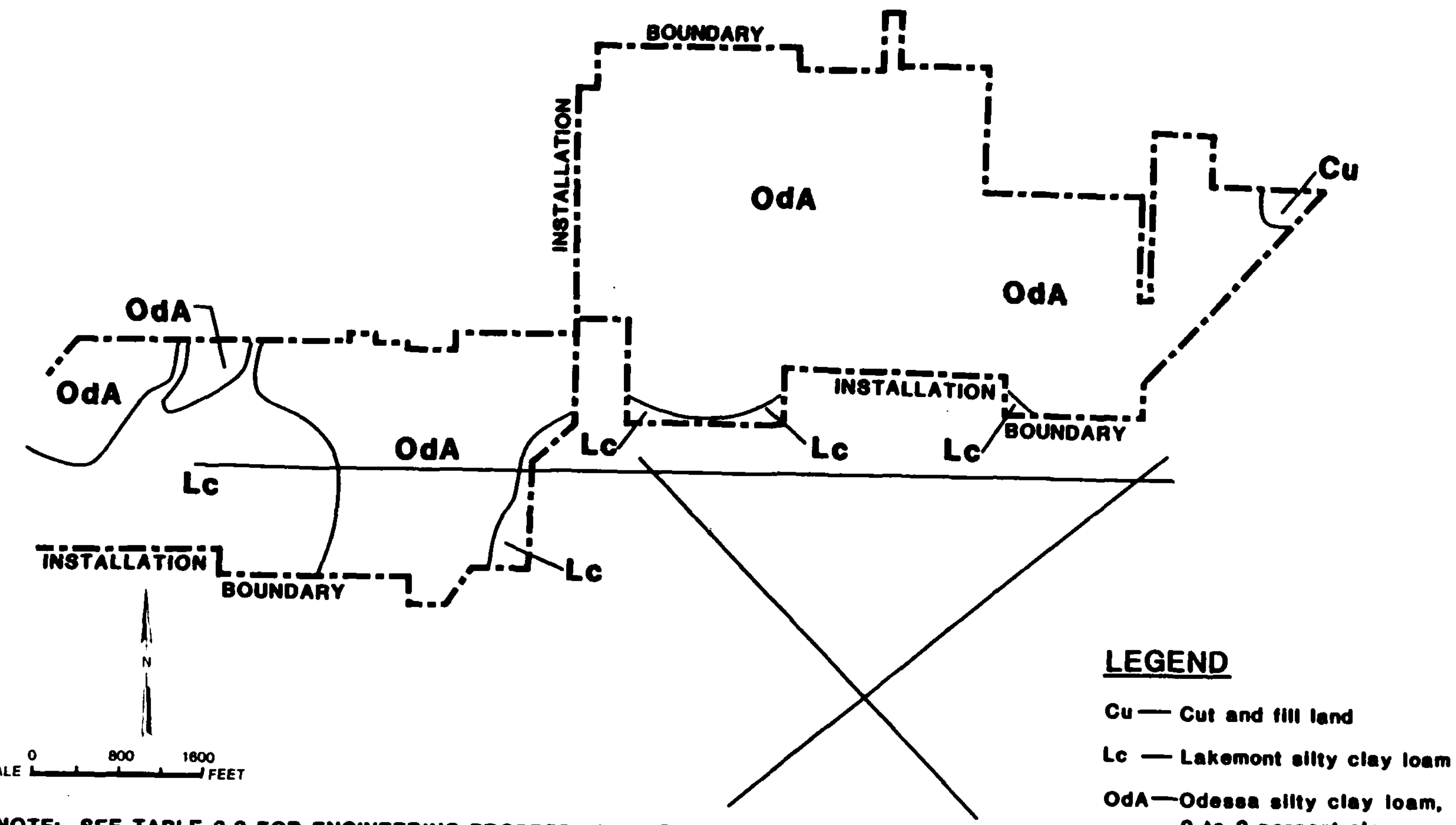

NIAGARA FALLS AFRF
MAJOR PHYSIOGRAPHIC FEATURES MAP
Lake
Ontario
ONTARIO PLAIN
NIAGARA ESCARPMENT
Lockport
Niagara River
Ontario
NIAGARA FALLS AFRF
NIAGARA FALLS INTERNATIONAL AIRPORT
HURON
PLAIN
Niagara Falls
NIAGARA COUNTY
ERIE COUNTY
COUNTY LINE
Chippawa Channel
Grand
Island
Niagara River
-N-
SCALE 0 4 MILES
BUFFALO
ONONDAGA ESCARPMENT
ERIE
PLAIN
Lake
Erie
CANADA
UNITED STATES
SOURCE: EPA, 1982 AND JOHNSTON, 1964

FIGURE 3.2

NIAGARA FALLS AFRF

SOILS



NOTE: SEE TABLE 3.2 FOR ENGINEERING PROPERTIES OF SOIL TYPES

SOURCE: USDA, SOIL CONSERVATION SERVICE, 1972 site visit (August, 1983) evidences of this saturation were ponded water, springs and the reported daily inflow of ground water into the POL diked areas. The low permeability of the soils indicates that the migration of any potential contaminant will be limited and slow except where deposits of sand and gravel may result in increased permeability and contaminant migration.

SURFACE-WATER RESOURCES

Cayuga Creek is the only surface water that is present on the Niagara Falls AFRF. It empties into the Little River approximately 4 miles down stream from the base and just north of Cayuga Island. The Little River empties into the Niagara River approximately five miles upstream of the American and Horseshoe (Canadian) Falls.

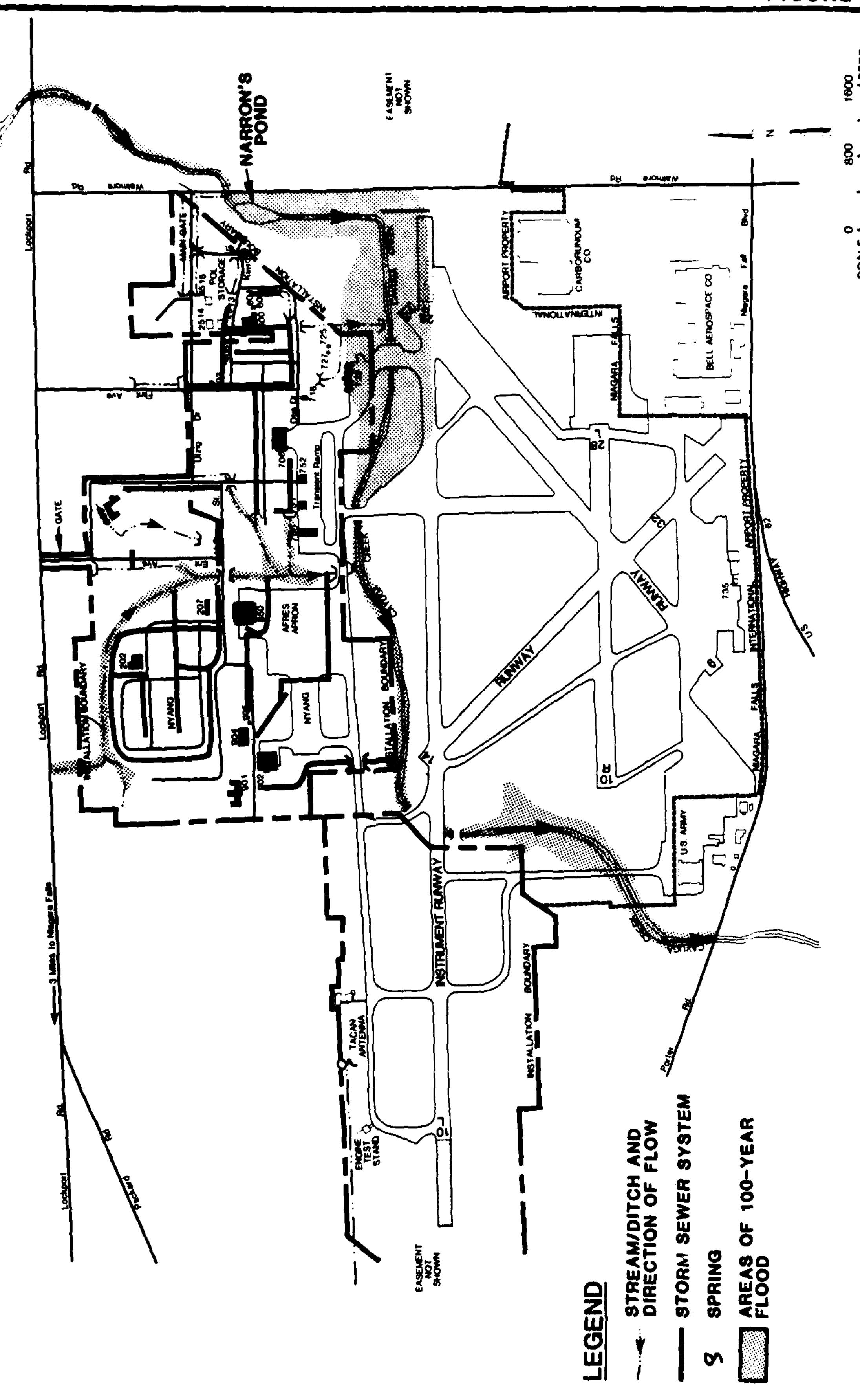
Niagara Falls AFRF lies partially within the 100-year and 500-year floodplain areas of Cayuga Creek (Figure 3.3). The most effected area of the base, if flooded by a 100-year flood, would be a 1,000-foot wide area south of Building 722 within the taxiway and Runway 28R. The least effected area would be a 100- to 400- foot wide area along the tributary of Cayuga Creek from Lockport Road south to the Transient Ramp (NFAFRB, Flood Boundary and Freshwater Wetland Base Map, 1983).

Drainage

Surface drainage on the Niagara Falls AFRF flows into one major stream and three tributaries which flow through the base (Figure 3.3). Cayuga Creek is the major stream entering the base on the eastern side near the main gate to Walmore Road. A small pond (Narron's Pond) has been constructed on Cayuga Creek just south of the main gate. The three tributaries enter the base on the northern side from Lockport Road. One tributary enters the base in the extreme northwestern corner of the base within the New York Air National Guard area. A second tributary enters the base near the main gate to Lockport Road and a third tributary enters the base along Flint Avenue. A storm drainage system consisting of above ground ditches and underground pipes control the surface-water drainage from the base to Cayuga Creek and its tributaries. A 72-acre freshwater wetland (TW-1) exists southwest of the stabilized overrun of Runway 10L. Fourteen acres are on NFAFRF property. The New York Department of Environmental Conservation (NYDEC) has classified this

NIAGARA FALLS AFRF

SURFACE DRAINAGE MAP



SOURCE: NIAGARA FALLS AFRF STORM DRAINAGE SYSTEM, 1977 AND FLOOD BOUNDARY & FRESHWATER WETLAND MAP, 1983 wetland as a Class II wetland (NFAFRF Land Management Plan). A Class II wetland is an emergent marsh with moderate value as a wetland protection area.

Surface-Water Quality

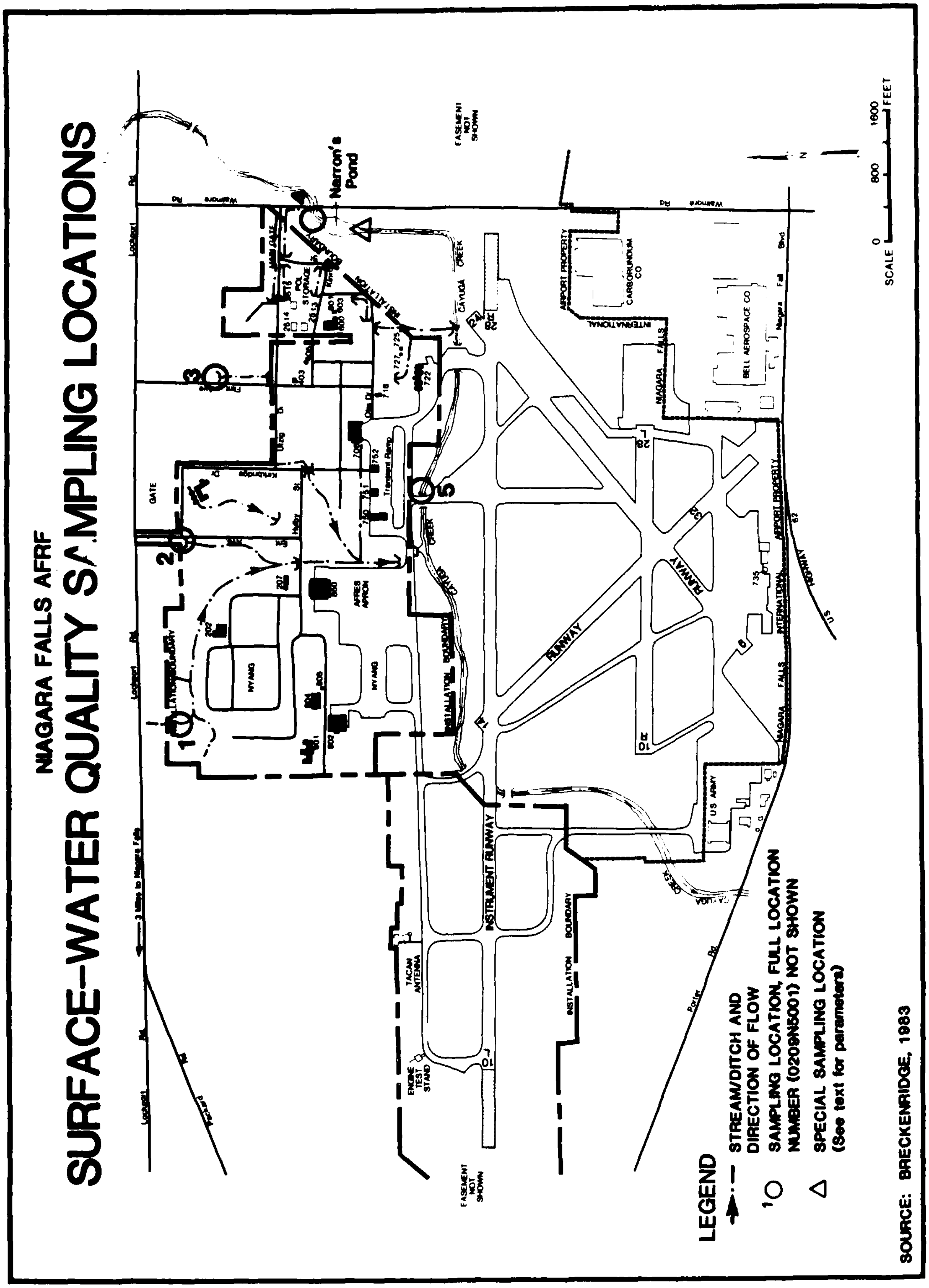
Surface-water quality in major streams in the vicinity of the Niagara Falls AFRF have been affected by pollution related to the industrial development in the Niagara Falls and Buffalo areas (Reck and Simmons, 1952). The American side of the Niagara River has in the past contained elevated levels of phenols and fecal coliforms (NFARFF, TAB A-1, 1977) and sampling of Cayuga Creek sediment downstream and west of the Love Canal area in Niagara Falls indicated elevated levels of gamma-emitting radionuclides (EPA, 1982). On the base, limited sampling of Cayuga Creek has found elevated levels of fecal coliforms (Breckenridge, 1983).

Cayuga Creek receives the surface water drainage from NFAFRB and is classified as a Class D stream in which the water quality parameters of pH and dissolved oxygen shall be maintained within specified limits. The pH shall be between 6.0 and 9.5 standard units and the dissolved oxygen shall not be less than 3 milligrams per liter at any time. Class D streams are suitable for secondary contact recreation, but due to intermittent flow and water conditions, the streams will not support fish propagation (NYDEC, 1974).

Formal water-quality sampling stations to monitor Cayuga Creek water quality have been recently established on the installation at five permanent locations and one special location (Figure 3.4). Station number 0209NS005 was sampled on July 27, 1983, but the analytical results are not yet available. The permanent stations are to be sampled during the months of April, June, August and October for the following parameters:

pH	Zinc
Dissolved Oxygen	Cadmium
Ammonia or Ammonium Compound	Turbidity
Cyanide	Flow
Ferro or Ferricyanide	Temperature
Copper	*Escherichia Coli* (bacteria)

FIGURE 3.4


NIAGARA FALLS AFRF
SURFACE-WATER QUALITY SAMPLING LOCATIONS
LEGEND
STREAM/DITCH AND DIRECTION OF FLOW
SAMPLING LOCATION, FULL LOCATION NUMBER (0209N5001) NOT SHOWN
SPECIAL SAMPLING LOCATION (See text for parameters)
SOURCE: BRECKENRIDGE, 1983
Narron's Pond
CAYUGA CREEK
INSTALLATION BOUNDARY
RUNWAY
INSTRUMENT RUNWAY
NIAGARA FALLS INTERNATIONAL AIRPORT PROPERTY
BELL AEROSPACE CO
CARBORUNDUM CO
US ARMY
TACAN ANTENNA
ENGINE TEST STAND
AFRES APRON
NYANG
POL STORAGE
MAIN GATE
GATE
Transient Ramp
EASEMENT NOT SHOWN
Lockport Rd
Walmore Rd
Porter Rd
Packard Rd
Niagara Falls Blvd
US HIGHWAY 62
3 Miles to Niagara Falls
SCALE
0
800
1600
FEET
N

Surface-Water Use

Surface water in the vicinity of the Niagara Falls AFRF is used for public water supply, electric power generation and recreation. The surface-water intakes for the public water supply of Niagara Falls is located in the Tonawanda Channel of the Niagara River. These intakes are located approximately 6.5 miles downstream from the Niagara Falls AFRF discharges into Cayuga Creek. Potential contaminants from the installation may migrate downstream to these water-supply intakes. The installation obtains its water supply from Niagara Falls through a ten-inch diameter water line which enters the installation in the southeastern corner near Building 621.

The Niagara Falls area surface water provides a variety of recreational uses. The American and Horseshoe (Canadian) Falls are major tourist attractions. Lake Ontario and lake Erie as well as the Niagara River itself are used extensively for fishing and boating.

GROUND-WATER RESOURCES

The ground-water resources of the Niagara Falls AFRF area have been reported by Reck and Simmons (1952), Johnston (1964), Higgins and others (1972), Niagara Falls AFRB, TAB A-1 (1977), Weist (1978), EPA (1982), USGS (1982), Air Force Reserve (1983) and Kantrowitz and Snavely (1982). Reports by the Niagara County Environmental Management Council (1983) and the USGS (1983) are in progress and the data are not currently available. Ground-water is available from both unconsolidated sediments and consolidated rocks within the Niagara Falls AFRF area (Kantrowitz and Snavely, 1982). These unconsolidated sediments and consolidated rocks comprise the hydrogeologic units found beneath Niagara Falls AFRF.

Hydrogeologic Units

Niagara Falls AFRF is underlain geologically by unconsolidated sediments which overlie consolidated rock. The hydrogeologic units present and their water-bearing characteristics are summarized in Table 3.3 and the details of the lithology of the facility'sdeepest soil boring (SB21, 24.9 ft.) are shown in Figure 3.5. Beneath the soil zone unconsolidated sediments consist of lake deposits of clay, silt and fine sand. These sediments were deposited in lakes formed during the melting of glacial ice sheets during Pleistocene geologic time (10,000 years ago) (Johnston, 1964). The lake deposits within the vicinity of the

TABLE 3.3

HYDROGEOLOGIC UNITS AND THEIR WATER-BEARING CHARACTERISTICS IN THE VICINITY OF NIAGARA FALLS AFRF

System	Series	Hydrogeologic Unit	Hydrogeologic Classification	Approximate Thickness (feet)	Dominant Lithology	Water-Bearing Characteristics
Quaternary	Pleistocene	Sand and Gravel	Aquifer (unconfined)	4-10	Thin deposits of sand and gravel	Readily transmits water. Wells provide adequate water for domestic supplies.
		Lake Deposits	Confining Bed	1-13	Laminated silt and clay with thin sand beds.	Does not readily transmit water.
		Glacial Till	Confining Bed	1-13	Clay, sand and boulders	Does not readily transmit water, but "washed zone" at bottom of till normally has good permeability.
Silurian (Middle)		Lockport Dolomite (upper section)	Aquifer (unconfined and confined)	20	Thin-bedded to massive dolomite.	Readily transmits water in fractured and jointed rock. Open hole wells reportedly yield up to 100 gpm.
		Lockport Dolomite (lower section)	Aquifer (confined)	100	Thin-bedded to massive dolomite.	Readily transmits water in seven distinct bedding planes and solution cavity zones. Average yield of wells is 7 gpm.

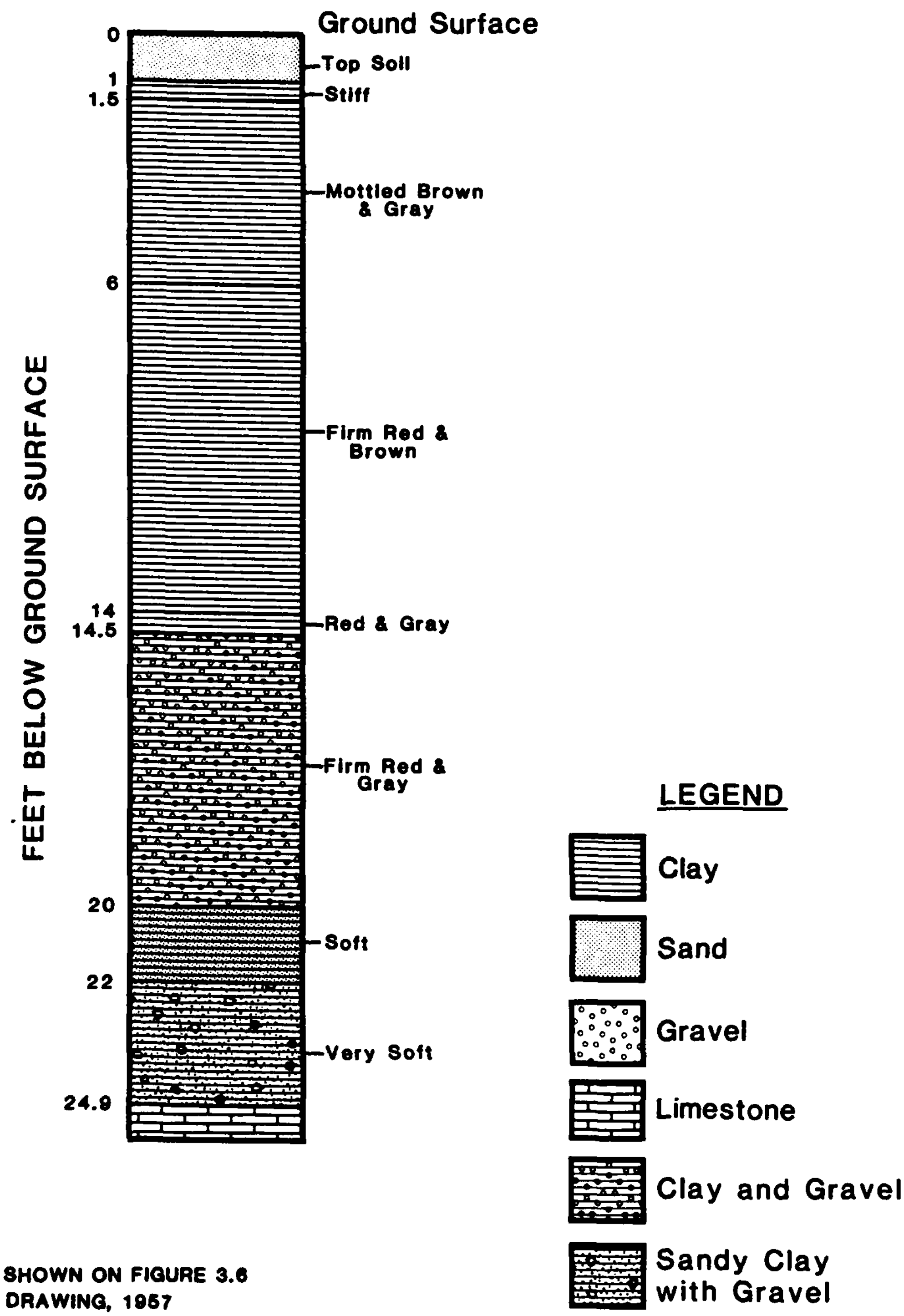
TABLE 3.3
HYDROGEOLOGIC UNITS AND THEIR WATER-BEARING
CHARACTERISTICS IN THE VICINITY OF NIAGARA FALLS AFRF
(Continued)

System	Series	Hydrogeologic Unit	Hydrogeologic Classification	Approximate Thickness (feet)	Dominant Lithology	Water-Bearing Characteristics
	Clinton	Rochester Shale	Confining Bed	60	Calcareous Shale	Does not readily transmit water.
		Irondequoit Limestone	Aquifer (Confined)	12	Coarse-grained Limestone	Transmits water moderately. Average well yields are 2-3 gpm.
		Reynolds Limestone		10	Shaly Limestone and Dolomite.	
		Neahga Shale of Sanford (1933)	Confining Bed	5	Shale	Does not readily transmit water.
		Thorold Sandstone	Aquifer (Confined)	8	Shaly Sandstone	Transmits water moderately. Average well yields are 2-3 gpm.
Silurian (Lower)	Albion	Grimsby Sandstone of Williams (1914)		45	Sandstone interbedded with shale.	
		Unnamed Unit	Confining Bed	40	Shale interbedded with sandstone	Does not readily transmit water.
		Whirlpool Sandstone	Aquifer (Confined)	20	Quartzitic sandstone.	Transmits water moderaterly. Average well yields are 2-3 gpm.
Ordovician (Upper)		Queenston Shale	Confining Bed	1,200	Sandy to argillaceous shale.	Does not readily transmit w• er, but upper part may yield 7 gpm to wells.

Source: Johnston, 1964

NIAGARA FALLS AFRF

BLDG. 850
BORING LOG NO. SB-21



NOTE: LOCATION SHOWN ON FIGURE 3.6
SOURCE: NFAFRB DRAWING, 1957

installation range from 3 to 29 feet thick (EPA, 1982). On the installation, the lake deposits range from 1 to 13 feet thick (NFAFRF, Soil Boring Plan, 1977). A glacial till deposit of clay, sand and boulders underlies the lake deposits. The till was deposited from glacial ice sheets as they transgressed the area. The till within the vicnity of the installation ranges from 5 to 20 feet thick (EPA, 1982). On the installation, the till ranges from 1 to 13 feet thick (NFAFRF, Soil Boring Plan, 1977). Sand and gravel deposited by streams in isolated areas of the base range from 4 to 10 feet thick. Most of the sand and gravel deposits are located just north of Cayuga Creek. Another isolated area is underneath Buildling 803 along Kirkbridge Drive.

The location of subsurface cross sections are shown in Figure 3.6. Subsurface cross sections of the unconsolidated sediments underlying the base along the lines shown in Figure 3.6 have been constructed based on Niagara Falls AFRF soil boring records. The cross sections are shown in Figures 3.7 and 3.8.

The consolidated rocks underlying the unconsolidated sediments consist of limestone, shale and sandstone. Niagara Falls AFRF is in the outcrop area of the Lockport Dolomite which is visible in the stream bed of Cayuga Creek (Figure 3.9). At its deepest point on the installation, the dolomite was encountered at 24.9 feet below ground. The Lockport Dolomite, which is also visible in the Niagara Stone Rock Quarry northwest of the installation, consists of dark-gray to brown, thin-bedded to massive dolomite locally containing gypsum. The dolomite is approximately 120 feet thick in the vicinity of the installation (Bailey, 1983).

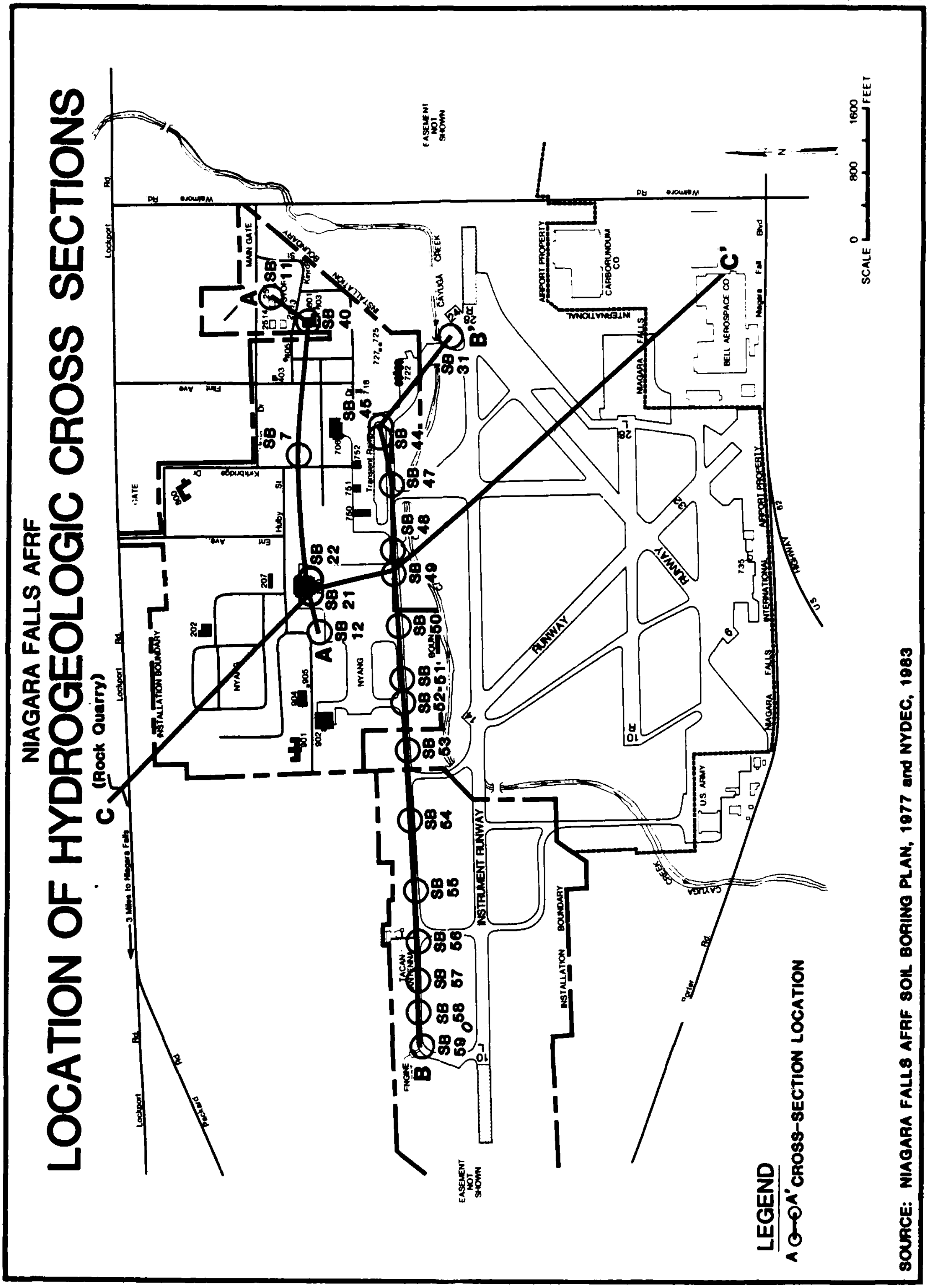
The Rochester Shale, composed of approximately 60 feet of dark-gray calcareous shale, underlies the Lockport Dolomite. The outcrop area of the Rochester Shale as well as other geological members of the Clinton and Albion Groups is approximately 5 miles north of the installation along the Niagara Escarpment (Johnston, 1964).

The Queenston Shale, composed of approximately 1,200 feet of red sandy to argillaceous shale, underlies the Albion Group. The outcrop area of the Queenston Shale is approximately 6 miles north of the installation between the Niagara Escarpment and Lake Ontario (Johnston, 1964). A natural gas well located approximately 4 miles northeast of the installation penetrated the Queenston Shale at 340 feet below land

FIGURE 3.6

NIAGARA FALLS AFRF

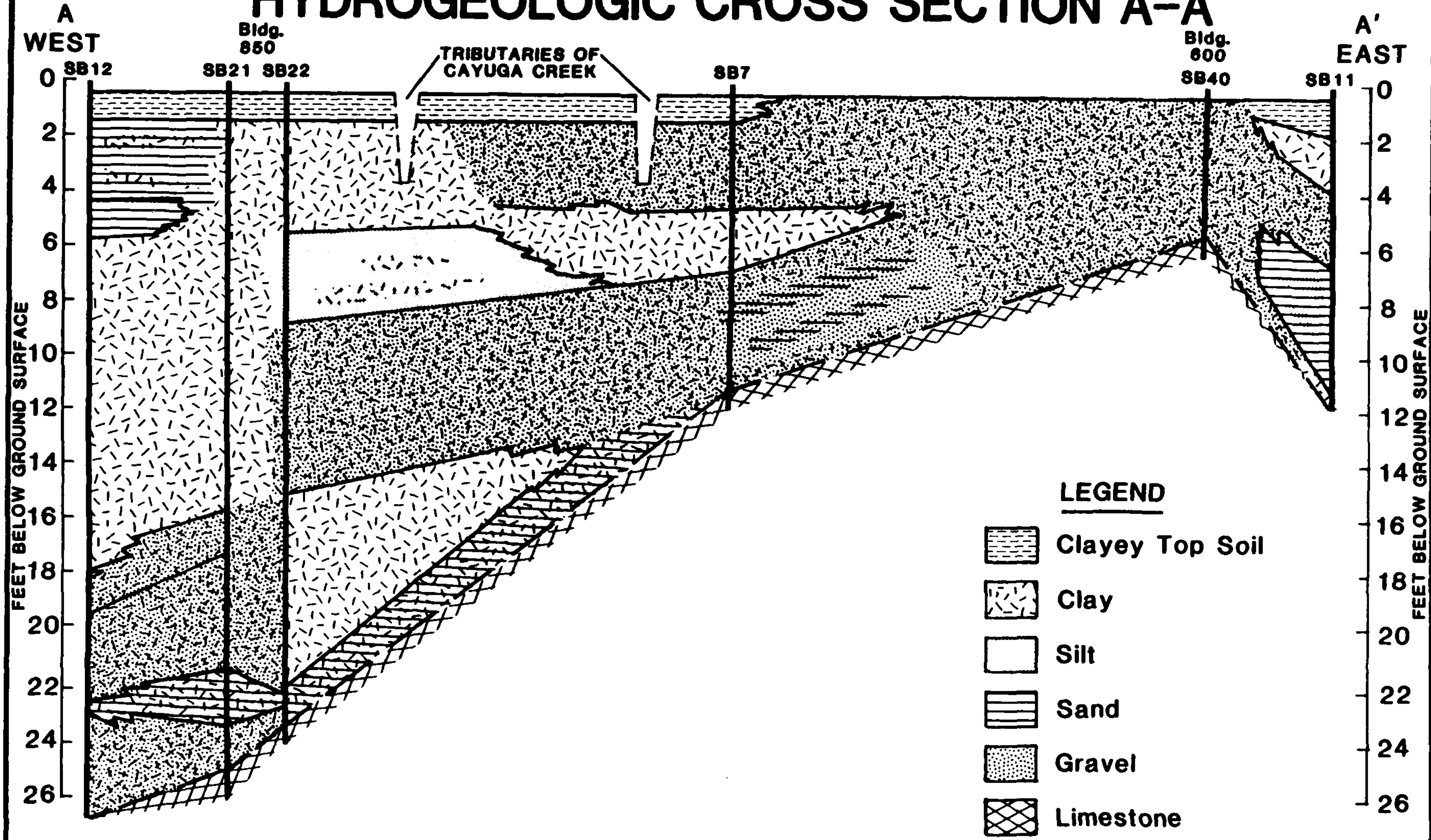
LOCATION OF HYDROGEOLOGIC CROSS SECTIONS



SOURCE: NIAGARA FALLS AFRF SOIL BORING PLAN, 1977 and NYDEC, 1983

NIAGARA FALLS AFRF

HYDROGEOLOGIC CROSS SECTION A–A′

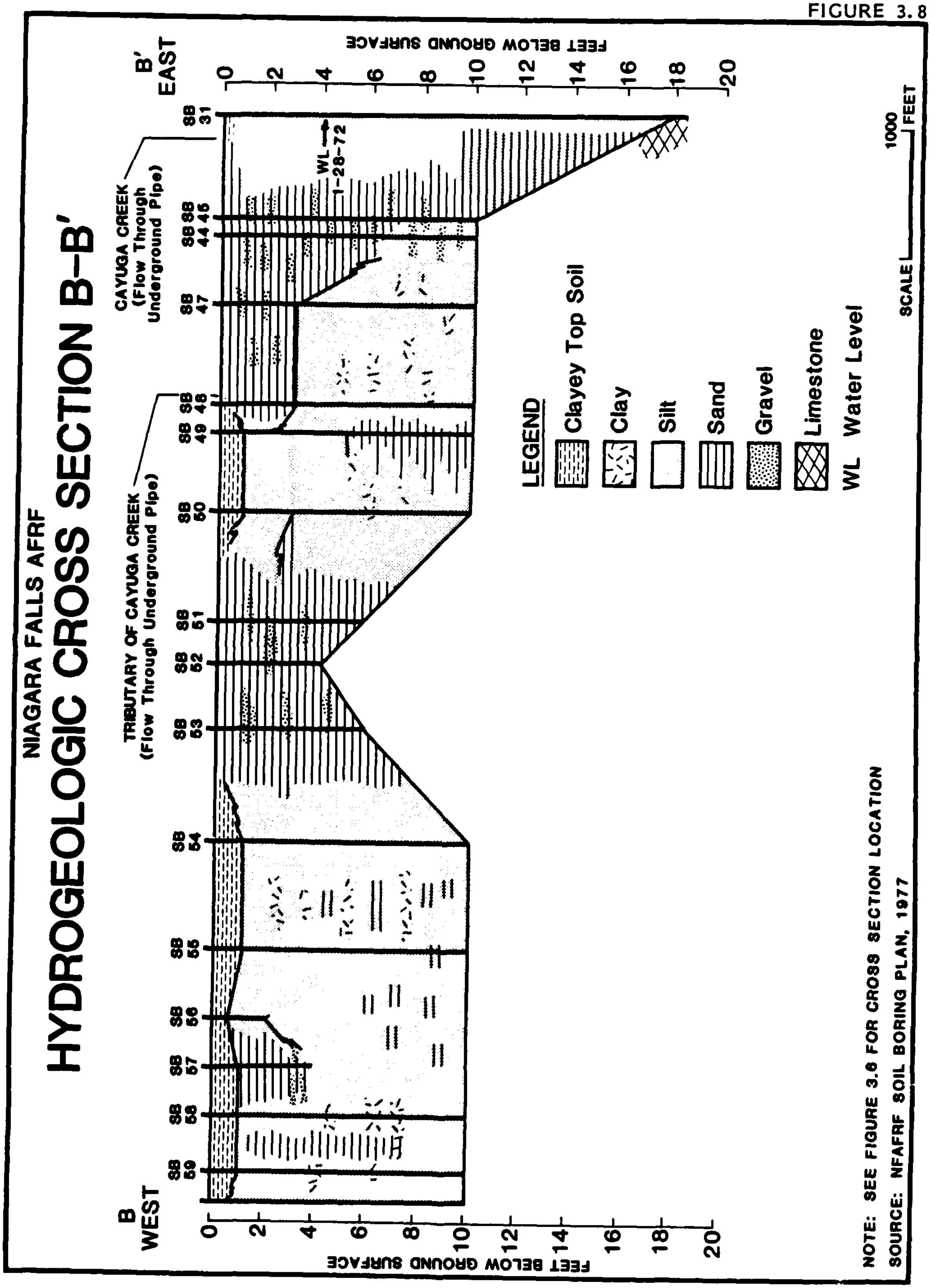


NOTE: SEE FIGURE 3.6 FOR CROSS SECTION LOCATION

SOURCE: NFAFRF SOIL BORING PLAN, 1977.

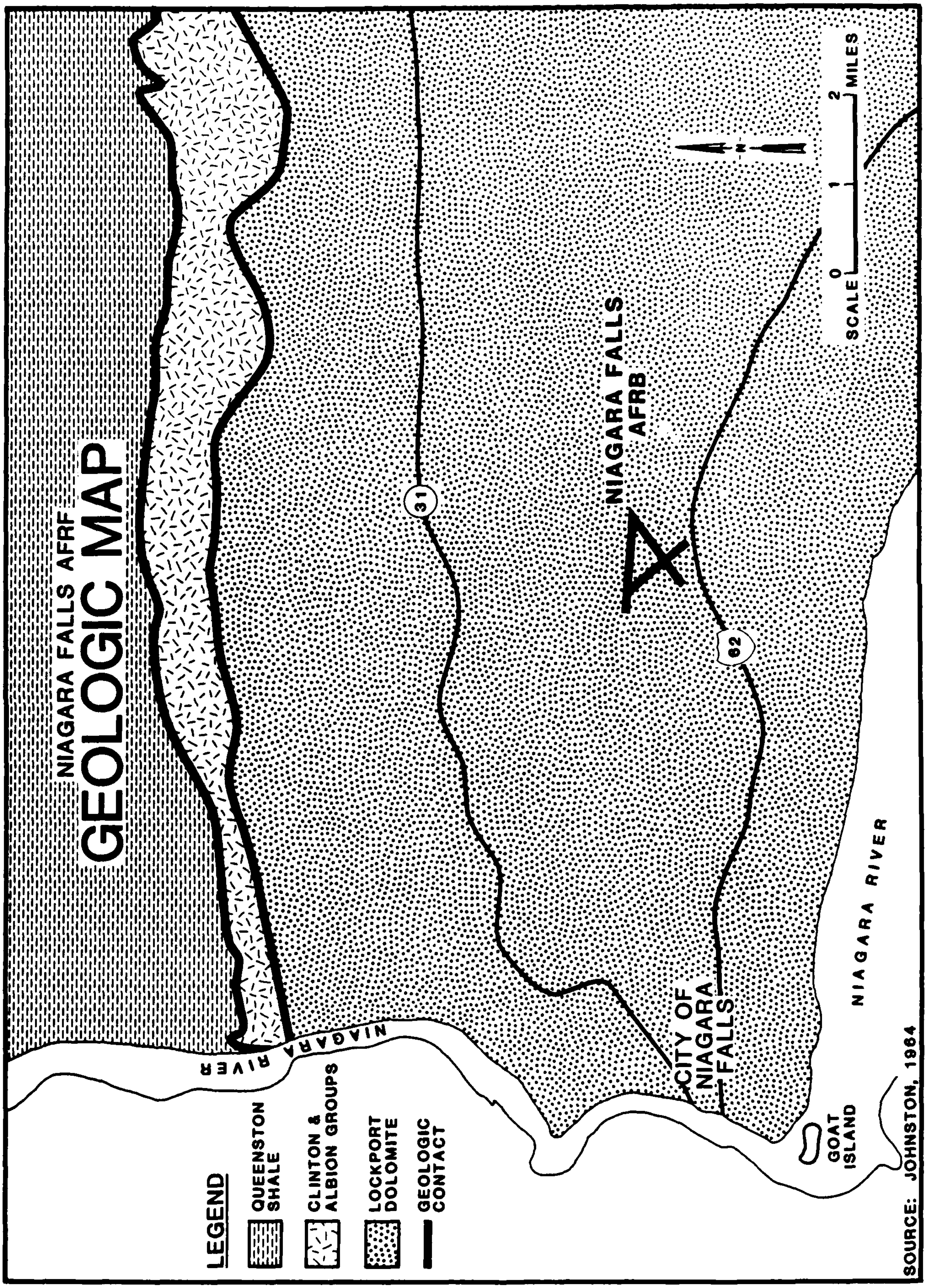
SCALE 0 500 FEET

FIGURE 3.8



NOTE: SEE FIGURE 3.6 FOR CROSS SECTION LOCATION
SOURCE: NFAFRF SOIL BORING PLAN, 1977

FIGURE 3.9



NIAGARA FALLS AFRF
GEOLOGIC MAP
LEGEND
QUEENSTON SHALE
CLINTON & ALBION GROUPS
LOCKPORT DOLOMITE
GEOLOGIC CONTACT
NIAGARA RIVER
31
NIAGARA FALLS AFRB
62
CITY OF NIAGARA FALLS
NIAGARA RIVER
GOAT ISLAND
SCALE
0
1
2
MILES
SOURCE: JOHNSTON, 1964

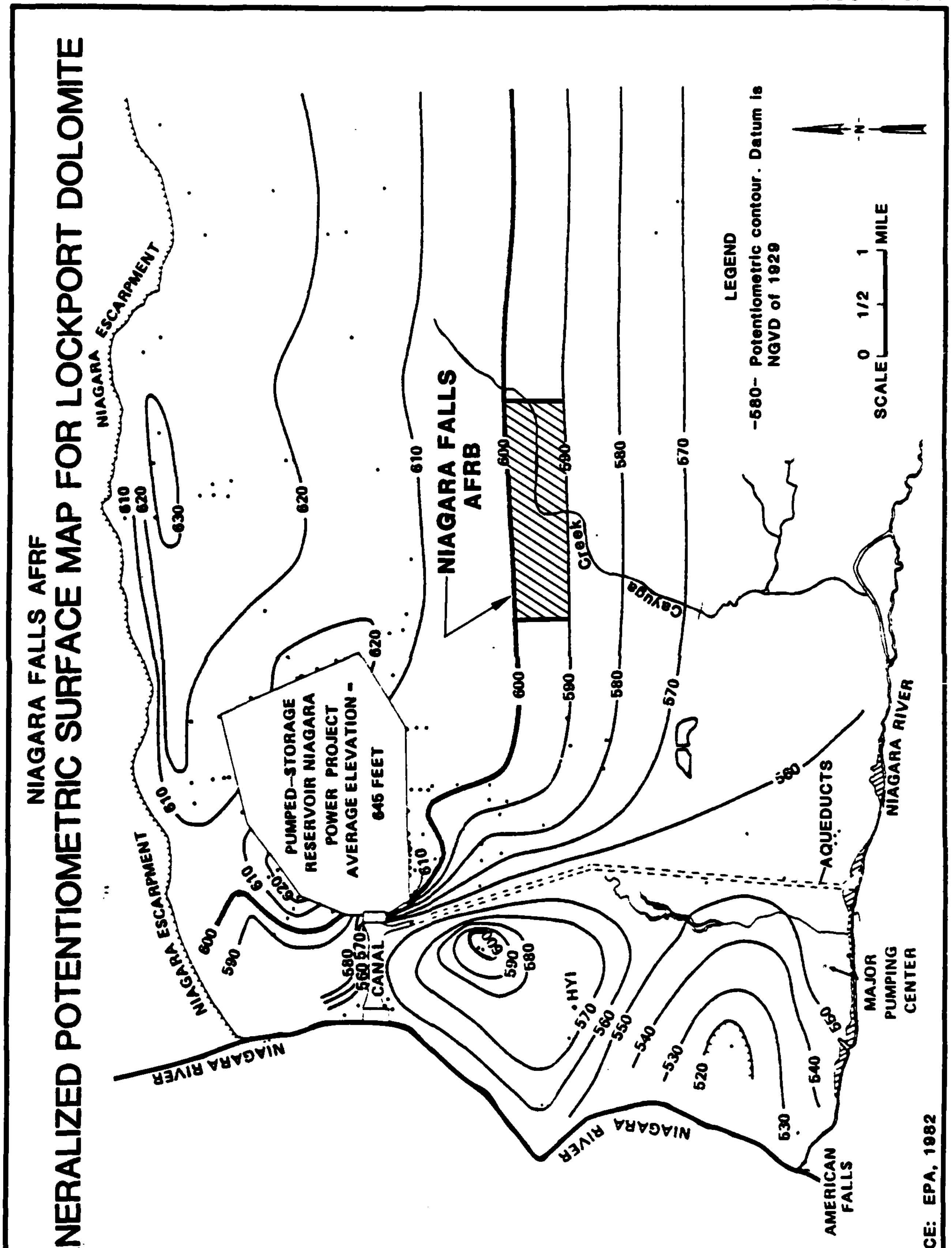
surface. The well is producing two thousand cubic feet of natural gas per day from formations below the Queenston Shale at a total well depth of 1,447 feet (Bailey, 1983).

Hydrologically, Niagara Falls AFRF is located in the recharge area for both the unconsolidated sediments and the Lockport Dolomite. Recharge to the unconsolidated sediments occurs as precipitation infiltrates directly into the permeable zones of the soil and migrates downward to the water-table aquifer within the unconsolidated sediments. Recharge to the Lockport Dolomite occurs as surface water within Cayuga Creek migrates downward through permeable zones (vertical fractures and solution cavities) within the rock. Surface water in the area is estimated to infiltrate soluble rocks in stream beds at a rate of 2 to 4 million gallons per day per mile of stream length (Kangrowitz and Snavely, 1982).

Ground-water discharge from the unconsolidated sediments in the vicinity of the installation occurs to local surface-water streams. Ground-water levels on the installation have been encountered between 2 and 6 feet below ground (NFAFRF, Soil Boring Records, 1967 and 1972). These levels in terms of an elevation are approximately 584 feet NGVD. Cayuga Creek flows through the base with water level elevations ranging approximately 580 feet NGVD. Since the ground-water elevations are higher than the surface-water elevations in a majority of Cayuga Creek, ground water would discharge into Cayuga Creek. During flood conditions reversals of flow directions would be expected. Other water-table aquifer discharge points on the installation are the spring observed near the TACAN antenna on the western side of the installation and the daily occurence of water within the dike around Bulk Fuel Tank A on the eastern side of the installation. Ground water reportedly occurs in perched water-table zones on the installation, therefore abnormally high ground-water levels (0.5 to 1 foot below ground) are possible during periods of ground saturation (Higgins and others, 1972).

Ground-water discharge from the Lockport Dolomite in the vicinity of the installation occurs in the Niagara River to the south and in the power plant aqueducts to the southwest (Johnston, 1964). Figure 3.10 is

FIGURE 3.10



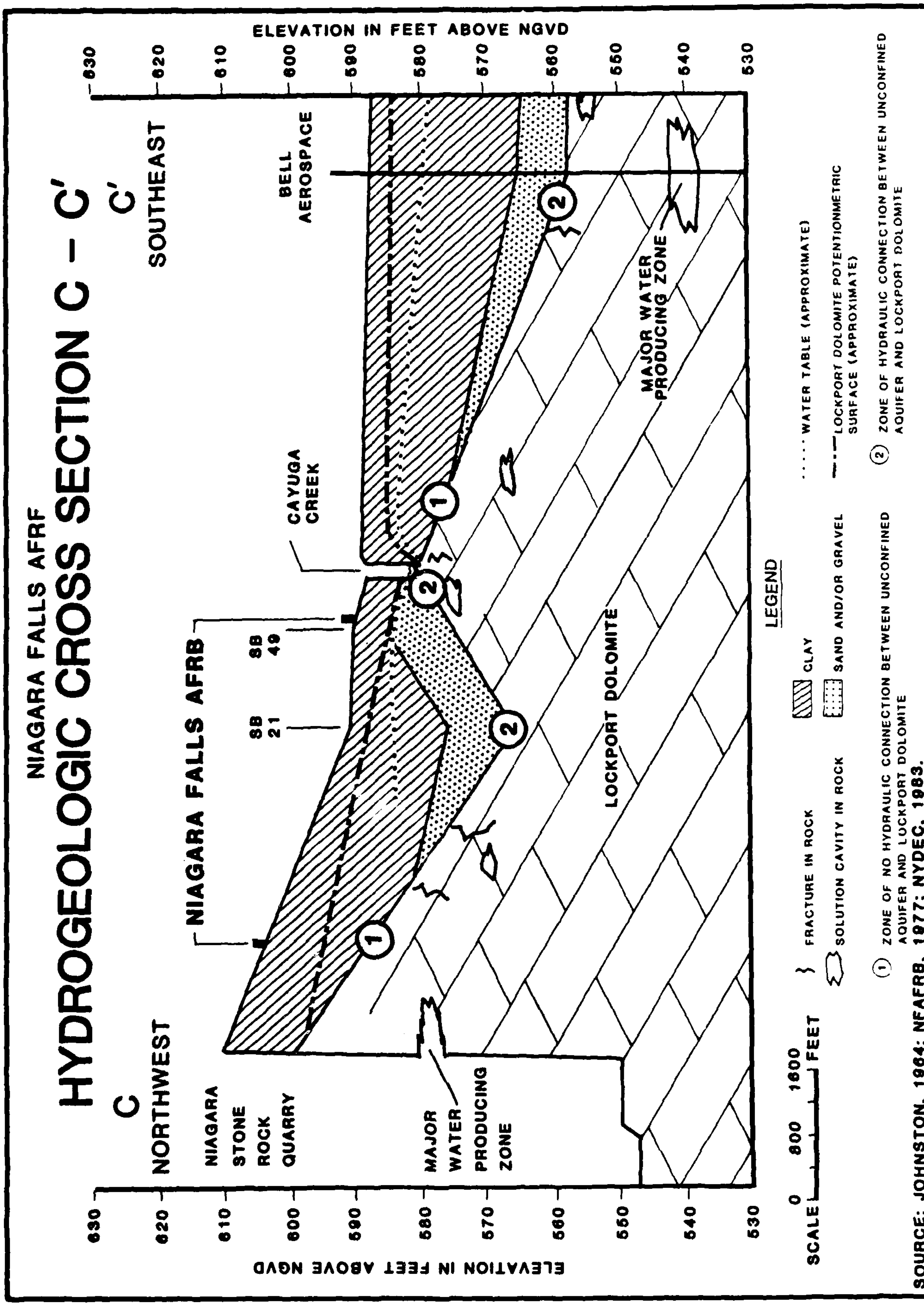
NIAGARA FALLS AFRF
GENERALIZED POTENTIOMETRIC SURFACE MAP FOR LOCKPORT DOLOMITE
NIAGARA ESCARPMENT
NIAGARA ESCARPMENT
NIAGARA FALLS AFRB
PUMPED-STORAGE RESERVOIR NIAGARA POWER PROJECT AVERAGE ELEVATION - 645 FEET
Creek
Cayuga
CANAL
AQUEDUCTS
NIAGARA RIVER
NIAGARA RIVER
NIAGARA RIVER
HYI
MAJOR PUMPING CENTER
AMERICAN FALLS
630
620
610
600
590
580
570
560
550
540
530
520
LEGEND
-580- Potentiometric contour. Datum is NGVD of 1929
SCALE 0 1/2 1 MILE
N
SOURCE: EPA, 1982

a generalized potentiometric surface map for the Lockport Dolomite. Ground-water elevations within the Lockport Dolomite in the vicinity of the installation range from 586 to 600 feet NGVD (Johnston, 1964). These elevations generally represent hydraulic heads within the upper section (top 20 feet) of the dolomite. This upper section displays hydraulic characteristics as both a water-table aquifer and an artesian aquifer (Johnston, 1964). Ground-water discharge from the dolomite to the overlying unconsolidated sediments and to Cayuga Creek may occur locally. A hydraulic connection may exist between the water-table aquifer, the upper section of the Lockport Dolomite and Cayuga Creek on the Niagara Falls AFRF. In areas on the installation north of the creek where the glacial till exists, this hydraulic connection may not exist. The glacial till reportedly acts as a confining bed in the vicinity of the installation (EPA, 1982). Figure 3.11 is a generalized hydrogeologic cross section of Niagara Falls AFRF showing the hydraulic relationships of the unconsolidated sediments and the most significant section (upper) of the Lockport Dolomite. The less significant lower sections of the Lockport Dolomite contain seven identified permeable zones related to the occurrence of bedding planes and solution cavities (Johnston, 1964). Figure 3.12 illustrates these seven zones which commonly exist as distinct artesian aquifers throughout the vicinity of the installation. The Rochester Shale acts as the lower confining bed restricting vertical ground-water movement from the Lockport Dolomite (EPA, 1982).

Ground-Water Quality

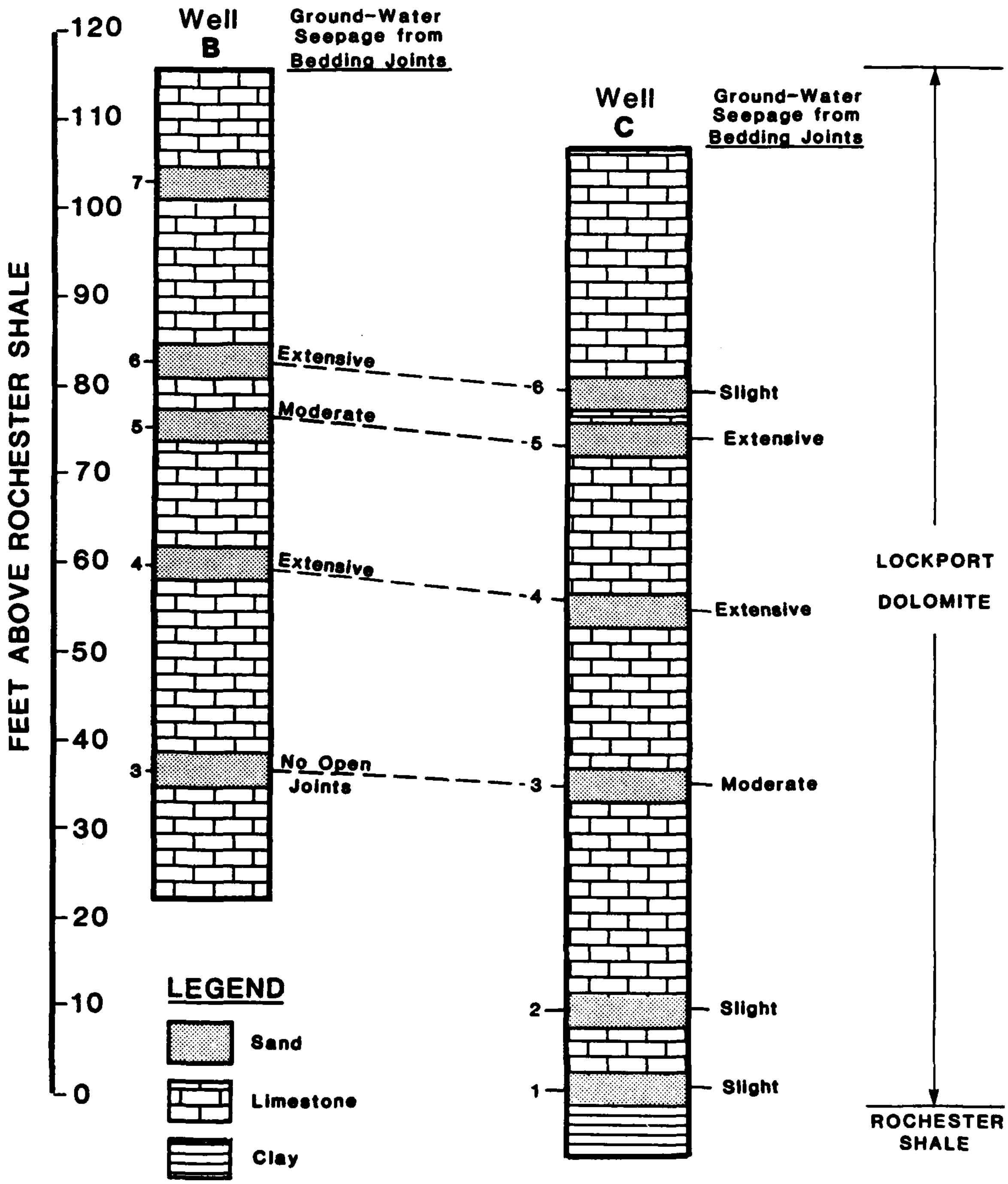
Ground-water quality in the vicinity of the installation has been investigated by EPA (1982), Johnston (1964), the Niagara County Health Department (1983) and the Niagara Falls AFRF (1983). The ground-water quality in the vicinity of the installation is generally described as poor in the unconsolidated sediments and generally good in the Lockport Dolomite. The unconsolidated sediments have been affected by past waste disposal areas in the area. Near the installation, monitor wells have been installed at Carborundum and Bell Aerospace to assess the ground-water quality within the unconsolidated sediments (Hopkins, 1983). The

FIGURE 3.11


NIAGARA FALLS AFRF
HYDROGEOLOGIC CROSS SECTION C – C′
C
NORTHWEST
C′
SOUTHEAST
ELEVATION IN FEET ABOVE NGVD
630
620
610
600
590
580
570
560
550
540
530
NIAGARA STONE ROCK QUARRY
MAJOR WATER PRODUCING ZONE
NIAGARA FALLS AFRB
SB 21
SB 49
CAYUGA CREEK
BELL AEROSPACE
LOCKPORT DOLOMITE
MAJOR WATER PRODUCING ZONE
SCALE 0 800 1600 FEET
LEGEND
FRACTURE IN ROCK
SOLUTION CAVITY IN ROCK
CLAY
SAND AND/OR GRAVEL
WATER TABLE (APPROXIMATE)
LOCKPORT DOLOMITE POTENTIONMETRIC SURFACE (APPROXIMATE)
1 ZONE OF NO HYDRAULIC CONNECTION BETWEEN UNCONFINED AQUIFER AND LOCKPORT DOLOMITE
2 ZONE OF HYDRAULIC CONNECTION BETWEEN UNCONFINED AQUIFER AND LOCKPORT DOLOMITE
SOURCE: JOHNSTON, 1964; NFAFRB, 1977; NYDEC, 1983.

NIAGARA FALLS AFRF

WATER-BEARING ZONES IN LOWER LOCKPORT DOLOMITE



NOTE: SEE FIGURE 3.13 FOR WELL LOCATIONS.
SOURCE: JOHNSTON, 1964

ground-water quality has also been effected by local septic tank and livestock pond discharges which have caused an increase in the occurrences of fecal coliform (Gwazdek, 1983). Niagara Falls AFRF has noted increases in the fecal coliform count in samples taken from Cayuga Creek and its on base tributaries (Breckenridge, 1983). These increases are probably a result of polluted ground water discharging into the creek upstream of the installation.

Ground-water quality within the Lockport Dolomite is generally described as good with hydrogen sulfide being the most objectionable constituent. The water is very hard and mineralized due to calcium, magnesium and calcium sulfate (gypsum) being dissolved by ground water moving through the rock. The lower section of the dolomite may contain brine with a dissolved-solids content greater than 35,000 parts per million (ppm). This brine reportedly was formed as the rock was formed and became trapped and isolated from the interconnecting bedding planes, fractures and solution cavities which contain better quality ground water (Johnston, 1964). Table 3.4 summarizes the ground-water quality data in the vicinity of the installation.

Ground-Water Use

Ground-water use in the vicinity of the Niagara Falls AFRF is limited to domestic and industrial uses. The domestic dug wells tapping the unconsolidated sediments are generally completed in the "washed till-top of rock" zone and are between 15 and 20 feet deep. Well yields are generally less than 100 gallons per day (gpd) (Johnston, 1964). Since the local central water system was installed in 1969, most homes within the vicinity of the installation no longer use their wells, but isolated use of dug wells may still exist (Walk, 1983). The domestic drilled wells tapping the Lockport Dolomite are generally completed within the upper section of the rock and range from 30 to 100 feet deep (Fittante, 1983). The average yield of wells tapping the upper section of the dolomite is 31 gallons per minute (gpm) while the average yield of wells tapping the lower section is 7 gpm (Johnston, 1964). Three wells drilled into rock on the Bell Aerospace property reportedly yielded water at rates of 60, 75 and 100 gpm. All three wells were 50

TABLE 3.4
GROUND-WATER QUALITY DATA FOR NIAGARA FALLS
AFRF AND VICINITY

Well ID	Date Sampled	Depth (ft)	pH	Specific Conductance (micromhos/cm at 25°C)	Total Dissolved Solids (residue at 180°C)	Chloride (Cl) (ppm)	Iron (Fe) (ppm)	Sulfate (SO_4) (ppm)	Hardness (as $CaCO_3$) (ppm)
3059003	2/27/40	31	7.0	--	3,230	1,000	16	1,140	2,180
3088594	8/23/60	100	--	758	--	18	--	--	--

NOTES:

ppm = parts per million
-- = not tested
Locations are shown on Figure 3.13

Source: Johnston, 1964

feet deep and the major water-bearing zones were 40 feet below ground (Frey, 1983).

The industrial use of ground water from the Lockport Dolomite is limited in the vicinity of the installation. One well located at the Carborundum Process Equipment Division Plant northwest of the installation is used for cooling water (Walk, 1983). Other industrial users are located along the Niagara River in the City of Niagara Falls. Wells near the Niagara River reportedly yield as much as 2,000 gpm due to infiltration of water from the Niagara River (Johnston, 1964).

A list of both dug and drilled wells identified within three miles of the installation are listed in Table 3.5. The well locations are shown in Figure 3.13.

BIOTIC ENVIRONMENT

The biotic environment of Niagara Falls AFRF includes typical plant and animal species found in western New York state. Typical plant species on base include shrubs such as Blue Pfitzer Juniper, Pyramidal Yew and Spreader Yew and trees such as Colorado Blue Spruce, Scotch Pine, Green Ash and Lombardy Popular. Typical animal species found on the installation include snow owls, hawks, field mice, rabbits, pheasants, song birds and sea gulls. Migratory birds occasionally found on the installation are ducks, Bald Eagles and Ospreys (NFAFRB, TAB A-1, 1977). The Bald Eagle is an endangered species and the Osprey is a threatened species but neither are permanent residents of the installation (Snider, 1983).

SUMMARY OF ENVIRONMENTAL SETTING

The environmental setting data for Niagara Falls AFRF indicate the following data are important when evaluating past hazardous waste disposal practices.

1. The mean annual precipitation is 35.58 inches; the net precipitation is +8.6 inches and the one-year 24-hour precipitation is two inches. These data indicate an abundance of rainfall in

TABLE 3.5
WATER WELL DATA FOR NIAGARA FALLS AFRF AND VICINITY

Well ID	Owner &/or Location	Depth (feet) Well	Depth (feet) Casing	Hydrogeologic Unit(s) Tapped By Well	Water Level (feet) Below Land Surface	Water Level (feet) Date mm/dd/yr	Water Level (feet) Approximate Elevation Above NGVD	Use
3048571	Wendt Dairy	35	22	Sl	--	--	--	U
3058551	N. Moll	25	--	Sl	7.4	10/20/60	562.6	U
3058552	N. Moll	20	18	Qsg and Sl	11.1	10/20/60	558.9	U
3059003	Union Carbide Chemical Co.	100	6	Sl	28	1940	549.0	A
3068531	E. Lass	49	40	Sl	6.3	10/26/60	573.7	D
3068541	R. Jaeger	19	--	Qsg	--	--	--	D
3068591	C.Swearengen	28	--	Sl	12.1	8/8/60	595.9	U
3068592	W. Mick	49	--	Sl	34.6	8/8/60	589.4	U
3068593	L.Toni	31	--	Sl	13.9	6/2/61	591.1	D
3068594	Haggerty	40	--	Sl	28.4	10/5/60	576.6	U
3078591	--	75	12	Sl	10.3	11/15/62	602.7	O
3078593	W. Lozan	31	15	Sl	12.5	8/8/60	607.5	U
3078594	J. Patterson	34	--	Sl	34.0	8/7/60	575.0	U
3079006	A.W. Nuzum	55	10	Sl	12.3	6/2/61	589.7	C
3079007	E. Schul	25	--	Sl	15.8	8/8/60	584.2	U
3079008	Military Road School	45	--	Sl	14.8	6/2/61	596.2	I
3079009	L. Cora	26	--	Sl	17.4	6/2/61	583.6	U
3088541	W. Kroening	38	--	Sl	23.1	10/27/60	606.9	S
3088561	N. Hasley	38	--	Sl	27.9	10/27/60	612.1	D
3088571	F. Scholefield	38	--	Sl	13.4	8/7/60	616.6	U
3088572	A. Wittcapp	34	--	Sl	25.6	10/27/60	614.4	D
3088581	Colonial Village School	37	11	Sl	20.8	8/8/60	608.2	U
3088582	E. Heath	44	--	Sl	25.1	8/7/60	612.9	D
3088583	W. Holland	49	--	Sl	12.0	8/8/60	617.0	D
3088584	P. Wagner	33	13	Sl	16.5	11/2/61	613.5	D
3088585	NMPC	45	6	Sl	13.4	11/15/62	620.6	O
3088586	PASNY	61	10	Sl	1.0	11/15/62	620.0	PR
3088587	PASNY	61	10	Sl	2.6	11/15/62	620.4	PR
3088591	NMPC	65	11	Sl	20.0	11/15/62	586.0	O
3088593	NMPC	16	12	Sl	4.1	11/15/62	602.9	O
3088594	NMPC	100	16	Sl	8.4	11/15/62	602.6	O
3088595	NMPC	16	14	Qti	8.3	10/30/62	602.7	O
3088596	NMPC	68	19	Sl	11.7	11/15/62	602.3	O
3088598	PASNY	98	21	Sl	6.5	11/15/62	603.5	O
3088599	PASNY	11	8	Qti	9.8	10/30/62	600.2	O
30885910	--	100	12	Sl	6.0	11/15/62	604.0	O
30885911	--	74	15	Sl	7.7	11/15/62	604.3	O
30885913	J. Williams	24	22	Sl	15.8	8/8/60	597.2	D
B	Corps of Engineers	268	--	Sl, Sr, Sc, Sa	--	--	--	GO
C	Corps of Engineers	238	--	Sl, Sr, Sc, Sa	--	--	--	GO
D1	--	--	--	Sl	--	--	--	D
D2	--	--	--	Sl	--	--	--	D
D3	--	--	--	Sl	--	--	--	D
D4	--	--	--	Sl	--	--	--	D
2897	William Beutel & Sons	1,447	--	--	--	--	--	NG
	Love Canal Area (147 Wells)	--	--	Qd and Sl	--	--	--	O
C1	Carborundum Process Equipment Div. Plant	35	--	Sl	--	--	--	I
	Carborundum Walmore Road Plant (5 Wells)	--	--	Qd	--	--	--	O
	Bell Aerospace Plant (9 Wells)	--	--	Qd and Sl	--	--	--	O

NOTES:

OWNER and/or Location
NMPC = Niagara Mohawk Power Corporation
PASNY = Power Authority of the state of New York

Hydrogeologic Unit(s) Tapped By Well
Qd = Pleistocene deposits, undifferentiated
Qsg = Pleistocene sand and gravel
Qt = Pleistocene glacial till
Sa = Albion Group
Sc = Clinton Group
Sl = Lockport Solomite
Sr = Rochester Shale

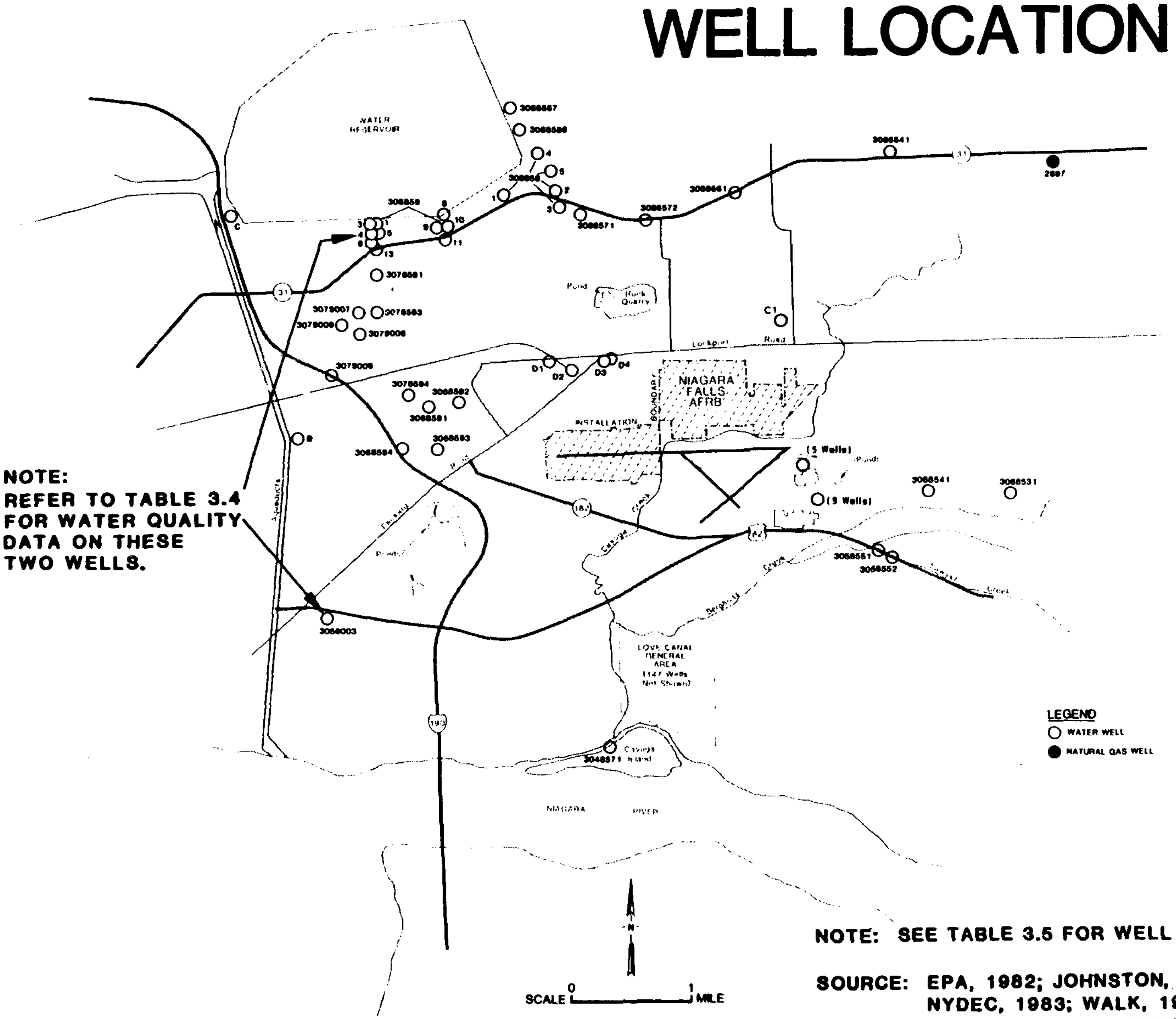
Use
A = Abandoned
C = Commercial
D = Domestic
GO = Geological Observation
I = Industrial
NG = Natural Gas
O = Observation
PR = Pressure Relief
U = Unused

Source: Johnston, 1967; EPA, 1982; Bailey, 1983; NYDEC, 1983; Walk, 1983; Town of Niagara, 1983.

FIGURE 3.13

NIAGARA FALLS AFRF

WELL LOCATION MAP



NOTE:
REFER TO TABLE 3.4
FOR WATER QUALITY
DATA ON THESE
TWO WELLS.

NOTE: SEE TABLE 3.5 FOR WELL DATA

SOURCE: EPA, 1982; JOHNSTON, 1964; BAILEY, 1983
NYDEC, 1983; WALK, 1983: TOWN OF NIAGARA, 1983

excess of evaporation plus a potential for storms to create excessive runoff.

2. The soils on the installation are typically silty clay loam with low permeabilities and are poorly drained. In areas where the natural soils have been disturbed and/or removed as in landfills, the soil texture and permeability would be altered. Sand and gravel deposits exist just north of Cayuga Creek and exhibit relatively high permeabilities. Ground-water levels are as high as two feet below ground. These data indicate high water tables within relatively impermeable soils underlie most of the installation, but permeable sand and gravel is present in local areas.

3. The top of the glacial till, a confining bed above the Lockport Dolomite, occurs over most of the installation at depths ranging from 10 to 20 feet below ground. This fact indicates that and contaminated ground water will normally discharge into Cayuga Creek, its tributaries or local springs.

4. The Lockport Dolomite, the major aquifer in the area, outcrops in the stream bed of Cayuga Creek. Vertical fractures and solution cavities may be present in the stream bed. Within the upper 40 feet of the dolomite relatively high permeabilities are common and interconnecting bedding planes are reportedly significant horizontal transmissive zones.

5. The lower zone of the Lockport Dolomite contains distinct permeable zones related to the occurrence of bedding planes. These bedding planes are not normally interconnected nor is the upper section of the dolomite normally hydraulically connected to the lower section. The Rochester Shale underlies the Lockport Dolomite and acts as a lower confining bed.

6. Niagara Falls AFRF lies within the drainage basin of the Niagara River which is a source of drinking water for the City of Niagara Falls.

7. There are no threatened or endangered species in permanent residence on Niagara Falls AFRF.

SECTION 4

FINDINGS

To assess past hazardous waste management at the Air Force Reserve Facility at Niagara Falls International Airport (NFIA), past activities of waste generation and disposal methods were reviewed. This section summarizes the hazardous waste generated by activity; describes waste disposal methods; identifies the disposal sites located on the base; and evaluates the potential for environmental contamination.

PAST SHOP AND INSTALLATION ACTIVITY REVIEW

A review was conducted of current and past waste generation and disposal methods at Niagara Falls AFRF with the objective of identifying those installation activities that generated hazardous waste. This review consisted of a search of files and records, interviews with installation employees, and site inspection.

The source of most hazardous wastes at Niagara Falls AFRF can be associated with any of the activities listed below:

- Industrial Shops
- Fire Protection Training
- Pesticide Utilization
- Waste Storage
- Fuels Management

The following discussion addresses only those wastes generated on installation which are either hazardous or potentially hazardous. Hazardous wastes are those wastes referenced by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, Public Law 96-510) or by New York State regulations concerning hazardous waste. A potentially hazardous waste is one which is suspected of being hazardous although insufficient data are available to fully characterize the waste material.

INDUSTRIAL OPERATIONS (SHOPS)

Since the Niagara Falls AFRF opened in 1952, the main function of the industrial operations (shops) on the installation has been to provide maintenance support activities to aircraft flying missions. Activities have included aircraft equipment maintenance, ground equipment maintenance, and installation facilities maintenance. A list of present industrial shops was obtained from the installation clinic files. Information contained in the files indicated those shops which generate hazardous waste and/or handle hazardous materials. A summary review of the shop files is presented in Appendix E, master list of industrial shops.

For the shops known to generate hazardous wastes, interviews with personnel familiar with shop activities were conducted. The information obtained from interviews and installation records has been summarized in Table 4.1. For each generator of hazardous wastes, this table presents the shop location, waste materials generated, quantities of wastes generated, and a disposal method timeline. Many of the disposal methods were identified from information obtained from past and present personnel of Niagara Falls AFRF. The waste quantities shown in Table 4.1 are based on verbal estimates given by present shop personnel at the time of the interviews. The shops that have generated insignificant quantities or no hazardous waste are not listed in Table 4.1.

From the time operations began at Niagara Falls AFRF (1952) until the late 1970's, combustible liquid wastes generated at the various facilities throughout the installation were usually burned for fire training exercises or sold to off-installation contractors. During this time frame, liquid wastes were mixed indiscriminately in "slop" tanks and drums. Since 1979, wastes have been segregated into numerous individual drums. From 1952 to 1970, liquid wastes were primarily drummed

TABLE 4.1

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 – 1960 – 1970 – 1980)
914th TACTICAL AIRLIFT GROUP				
CORROSION CONTROL	400	MEK	1 GAL. /MO.	DM ----- DS
		THINNERS & PAINT SLUDGES	10 GALS. /MO.	DM ----- DS
FUEL DISTRIBUTION/LAB	421/460	ETHER	1 GAL. /MO.	DM ----- DS
		ISOPROPYL ALCOHOL	1 GAL. /MO.	DM ----- DS
		TRICHLOROETHYLENE	<1 GAL. /MO.	DM ----- DS
		CONTAMINATED JP-4	20 GALS. /MO.	1955 FTF 1; 1960 FTF 1 AND FTF 2; 1962 FTF 3
HEATING PLANT	506	SODIUM HYDROXIDE	10 LBS. /MO.	1952 SANITARY SEWER
		SODIUM SULFITE	5 LBS. /MO.	SANITARY SEWER
		BLOWDOWN	1500 LBS. /MO.	SANITARY SEWER
ROADS & GROUNDS	612/626	PD-680	4 GALS. /MO.	DM ----- 1979 DS
		DEICING FLUID (ETHYLENE GLYCOL)	<5 GALS. /MO.	DM ----- DS
		WASTE PESTICIDE CONTAINERS	<8 CANS/YR.	GENERAL REFUSE

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FTF - Fire Training Facility
DM - Drum, Mixed Contents, to Contractor
DS - Drum, Segregated Waste, to Contractor
GAFB - Drum, to DPDO at Griffiss AFB

AGE - Recycled to use in AGE Shop
TM - Underground Tank, Mixed Contents, to Contractor or FTF
KAFB to DPDO at Kelly AFB

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL (1950 – 1960 – 1970 – 1980)
914th TACTICAL AIRLIFT GROUP (cont'd)				
VEHICLE MAINTENANCE	680	DENATURED ALCOHOL	5 GAL. /MO.	SANITARY SEWER
		PD-680	40 GALS. /MO.	DM; 1979 DS
		TRICHLOROETHANE	<6 GALS. /YR.	DM; DS
		ETHYLENE GLYCOL	15 GALS. /MO.	DM; DS
		WASTE OIL	50 GALS. /MO.	DM AND FTF 1 AND FTF 3; DS
AGE SHOP	706	PD-680	10 GALS. /MO.	DM; 1971 TM; DS
		WASTE OIL	50 GALS. /MO.	DM; TM; DS
		HYDRAULIC FLUIDS	30 GALS. /MO.	DM; TM; DS
		DENATURED ALCOHOL	1 GAL. /MO.	DM; TM; DS
ENGINE SHOP	706	PD-680	55 GALS. /MO.	1952 DM; 1971 TM; 1979 DS
		CONTAMINATED JP-4	40 GALS. /MO.	1955 FTF 1; 1960; 1962 FTF 1 AND FTF 2 FTF 3 AND AGE
		HYDRAULIC FLUID	110 GALS. /MO.	DM AND FTF 1 and FTF 3; 1971 TM; 1979 DS
		ETHYL ALCOHOL	10 GALS. /MO.	STORM SEWER

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FTF - Fire Training Facility
DM - Drum, Mixed Contents, to Contractor
DS - Drum, Segregated Waste, to Contractor
GAFB - Drum, to DPDO at Griffiss AFB
AGE - Recycled to use in AGE Shop
TM - Underground Tank, Mixed Contents, to Contractor or FTF
KAFB - to DPDO at Kelly AFB

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
914th TACTICAL AIRLIFT GROUP (cont'd)				
PROPELLER SHOP	706	PD-680	1 GAL. /MO.	DM - - - 1971 TM 1979 DS
		TOLUENE	<1 GAL. /MO.	DM - - - TM - DS
		MEK	<1 GAL. /MO.	DM - - - TM - DS
		PROPELLER OIL	40 GALS. /MO.	DM - - - TM - DS
		HYDRAULIC FLUID	6 GALS. /MO.	DM - - - TM - DS
CLINIC	802	PHOTOCHEMICALS	<1 GAL. /MO.	SANITARY SEWER - - - 1977 GAFB
MISSILE MAINTENANCE	820	PHOTOCHEMICALS	10 GALS. /MO.	1952 SANITARY SEWER - - - 1977 GAFB
		HYDRAULIC SYSTEM FILTERS	2 FILTERS/MO.	GENERAL REFUSE
		HYDRAULIC FLUID	10 GALS. /MO.	DM - - - 1979 DS
AVIONICS SHOP		LOW LEVEL RADIOACTIVE ELECTRON TUBES	<10 TUBES /YEAR	GENERAL REFUSE 1973 KAFB
BATTERY SHOP	850	WASTE BATTERY ACID	2 GALS. /MO.	NEUTRALIZED/TO SANITARY SEWER
HYDRAULIC SHOP	850	MEK	1 GAL. /MO.	DM - - - 1979 DS
	850	PD 680	50 GALS. /MO.	DM - - - DS
		HYDRAULIC FLUID	5 GALS. /MO.	DM - - - DS

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FTF	Fire Training Facility	AGE	Recycled to use in AGE Shop
DM	Drum, Mixed Contents, to Contractor	TM	Underground Tank, Mixed Contents, to Contractor or FTF
DS	Drum, Segregated Waste, to Contractor		
GAFB	Drum, to DPDO at Griffiss AFB	KAFB	to DPDO at Kelly AFB

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
914th TACTICAL AIRLIFT GROUP (cont'd)				
PHASE DOCK	850	ALKALINE SOAP	55 GALS./MO.	1952 SANITARY SEWER
		PD-680	20 GALS./MO.	DM; 1979 DS
		TRICHLOROETHANE	<1 GAL./MO.	DM; DS
		PAINTS & THINNERS	19 GALS./MO.	DM; DS
SHEET METAL SHOP	850	EMPTY PAINT CANS	10 CANS/MO.	GENERAL REFUSE
		MEK	1 GAL./MO.	DM; 1979 DS
		PAINT STRIPPER	<1 GAL./MO.	DM; DS
REPAIR AND RECLAMATION SHOP	850	PD-680	10 GALS./MO.	DM; DS
		MEK	<1 GALS./MO.	DM; DS
		EMPTY PAINT CANS	2 CANS/MO.	GENERAL REFUSE
NEW YORK AIR NATIONAL GUARD				
ROADS & GROUNDS	202	PD 680	<1 GAL./MO.	1952 SANITARY SEWER
		WASTE ENGINE OIL	<5 GALS./MO.	DS

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FTF - Fire Training Facility
DM - Drum, Mixed Contents, to Contractor
DS - Drum, Segregated Waste, to Contractor
GAFB - Drum, to DPDO at Griffiss AFB

AGE - Recycled to use in AGE Shop
TM - Underground Tank, Mixed Contents, to Contractor or FTF
KAFB to DPDO at Kelly AFB

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
NEW YORK AIR NATIONAL GUARD (cont'd)				
ENGINE SHOP	204	PD-680	10 GALS./MO.	DM, 1979 DS
		WASTE ENGINE & LUBE OIL	20 GALS./MO.	DM, DS
AGE SHOP	207	PD-680	20 GALS./MO.	DM, 1971 TM, DS
		WASTE OIL	30 GALS./MO.	DM, TM, DS
		SOLVENTS	5 GALS./MO.	DM, TM, DS
AIRCRAFT ORDNANCE SYSTEMS	816	PD-680	2 GALS./MO.	DM, 1979 DS
		EMPTY PAINT CANS	1 CAN/MO.	GENERAL REFUSE
PHOTO LABORATORY	901	PHOTOCHEMICALS	10 GALS./MO.	SANITARY SEWER, 1977 GAFB
		ACETIC ACID	6 GALS./MO.	SANITARY SEWER
SECURITY POLICE	901	EMPTY PAINT CANS	1 CAN/MO.	GENERAL REFUSE
BATTERY SHOP	902	OLD BATTERIES	1 BATT./MO.	CONTRACTOR
		BATTERY ACID	10 GALS./MO.	NEUTRALIZED/TO SANITARY SEWER
FUEL SYSTEMS	902	CONTAMINATED JP-4	30 GALS./MO.	1955 FTF 1, 1960 FTF 1 AND FTF 2, 1962 FTF 3 AND AGE

KEY

——— CONFIRMED TIME-FRAME DATA BY SHOP PERSONNEL

- - - - - ESTIMATED TIME-FRAME DATA BY SHOP PERSONNEL

FTF - Fire Training Facility
DM - Drum, Mixed Contents, to Contractor
DS - Drum, Segregated Waste, to Contractor
GAFB - Drum, to DPDO at Griffiss AFB
AGE Recycled to use in AGE Shop
TM Underground Tank, Mixed Contents, to Contractor or FTF
KAFB - to DPDO at Kelly AFB

TABLE 4.1 (cont'd)

INDUSTRIAL OPERATIONS (Shops)

Waste Management

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL 1950 1960 1970 1980
NEW YORK AIR NATIONAL GUARD (cont'd)				
FUEL SYSTEMS (CONT'D)		WASTE OIL	30 GALS./MO.	DM 1971 TM 1979 DS
		PAINT REMOVER & SOLVENTS	10 GALS./MO.	DM TM DS
HYDRAULIC SHOP	902	WASTE FILTERS	2 FILTERS/MO.	1952 GENERAL REFUSE
		HYDRAULIC FLUID	20 GALS./MO.	DM 1971 TM 1979 DS
MARS/FUEL SYSTEMS	902	CONTAMINATED JP-4	10 GALS./MO.	FTF 1 FTF 1 AND FTF 2 FTF 3 AND AGE
		WASTE SOLVENTS	10 GALS./MO.	DM 1971 TM 1979 DS
METALS PROCESSING	902	PD-680	10 GALS./MO.	DM TM DS
TIRE SHOP	902	PD-680	20 GALS./MO.	DM TM DS
		EMPTY PAINT CANS	5 CANS/MO.	GENERAL REFUSE
VEHICLE MAINTENANCE	906	WASTE ENGINE OIL	55 GALS./MO.	DM 1979 DS
		PD-680	30 GALS./MO.	DM DS
		PAINTS AND THINNERS	5 GALS./MO.	DM DS

KEY

——— CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL

- - - - - - ESTIMATED TIME FRAME DATA BY SHOP PERSONNEL

FTF Fire Training Facility
DM - Drum, Mixed Contents, to Contractor
DS - Drum, Segregated Waste, to Contractor
GAFB - Drum, to DPDO at Griffiss AFB

AGE Recycled to use in AGE Shop
TM Underground Tank, Mixed Contents, to Contractor or FTF
KAFB to DPDO at Kelly AFB

prior to disposal. In 1971, three underground fuel tanks were taken out of service and used as slop tanks by shops operating in adjacent facilities (Bldg. 207, 706, and 905). These tanks were pumped out and drums removed intermittently both by contractors (for waste purchase) and the installation fire department (for training fires).

Solid waste generated by shop operations,along with the rest of the base's general rubbish, was disposed of in the installation landfill from 1952 through the late 1960's. Since then general refuse has been removed from the installation by a contract-disposal company.

Fire Training

Since 1955, fire training exercises have been conducted at three locations on Air Force property at Niagara Falls AFRF (Figure 4.1). Prior to 1955, exercises were conducted off the installation, at the Bell Aerospace plant.

Fire Training Facility No. 1

From approximately 1955 to the early 1960's, the installation fire department conducted fire training exercises in an area immediately east of the fire station (old bldg. 716). The burn pit was probably constructed with an earth berm around it, but this has not been confirmed. Contaminated fuel (AVGAS) and other combustible liquids were burned here. No visual evidence of the site was present during the site visit.

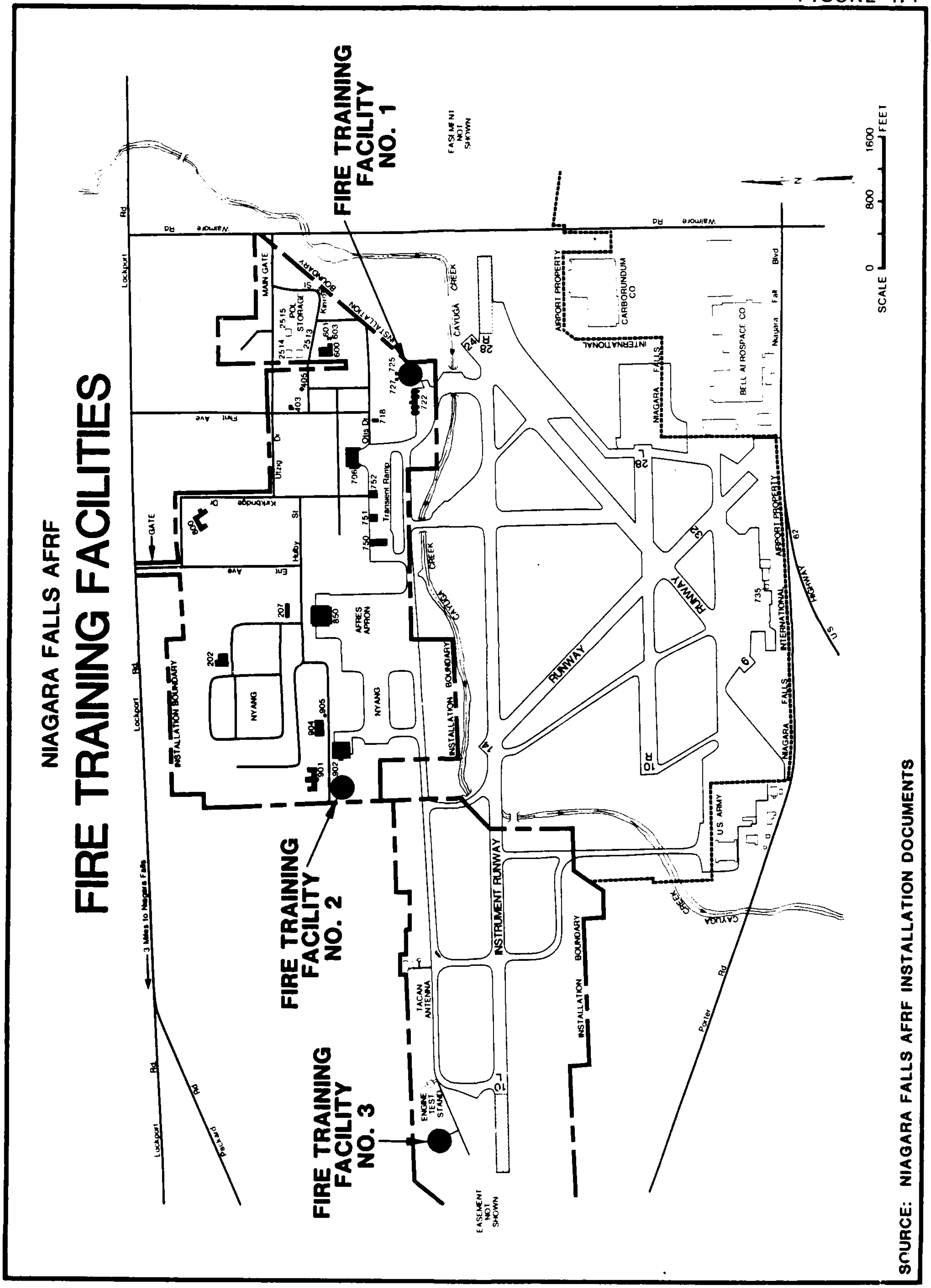
Fire Training Facility No. 2

For about a one-year period during the late 1950's, a second fire training facility was used concurrently with the first facility discussed above. It was an abandoned, stone farmhouse located in the area of present Bldgs. 900 and 902. No precautions were taken here to contain the fuel for the fire prior to burning. The site was probably only used a total of ten times. No visual evidence of the site was observed during the site visit.

Fire Training Facility No. 3

From the early 1960's to the present, the Fire Department has used an area located just north of the west end of the instrument runway for its fire training exercises (see Appendix F for pictures). One large oval pit was constructed with a low earth berm surrounding it. Since

FIGURE 4.1



SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

1979, only JP-4 has been burned in the facility, but prior to that point in time, it is probable that other combustible materials (oils, solvents, etc.) were burned along with the jet fuel. An average of twenty to thirty fire training exercises are performed yearly. Less than 500 gallons of fuel is used per fire. A tank truck transports fuel to the facility's fuel storage tank. This above-ground tank stands on an earthen area, with an earth berm. Fire fighting agents used include aqueous film forming foam (AFFF) and dry chemicals. Standing water was evident in both the tank and the training pits during the site visit.

Pesticide Utilization

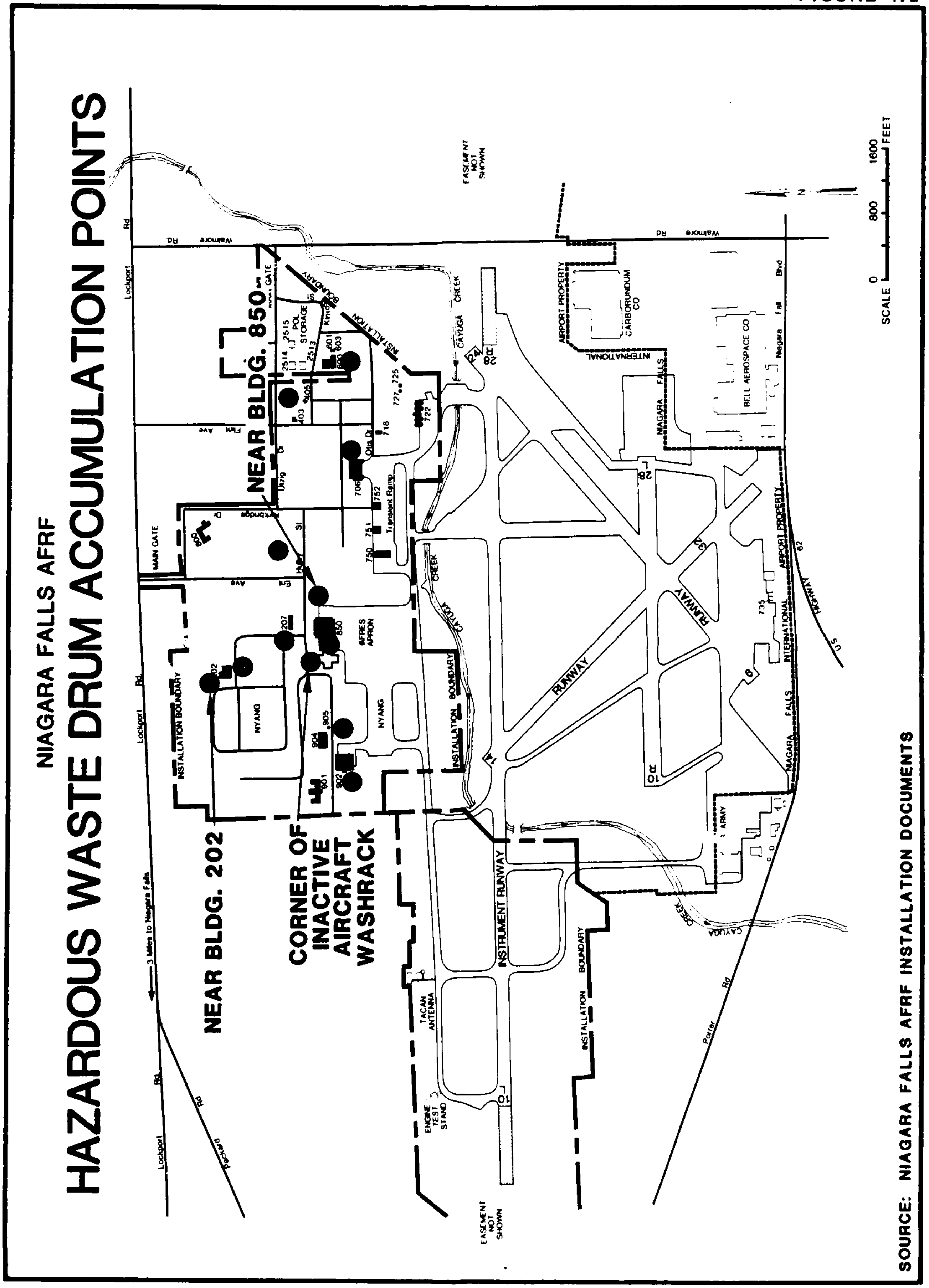
Pesticide applications have been conducted on the installation throughout its history. Currently, shop personnel apply 2, 4-D (an amine herbicide) annually throughout the installation for general weed control. Previously, the herbicide HyvarX was used. Intermittently throughout the year, Roundup® is used for specific weed control situations. All of the pesticide material prepared is used up in the application process. Containers are rinsed with water and disposed of as general refuse.

Waste Storage Areas

Waste chemicals and used oils have been stored in several areas throughout the base. In most cases, the wastes have been accumulated at the site of generation until removed to a central storage area. From the 1950's to the early 1960's drums of hazardous waste from the hangar at Bldg. 850 were stored in an outside area just east of the hangar (see Figure 4.2). There were no reports of significant spills in the area and no visual evidence of the environmental stress was observed during the site visit.

In 1971, when the POL hydrant system was taken out of service, one of the underground tanks located at the AFRES transient ramp was converted into a "slop" tank for storage of flammable liquid wastes from the hangar at Bldg. 706 (see Figure 4.3). This practice continued through 1978. The 5000 gallon tank was intermittently pumped out by both a contractor and the fire department. A 500 gallon underground

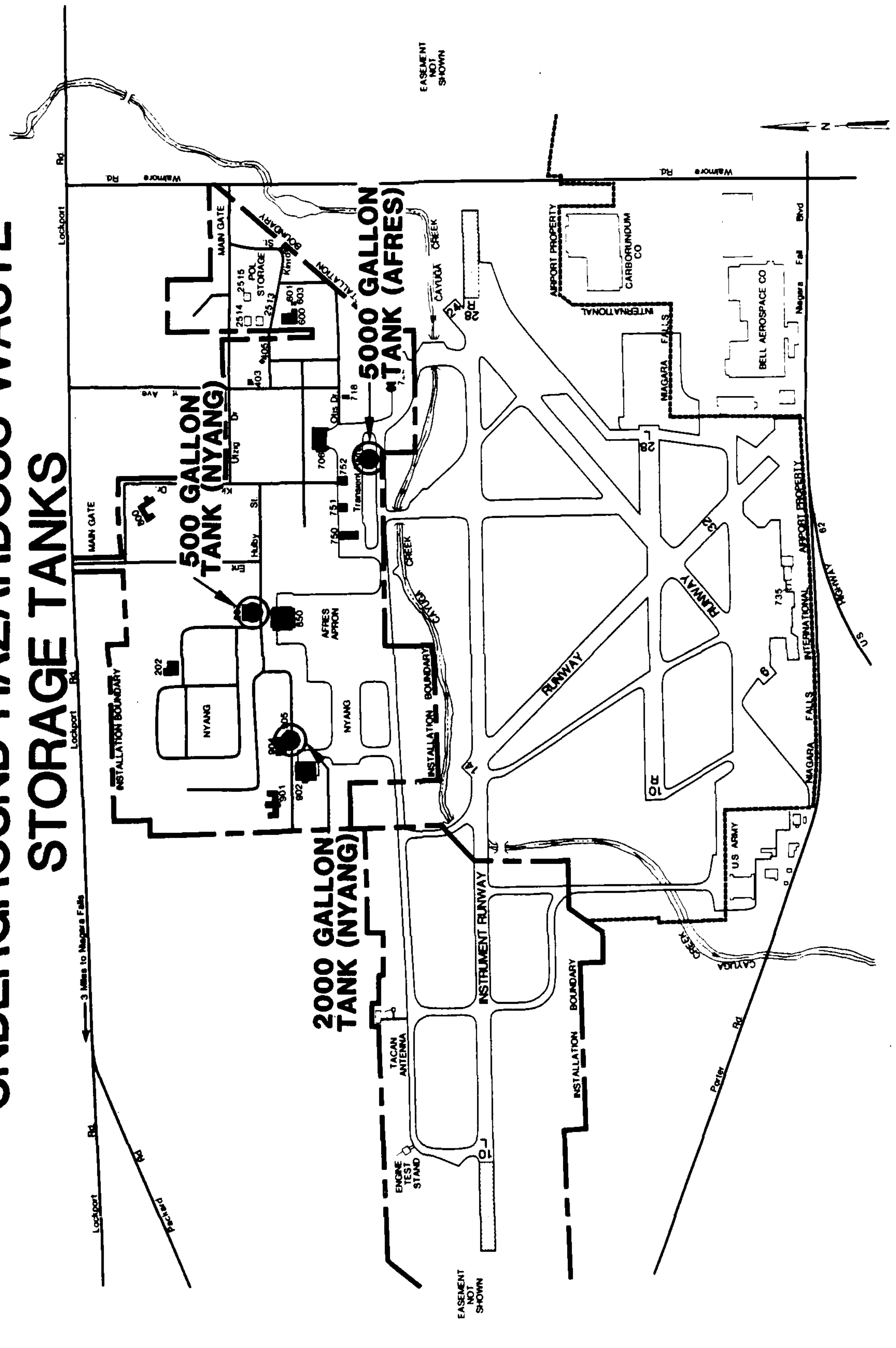
FIGURE 4.2



NIAGARA FALLS AFRF
HAZARDOUS WASTE DRUM ACCUMULATION POINTS
NEAR BLDG. 850
NEAR BLDG. 202
CORNER OF INACTIVE AIRCRAFT WASHRACK
MAIN GATE
INSTALLATION BOUNDARY
NYANG
AFRES APRON
Transient Ramp
POL STORAGE
CAYUGA CREEK
RUNWAY
INSTRUMENT RUNWAY
TACAN ANTENNA
ENGINE TEST STAND
EASEMENT NOT SHOWN
AIRPORT PROPERTY
CARBORUNDUM CO
BELL AEROSPACE CO
NIAGARA FALLS INTERNATIONAL AIRPORT PROPERTY
ARMY
Lockport Rd
Walmore Rd
Porter Rd
Packard Rd
Niagara Falls Blvd
US HIGHWAY 62
3 Miles to Niagara Falls
SCALE
0 800 1600 FEET
N
SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

FIGURE 4.3

NIAGARA FALLS AFRF
UNDERGROUND HAZARDOUS WASTE STORAGE TANKS



SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

tank outside Bldg. 207 (see Figure 4.3) was also used for "slop" waste storage during this period of time.

The 2000 gallon underground tank located near Bldg.'s 905 & 902 was used for MOGAS storage until the early 1970's when it became a "slop" tank for liquid hazardous waste from the NYANG hangar (see Figure 4.3).

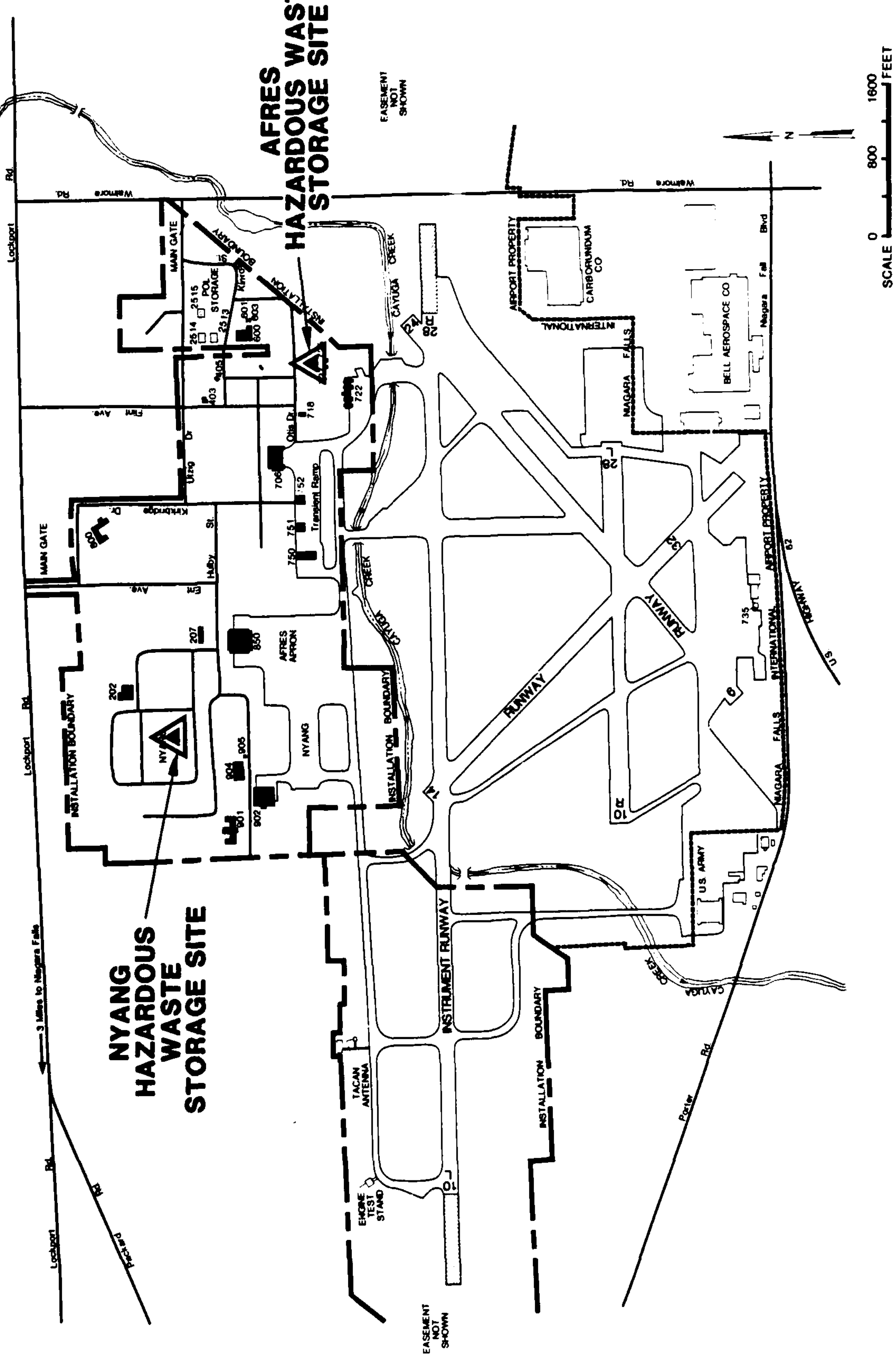
In 1978 the use of these waste storage tanks was discontinued in favor of segregated drumming of wastes. There have been at least four sites dedicated to drum accumulation and storage on installation since that time. Behind Bldg. 202, NYANG accumulated a number of drums for an undetermined period of time (see Figure 4.2). The drums have recently been removed, but stains on the gravel indicated previous spillage in the area. NYANG also stores its waste drums on a concrete pad in an area formerly used as a BOMARC missile site (see Figure 4.4). The pad is not diked and there was visual evidence of minor spills during the site visit including evidence of a spill migrating to surface drainage. Other waste accumulation areas are indicated in Figure 4.2.

The AFRES Hazardous Waste Drum Storage Area has a fence and an asphalt floor. It is unbermed and uncovered area (see Figure 4.4). Approximately 200 drums were in storage at the time of the site visit, most of them off the ground on pallets, or on other drums. There was no visual evidence of spills from this site, but one interviewee reported seeing damaged barrels after winter snow plowing operations in the area. AFRES also accumulates drums from its hangar on a corner of an old aircraft washrack by Bldg. 850 (see Figure 4.2). There was no visual evidence of spills at this site. Other waste accumulation points are indicated in Figure 4.2.

The Outside Transformer Storage Area (Figure 4.8) near buildings 601/603 was relocated to another area on installation during the time of the site visit. Although subsequent testing has indicated that some of these transformers contained PCB-contaminated dielectric, there was no indication that any of these devices leaked onto the ground. The Inside Transformer Storage Area in building 402 is enclosed and on a concrete pad. The area is not curbed but an inspection of the concrete pad

FIGURE 4.4

NIAGARA FALLS AFRF
HAZARDOUS WASTE STORAGE AREAS



SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

revealed no evidence of leaks and no leaks were reported by personnel working in the area.

Fuels Management

The Niagara Falls AFRF Fuels Management Storage System consists of a number of above-ground and underground storage tanks located throughout the base. A listing of the locations of the fuel storage tanks and their products and capacities has been provided in Appendix D. Fuels stored at Niagara Falls AFRF include: JP-4, MOGAS, diesel fuel, fuel oil No. 2 and contaminated fuels and used oils. All fuels currently arrive on installation by tank truck. A rail tank car unloading facility was originally located between buildings 402 and 420 but it was either never used or used for a very short period of time.

JP-4 is stored in the POL storage area in three above-ground tanks with volumes of approximately 160, 315 and 215 thousand gallons (see Appendix F for site photograph). Each of the above ground tanks is equipped with secondary containment in the form of a diked area lined with gunnite. The diked areas are checked on a daily basis, with water accumulations discharged to a storm sewer via an oil water separator. Cracks in the gunnite lining were observed and periodic ground-water intrusions in the diked area were reported to have occurred.

The fuel storage tanks are cleaned on a periodic basis by an outside contractor. The contractor places the sludge in 55-gallon drums and disposes of the barrels off the base. This appears to have been the procedure since the installation start-up.

JP-4 is currently delivered to the flight line using tank trucks that are loaded inside the POL storage area and driven to the flight line. Prior to the use of tank trucks a hydrant system was used (1952-1972). The hydrant system used pumps located inside building 420 to pump the fuel from the storage tanks to building 718 where the fuel was temporarily stored in five 25,000-gallon and two 5000-gallon underground fuel storage tanks prior to delivery to the flight line. The 25,000 gallon tanks have been pickled and are not currently used. The 5000-gallon tanks are currently used for diesel fuel and de-icing fluid. Also associated with the hydrant system is a 5000-gallon underground defueling pit/tank located underneath a grassy area south of building 752 and the transient ramp. The tank is currently used for liquid waste storage as described under "Industrial Operations (Shops)".

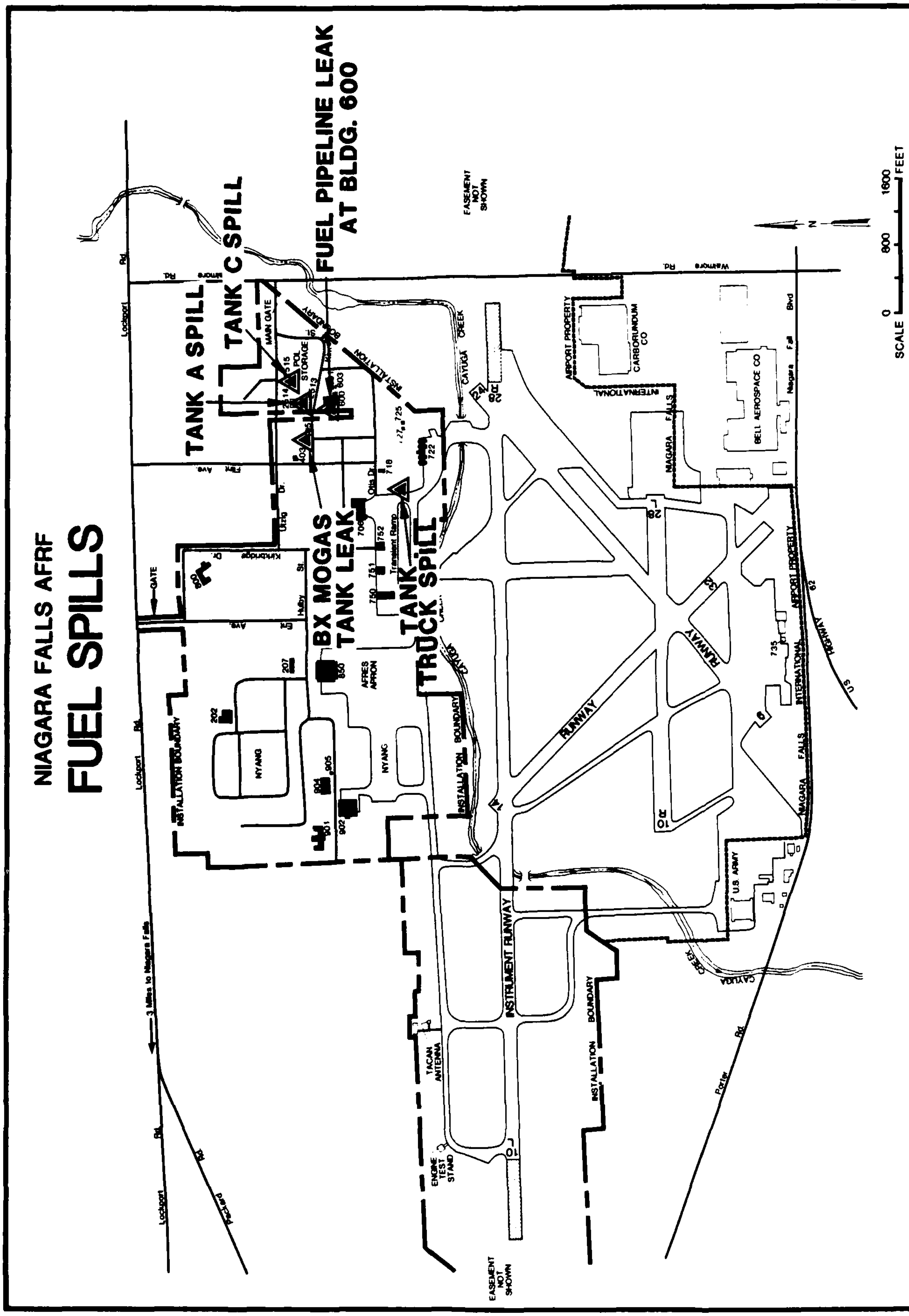
Spills and Leaks

Small fuel spills have occurred in several areas throughout the base. The spills are generally attributed to fuel transfer and aircraft refueling operations. They typically occur on paved areas and evaporate or are immediately cleaned up. No significant environmental contamination is attributed to these spills except for a recent accident involving a tank truck that upset while making a turn at the east end of the transient ramp (see Figure 4.5). The placement of temporary dikes prevented the fuel from reaching surface waters and made possible the of a significant quantity of fuel. However, approximately 2500 gallons of fuel was unaccounted for. Some of this fuel was included in contaminated soil that was removed to the fire pit and burned. Nevertheless significant quantities of the fuel may still be present at the spill site.

With respect to leaks, four significant leaks have occurred at Niagara Falls AFRF. They include two JP-4 leaks in the underground piping associated with the POL storage area, one leak in the old JP-4 hydrant system and a MOGAS leak at the BX service station (see Figure 4.5).

The POL storage area leaks occurred when the underground inlet pipe to JP-4 storage tank A developed a leak in 1979 and when the inlet and outlet pipes to tank C developed leaks in 1982. Both leaks were detected when fuel began to surface in the area of the underground pipes and appeared in storm water drainage. In the case of Tank A, the fuel surfaced near the fuel pump house and inside the diked area. In case of Tank C the fuel appeared between the diked area and the tank truck loading facilities and in the oil water separator that drains the diked area. In both cases the fuel lines were pressure tested and found to lose pressure at a rapid rate. Subsequent removal of the pipe found the black iron pipes badly corroded with numerous small holes on the bottom side. This indicates the leaks developed over an extended period of

FIGURE 4.5



SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

time and potentially could have released large quantities of fuel. Accurate estimates of these losses are not possible because previous fuel inventory procedures did not take into account the effect of temperature on tank volume, but it is reasonable to assume that the leaks amounted to several thousand gallons.

The leak in the hydrant system occurred between building 600 and McGuire Street around 1969. The leak was discovered when JP-4 odor was detected after rains and oil began to appear in surface drainage. By the time the leak was located, the grass in the area had died and the ground had become saturated with JP-4.

A 500-gallon underground oil tank located in the same vicinity also developed a leak near its top with some release of fuel oil resulting from ground-water intrusion into the tank. This leak was considered to be small.

An underground MOGAS tank at the BX service station (Building 405) experienced a MOGAS leak in 1981. One of the pipes entering an underground MOGAS tank broke during winter, possibly from frost induced stresses. Ground water entered the tank and caused gasoline to float out. An undetermined amount of gasoline escaped, but it was of sufficient quantity to appear in storm sewers for several weeks after the incident and to soften the asphalt pavement around the gas pumps. The defective metal tank was dug up and replaced with a new fiberglass tank.

DESCRIPTION OF PAST ON-INSTALLATION TREATMENT AND DISPOSAL METHODS

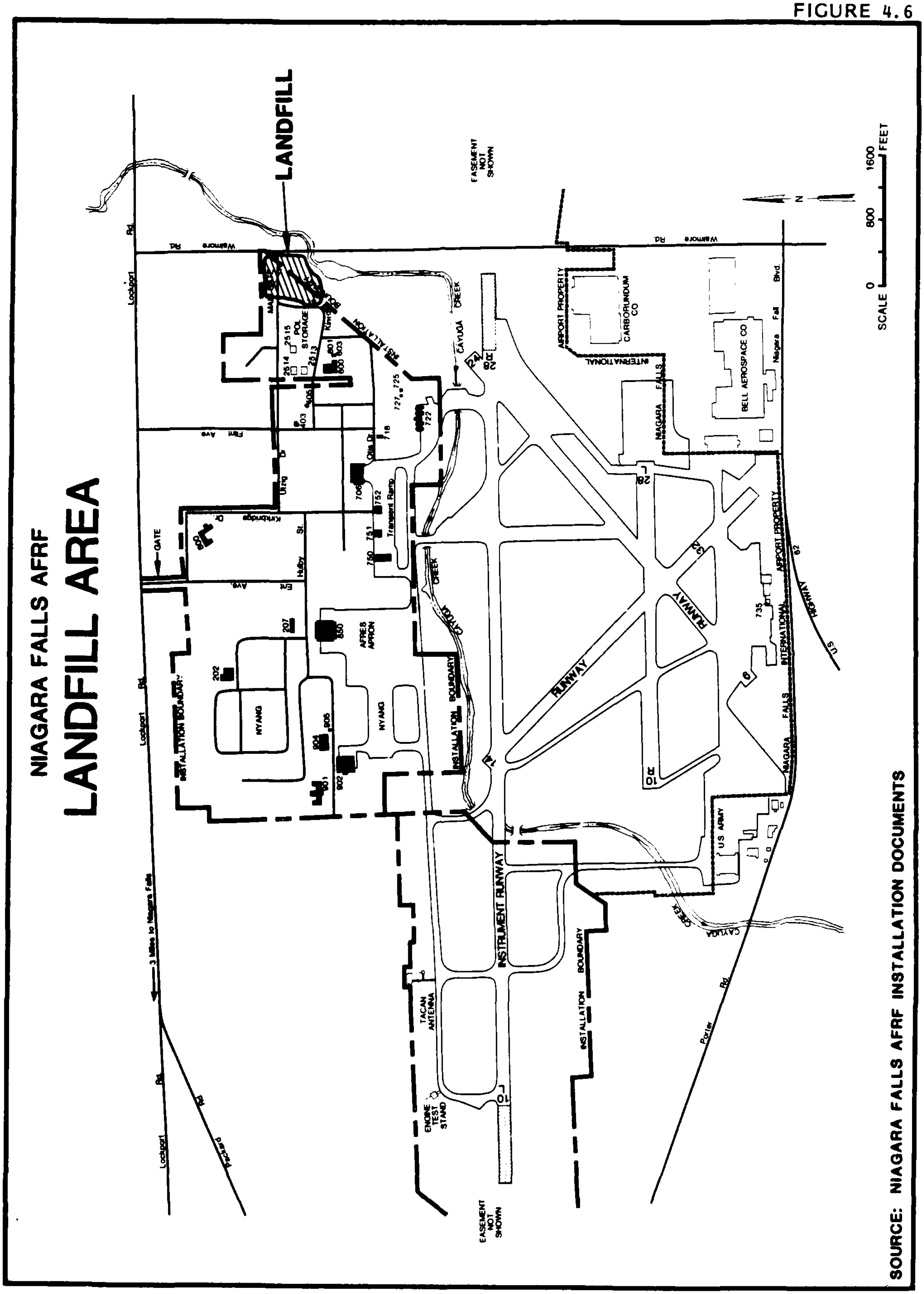
The facilities on Niagara Falls AFRF which have been used for the management and disposal of waste can be categorized as follows:

- o Landfills
- o Sewage Treatment System and Sludge Landfarm
- o Storm Drainage System

Landfills

One landfill operation was identified in the northeast corner of Niagara Falls AFRF. Its approximate location is marked on Figure 4.6

FIGURE 4.6



SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

and in pictures in Appendix F. The exact size of the landfill is unknown but it was probably less than 5 acres. It was operated from the early 1950's until sometime in the late 1960's. Initially a marshy depressed area running from the railroad tracks, underneath Utzig Drive and south to Cayuga Creek was filled to a depth of 8 to 10 feet and sporadically burned. In the mid 1960's the burning was halted because of air pollution constraints and the wastes were buried in trenches dug along the southern edge of the landfill until 1969 when the landfill was closed.

Direct evidence of the landfill location and existence was found during renovation of the road to the current main gate and placement of the airplane beside Utzig Drive near the guard shack. During excavation for these construction activities, car parts and various construction rubble were found. A black material also slowly flowed into a trench cut during road construction. This material may have been a combination of charred material from the landfill burning, mixed with soil and ground water or, as relayed by one interviewee, waste grit from Carborundum mixed with soil and ground water. A french drain was eventually installed to remove excess ground water from underneath the road but no similar contaminated water drainage has been visually observed.

The greatest volume of materials placed in the landfill was construction rubble. It is evident, however, from interviews with people present on the installation during the landfill years, that a wide variety of wastes were disposed of in the landfill. These include trash, garbage, ash from coal stoves, waste oil, shop wastes, barrels of unknown content, batteries, scrap electrical parts from Bell Aerospace, car parts, trash from the Navy station then located across the runway, and by one account, occassionally truck loads of waste from the Army Nike missile sites located in the area, Fort Niagara and Model City. It is also reported that for a short time after closure of the landfill a large number of barrels were stored on the old landfill site. They were eventually removed or disposed of by DPDO. It is not known if the barrels were empty or full or if the barrels were intentionally stored there or left there out of habit.

Sewage Treatment Plant and Sludge Landfarming

Sewage from Niagara Falls AFRF is currently treated by the City of Niagara Falls. Prior to 1967 the waste was treated by an on-site wastewater treatment plant that consisted of two Imhoff tanks, six leaching-treatment beds and foir small sludge drying beds. The location of these facilities is displayed in Figure 4.7 and can be seen in the photograph displayed in Appendix F. The Imhoff tanks were located just north of the bend in Kinoss St., the drying beds just east of the Imhoff tanks immediately across Kinross St., and the leaching-treatment beds immediately south of Kinross St. extending from Langley St. to a point approximately 150 ft. east of the bend in Kinross St. The drainage from the treatment-leaching beds was directed to Cayuga Creek and the sludge from the drying beds was either placed in the landfill or disked into the ground south and east of the drying beds. In 1968, after use of the treatment plant was discontinued, the facility was razed with construction rubble being hauled off-site. Clay fill was placed over the remaining facilities and landscaped. Currently little evidence of the treatment plant exists.

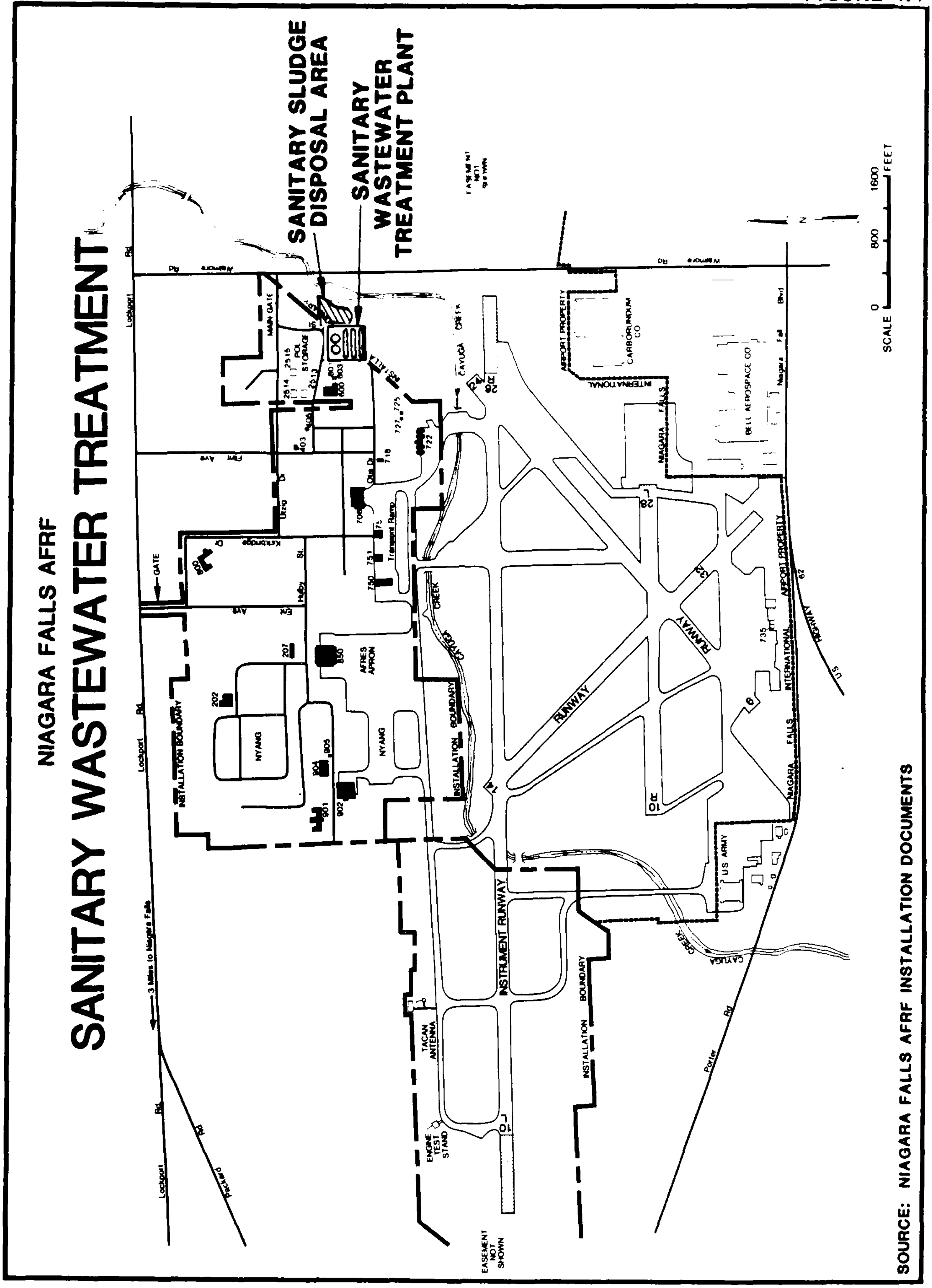
Storm Water Drainage System

Stormwater drainage at Niagara Falls AFRF is accomplished by overland flow to open ditches and stormwater sewers which discharge into surface ditches (see Figure 3.3). These ditches then discharge into Cayuga Creek, which flows into Little River and on to the Niagara River approximately five miles upstream of the falls.

The stormwater drainage system recieves small amounts of waste from aircraft and vehicle maintenance, mainly after a rainfall. Typically, fuel spills on the flight line are washed down into the storm drainage system as a fire prevention measure. Runoff from the POL storage area and the airplane washrack areas are also discharged to surface water drainage after passing through oil water separators.

EVALUATION OF PAST DISPOSAL ACTIVITIES AND FACILITIES

The review of past operation and maintenance functions and past waste management practices at Niagara Falls AFRF has resulted in the



SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

identification of 21 sites which were initially considered as areas of concern with regard to the potential for contamination, as well as the potential for the migration of contaminants. These sites were evaluated using the Decision Tree Methodology shown in Figure 1.1. Those sites which were considered as not having a potential for contamination were deleted from further consideration. Those sites which were considered as having a potential for the occurrence of contamination and migration of contaminants were further evaluated using the Hazard Assessment Rating Methodology (HARM) (Appendix G). Table 4.2 identifies the decision tree logic used for each of the areas of intitial concern.

Based on the decision tree logic, eight of the 21 sites originally reviewed did not warrant evaluation using the Hazard Assessment Rating Methodology. The rationale for omitting these eight sites from HARM evaluation is discussed below.

The three underground slop tanks discussed above have been used as storage tanks for hazardous wastes, but no reports or other information were found during the site visit to indicate that they have leaked at anytime.

The Outside Transformer Storage Area (Figure 4.3) near buildings 601/603 showed no indication that any transformers had leaked onto the ground. The potential for contamination at this site, therefore, is considered to be very small. The Inside Transformer Storage Area in building 402 is enclosed and on a concrete pad. No leaks were reported by personnel working in the area. The potential for contamination in this site, therefore, is considered to be very small.

The Sanitary Sludge Disposal Area was located immediately south of the Sanitary Wastewater Treatment Plant. Sludge from this plant was in all likelihood, non-toxic and was land farmed in the disposal area. When the plant was closed, the inground tanks were backfilled inplace. It is expected that no potential for contamination exists at either of these sites.

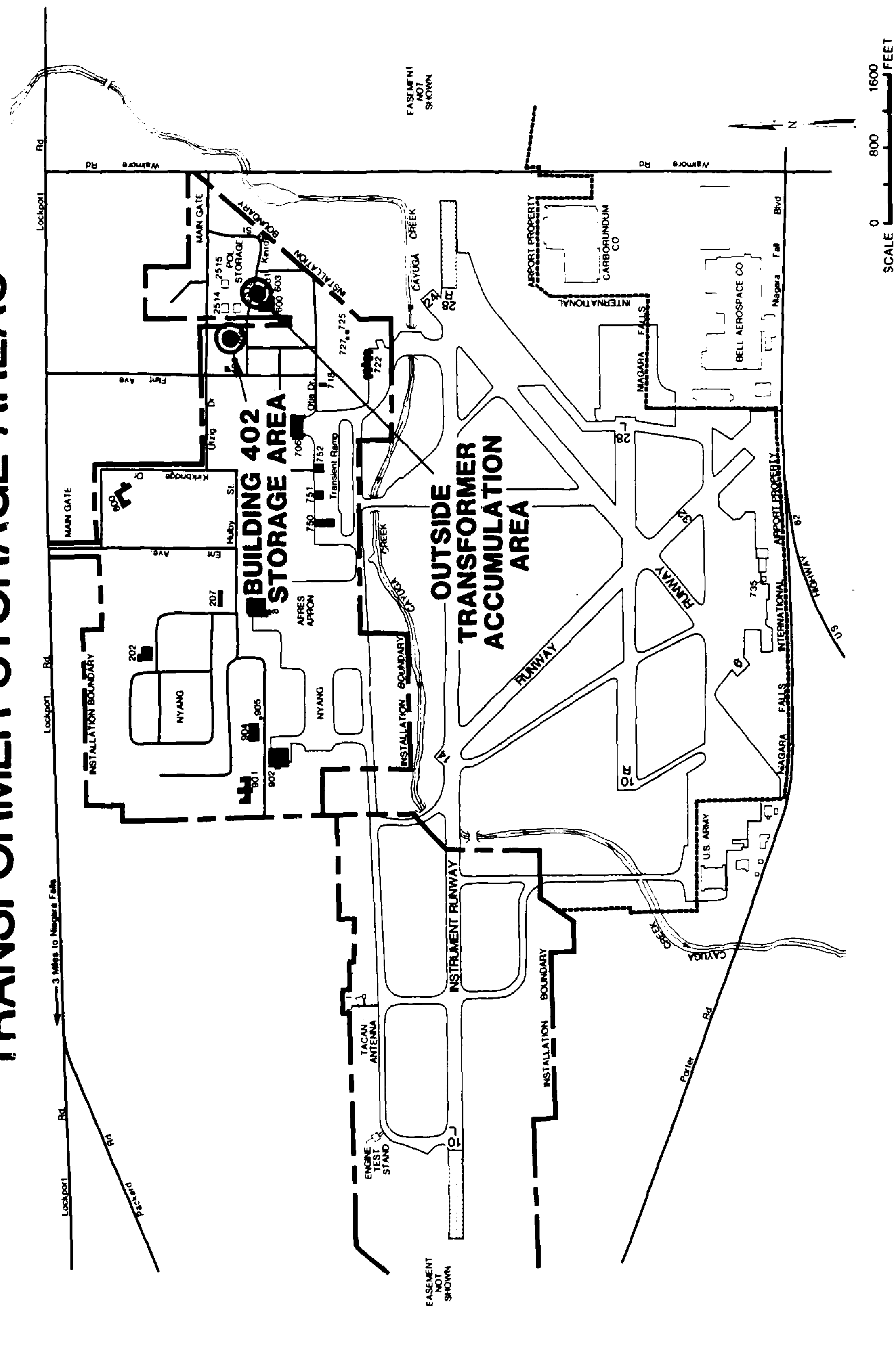
TABLE 4.2
SUMMARY OF DECISION TREE LOGIC FOR AREAS OF INITIAL ENVIRONMENTAL CONCERN AT NIAGARA AFRF

Site Description	Potential For Contamination	Potential For Contaminant Migration	Potential For Other Environmental Concern	HARM Rating
Landfill	Yes	Yes	N/A	Yes
JP-4 Tank Truck Spill	Yes	Yes	N/A	Yes
POL JP-4 Tank A	Yes	Yes	N/A	Yes
POL JP-4 Tank C	Yes	Yes	N/A	Yes
BX MOGAS Tank Leak	Yes	Yes	N/A	Yes
NYANG Hazardous Waste Drum Storage	Yes	Yes	N/A	Yes
Bldg. 600 JP-4 Pipeline Leak	Yes	Yes	N/A	Yes
Fire Training Facility No. 3	Yes	Yes	N/A	Yes
5,000 Gallon Underground Waste Storage Tank	No	No	Yes	No
500 Gallon Underground Waste Storage Tank	No	No	Yes	No
2,000 Gallon Underground Waste Storage Tank	No	No	Yes	No
Bldg. 202 Drum Storage Yard	Yes	Yes	N/A	Yes
Fire Training Facility No. 1	Yes	Yes	N/A	Yes
Fire Training Facility No. 2	Yes	Yes	N/A	Yes
Bldg. 850 Drum Storage Yard	Yes	Yes	N/A	Yes
AFRES Hazardous Waste Drum Storage	Yes	Yes	N/A	Yes
Bldg. 601/603 Outside Transformer Storage Area	Yes	No	Yes	No
Bldg. 402 Inside Transformer Storage Area	Yes	No	Yes	No
Sanitary Sludge Disposal Area	No	No	No	No
Sanitary Wastewater Treatment Plant	No	No	No	No

FIGURE 4.8

NIAGARA FALLS AFRF

TRANSFORMER STORAGE AREAS



SOURCE: NIAGARA FALLS AFRF INSTALLATION DOCUMENTS

The remaining 13 sites identified on Table 4.2 were evaluated using the Hazard Assessment Rating Methodology. The HARM process takes into account characteristics of potential receptors, waste characteristics, pathways for migration, and specific characeristics of the site related to waste management practices. The details of the rating results are summarized in Table 4.3. The HARM system is designed to indicate the relative need for follow-on action. The information presented in Table 4.3 is intended for assigning priorities for further evaluation of the Niagara Falls AFRF disposal areas (Section 5, Conclusions and Section 6, Recommendations). The rating forms for the individual waste disposal sites at Niagara Falls AFRF are presented in Appendix H. Photographs of some of the disposal sites are included in Appendix F.

TABLE 4.3
SUMMARY OF HARM SCORES FOR POTENTIAL CONTAMINATION SOURCES
NIAGARA FALLS

Rank	Site Name	Receptor Subscore	Waste Characteristics Subscore	Pathways Subscore	Waste Management Factor	Overall Total Score
1	Bldg. 600 JP-4 Pipeline Leak	54	80	80	1.00	71
2	POL JP-4 Tank C	54	80	80	1.00	71
3	Landfill	59	72	88	.95	69
4	BX MOGAS Tank Leak	54	64	88	1.00	69
5	NYANG Hazardous Waste Drum Storage	61	60	80	1.00	67
6	POL JP-4 Tank A	54	64	80	1.0	66
7	JP-4 Tank Truck Spill	54	64	80	1.00	66
8	Bldg. 202 Drum Storage Yard	61	40	80	1.00	60
9	Fire Training Facility No. 3	62	64	54	.95	57
10	Fire Training Facility No. 1	54	64	46	.95	52
11	Fire Training Facility No. 2	58	48	46	1.00	51
12	Bldg. 850 Drum Storage Yard	58	40	46	1.00	48
13	AFRES Hazardous Waste Drum Storage	54	40	46	.95	44

SECTION 5

CONCLUSIONS

The goal of the IRP Phase I study is to identify sites where there is the potential for environmental contamination resulting from past waste disposal practices and to assess the probability of contaminant migration from these sites. The conclusions given below are based on field inspections, review of records and files, review of the environmental setting, and interviews with base personnel, past employees, and state and local government employees. Table 5.1 contains a list of the potential contamination sources identified at Niagara Falls AFRF and a summary of the HARM scores for those sites.

BLDG. 600 JP-4 PIPELINE LEAK

This site has a sufficient potential to create environmental contamination and follow-on investigation is warranted. Around 1965 a leak in the hydrant system occurred between building 600 and McGuire Street. The leak was found when JP-4 odor was detected after rains and oil began to appear in surface drainage. By the time the leak was located the ground had become saturated with JP-4 killing much of the local grass. The site received a HARM score of 66, due mainly to the documented indirect evidence of the leak.

POL JP-4 TANK C

This site has a sufficient potential to create environmental contamination and follow-on investigation is warranted. In 1982 the inlet and outlet pipes to POL bulk Storage Tank Farm Tank C developed leaks which were detected when fuel began to appear between the dike area and the tank truck loading facilities, as well as in the oil/water separator. Subsequent excavation of the underground pipes found them badly corroded and leaking. The site received a HARM score of 71, a score resulting from the large quantity of fuel lost (estimated to be

TABLE 5.1
SITES ASSESSED USING THE HARM METHODOLOGY
NIAGARA FALLS AFRF

Rank	Site Name	Date of Operation or Occurrence	Overall Total Score
1	Bldg. 600 JP-4 Pipeline Leak	1969	71
2	POL JP-4 Tank C	1982	71
3	Landfill	1952-1969	69
4	BX MOGAS Tank Leak	1981	69
5	NYANG Hazardous Waste Drum Storage	1983	67
6	POL JP-4 Tank A	1979	66
7	JP-4 Tank Truck Spill	1983	66
8	Bldg. 202 Drum Storage Yard	1978-1983	60
9	Fire Training Facility No. 3	1963-1983	57
10	Fire Training Facility No. 1	1955-1963	52
11	Fire Training Facility No. 2	early 1960's	51
12	Bldg. 850 Drum Storage Yard	1950's - early 1960's	48
13	AFRES Hazardous Waste Drum Storage	1979-1983	44

NOTE: This ranking was performed according to the Hazard Assessment Rating Methodology (HARM) described in Appendix G. Individual site rating forms are in Appendix H.

greater than 4,000 gallons) and from the confirming, through indirect, evidence of the leak.

LANDFILL

The landfill at Niagara AFRF has a sufficient potential to create for environmental contamination and follow-on investigation is warranted. It was operated from the early 1950's until 1969. The landfill was located in the area immediately adjacent to the main gate. The size of the landfill was less than 5 acres. Initially a marshy depressed area was filled to a depth of 8 to 10 feet. Periodically, the waste material was burned. About 1966 the burning was stopped because of air pollution constraints. Since that time the wastes were buried in trenches dug along the southern edge of the landfill. Although it contains largely construction rubble, the landfill was the disposal site for a wide variety of other wastes, including trash, garbage, ash from coal stoves, waste oil, shop wastes, batteries, scrap electrical parts from Bell Aerospace, car parts, trash from the Navy station then located across the runway and wastes from Fort Niagara and Model City. The site received a HARM score of 77. This score is due both to the large quantity of persistent hazardous wastes suspected of being present, the landfill is in contact with the uppermost aquifer and the site is partially in the flood plane of Cayuga Creek.

BX MOGAS TANK LEAK

The BX service station located in building 405 has a sufficient potential to create environmental contamination and follow-on investigation is warranted. The station experienced a MOGAS leak in 1981. One of the pipes entering as underground MOGAS broke during winter. Ground water entered the tank and caused gasoline to float out. An undetermined amount of gasoline escaped, but it was of sufficient quantity to appear in storm sewers for several weeks after the incident and to soften the asphalt pavement around the gas pumps. The site received a HARM score of 69. This high score was due primarily to the nature of the material spilled and the fact that the buried tank is in contact with the uppermost aquifer.

NYANG HAZARDOUS WASTE DRUM STORAGE

The New York Air National Guard Drum Storage Area has a sufficient potential to create environmental contamination and follow-on investigation is warranted. NYANG stores hazardous wastes from its shop operations in drums on a concrete pad in an area formerly used as a BOMARC missile site. During the site visit there was visual evidence of small spills exiting the pad and migrating towards a ditch at the time of the site visit. The site received a HARM score of 67.

POL JP-4 TANK A

This site has a sufficient potential to create environmental contamination and follow-on investigation is warranted. In 1979 the underground inlet pipe to POL Bulk Storage Tank Farm Tank A developed a leak. The leak was detected when fuel began to appear at the ground surface inside the dike and in the nearby stormwater drain near the pumphouse. Subsequent excavation of the pipe found that the iron pipe was badly corroded and leaking. The site received a HARM score of 71. This score resulted from the large quantity of fuel lost, estimated to be greater than 4,000 gallons.

JP-4 TANK TRUCK SPILL

This site has a sufficient potential to create environmental contamination and follow-on investigation is warranted. In early 1983 a refueling JP-4 tank truck overturned at the east end of the transient ramp. The placement of temporary dikes prevented the fuel from reaching surface waters and made possible the recovery of a significant quantity of fuel. However, approximately 2500 gallons of fuel was unaccounted for. The site received a HARM score of 66, which is due largely to the visual observation of indirect evidence of the medium quantity spill.

BLDG. 202 DRUM STORAGE YARD

The area behind building 202 (NYANG Civil Engineering) has a sufficient potential to create environmental contamination and follow-on investigation is warranted. It has been an accumulation point for drums of waste oils and hazardous waste in the recent past. Small spills have occurred in this area. During the site visit, indirect evidence of spills was observed. Thus indirect evidence was mainly responsible for the site receiving a HARM score of 60.

FIRE TRAINING FACILITY NO. 3

Fire Training Facility No. 3 has a sufficient potential to create environmental contamination and follow-on investigation is warranted. From the early 1960's to the present, the Fire Department has used an area located just north of the west end of the instrument runway for its fire training exercises. One large oval pit has been constructed with a low earth berm surrounding it. Since 1979, only JP-4 has been burned in the facility but prior to that point in time, it is probable that other combustible materials (oils, solvents, etc.) were burned along with the jet fuel. Fire fighting agents used include aqueous film forming foam and dry chemicals. Standing water was evident in both the tank and the training pits during the site visit and surface runoff into Cayuga Creek was observed. The site received a HARM score of 65. This score is due mainly to the observed runoff, which is considered indirect evidence of contaminant migration.

FIRE TRAINING FACILITY NO. 1

Fire Training Facility No. 1 has an insufficient potential to create environmental contamination and no follow-on investigation is warranted. From approximately 1955 to the early 1960's, the Base Fire Department conducted fire training exercises in an area immediately east of the Fire Station (old building 716). The burn pit was probably constructed with an earth berm around it. Contaminated fuel (AVGAS) and other combustible liquids were burned here. No visual evidence of the site was present during the site visit. The site received a low HARM score of 52.

FIRE TRAINING FACILITY NO. 2

Fire Training Facility No. 2 has an insufficient potential to create environmental contamination and no follow-on investigation is warranted. For about a one-year period during the late 1950's, a second Fire Training Facility was used concurrent with the first mentioned above. It was an abandoned, stone farmhouse located in the area of present buildings 900 and 902. No precautions were taken here to contain the fuel for the fire prior to burning. The site was probably only used a total of ten times. No visual evidence of the site was observed during the site visit. The site received a low HARM score of 51.

BLDG. 850 DRUM STORAGE YARD

This site has an insufficient potential to create environmental contamination and no follow-on investigation is warranted. From the 1950's to the early 1960's drums of waste oil and hazardous waste from the AFRES hanger (building 850) were stored in an area just east of the hanger. There were no reports of significant spills in the area and no visual evidence of the site was observed during the site visit. The site received a low HARM score of 48.

AFRES HAZARDOUS WASTE DRUM STORAGE

The AFRES Hazardous Waste Drum Storage area has an insufficient potential to create environmental contamination and no follow-on investigation is warranted. It is on an asphalt pad surrounded by a fence. There is no berm or diking and the site is not covered. Approximately 200 drums were in storage at the time of the site visit, most of them off the ground on pallets, or on other drums. There was no visual evidence of spills from this site during the site visit but one source did report seeing a few barrels of unknown content damaged by snow removal equipment. For these reasons, the site received a low HARM score of 44.

SECTION 6

RECOMMENDATIONS

Thirteen sites were identified at Niagara Falls AFRF as having the potential for environmental contamination and have been evaluated using the HARM system which assesses their relative potential for environmental contamination. Nine of the sites were determined to have sufficient evidence to indicate potential for environmental contamination. Additional data concerning these sites will be required in order to clearly ascertain whether or not these sites have contributed environmental contamination. Therefore, the following recommendations have been developed for each of the sites. There was insufficient evidence at the other four sites to warrant further investigation.

PHASE II MONITORING RECOMMENDATIONS

The following recommendations are made to further assess the potential for environmental contamination from waste disposal areas at Niagara Falls, AFRF. The recommended actions are generally one-time sampling programs to determine if contamination does exist at the site. If contamination is identified, the sampling program may need to be expanded to further define the extent of contamination. Geophysical surveys, consisting of electrical resistivity, electromagnetic and/or magnetometer techniques, are recommended prior to the well installations to attempt to delineate the horizontal and vertical extent of the site as well as any subsurface leachate plumes migrating from the site. Preliminary checks with geophysical techniques on and in the vicinity of the site should be made to determine the effectiveness of geophysics prior to a complete site survey.

Following the geophysical surveys ground-water monitoring wells should be installed and sampled. During the well installation readings with an organic vapor analyzer or similar equipment should be made. The ground water at those sites with a high potential for environmental contamination will be monitored with wells consisting of Schedule 40 PVC, screened into the shallow aquifer (approximately 20 feet deep). If the initial samples indicate contamination, additional wells will be required. The number of wells may be reduced if the geophysical techniques are successful in identifying subsurface leachate plumes.

The recommended monitoring program for Phase II is summarized in Table 6.1 and described in more detail below.

1. The Building 600 JP-4 Pipeline Leak Site has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Prior to the installation of ground-water monitoring wells, surface geophysical techniques such as electrical resistivity and/or electromagnetic surveys should be employed. The surveys, if effective, should be used to guide the placement of three downgradient wells and one upgradient well to characterize the ground-water quality and identify any contaminant migration. Explosimeter readings should be observed while drilling the wells. Samples from the well and nearby storm drainage should be analyzed for the parameters listed in Table 6.2, list A.

2. POL JP-4 Tank C has a sufficient potential to create environmental contamination and monitoring of this site is recommended. The recommended action is described under Item 2 (POL Tank A) above. Samples from the wells, storm drainage and standing water inside the berms should be analyzed for the parameters listed in Table 6.2, list A.

3. The Landfill has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Prior to the installation of ground-water monitoring wells, surface geophysical techniques such as electrical resistivity, electromagnetic and/or magnetometer surveys should be employed. The surveys, if effective, should be used to guide the placement of three downgradient wells and one upgradient well to characterize the ground-water quality and identify any contaminant migration. Explosimeter readings should be observed while drilling the wells. Samples from the wells, Cayuga

TABLE 6.1
RECOMMENDED MONITORING PROGRAM FOR PHASE II
NIAGARA FALLS AFRF

Ranking Number	Site Name	Rating Score	Recommended Monitoring	Sample Analyses List[1]	Comments
1	Bldg. 600 JP-4 Pipeline Leak	71	Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells. Sample storm drainage. Observe explosimeter readings in wells.	A	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
2	POL JP-4 Tank C	71	Conduct geophysical surveys; install and sample 3 downgradient wells; sample storm drainage and standing water in berms. Observe explosimeter readings in wells.	A	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
3	Landfill	69	Conduct geophysical surveys; install and sample 5 downgradient wells and one upgradient well; sample Cayuga Creek and Narron's Pond water and sediment; observe explosimeter readings in wells.	B	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination. A GS/MS scan will be run to identify contaminants found.
4	BX MOGAS Tank Leak	69	Conduct geophysical s[illegible]eys; install and sample 1 upgradien[illegible] 1 downgradient wells; sample sto[illegible]ainage. Observe explosimeter readings in wells.	D	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
5	NYANG Hazardous Waste Drum Storage	67	Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells; sample storm drainage.	B	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
6	POL JP-4 Tank A	66	Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells; sample storm drainage and standing water inside berm. Observe explosimeter readings in wells.	A	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
7	JP-4 Tank Truck Spill	66	Conduct geophysical surveys; install and sample 1 upgradient and 3 downgradient wells; sample existing shallow well. Observe explosimeter readings in wells.	A	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination.
8	Bldg. 202 Drum Storage Yard	60	Conduct geophysical surveys; install and sample 3 downgradient and 1 upgradient well; sample storm drainage.	B	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination. A GS/MS scan will be run to identify contaminants found.
9	Fire Training Facility No. 3	57	Conduct geophysical surveys; install and sample 3 downgradient and one upgradient well. Sample storm drainage. Observe explosimeter readings in wells.	C	Continue monitoring if sampling indicates contamination. Additional wells may be necessary to assess extent of contamination. A GS/MS scan will be run to identify contaminants found.

Note 1: Sample Analyses List is provided in Table 6.2 of this report.

TABLE 6.2
RECOMMENDED LIST OF ANALYTICAL PARAMETERS
NIAGARA FALLS AFRB

LIST A

pH
Oil and Grease
Total Organic Carbon
Volatile Organics

LIST B

pH
Total Dissolved Solids
Oil and Grease
Total Organic Carbon
Lead
Volatile Organics
Total Organic Halogens
Phenolics

LIST C

pH
Total Dissolved Solids
Oil and Grease
Total Organic Carbon
Volatile Organics
Phenolics
Total Organic Halogens

LIST D

pH
Oil and Grease
Total Organic Carbon
Tetraethyl Lead

Creek, the French drain under the road and Narron's Pond water and sediment should be analyzed for the parameters listed in Table 6.2, list B.

4. The BX MOGAS Tank Leak Site has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Prior to the installation of ground-water monitoring wells, surface geophysical techniques such as electrical resistivity and/or electromagnetic surveys should be employed. The surveys, if effective, should be used to guide the placement of two downgradient wells and one upgradient well to characterize the ground-water quality and identify any contaminant migration. Explosimeter readings should be observed while drilling the wells. Samples from the wells and nearby storm drainage should be analyzed for the parameters listed in Table 6.2, list D.

5. The NYANG Hazardous Waste Drum Storage Site has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Prior to the installation of ground-water monitoring wells, surface geophysical techniques such as electrical resistivity and/or electromagnetic surveys should be employed. The surveys, if effective, should be used to guide the placement of three downgradient wells and one upgradient well to characterize the ground-water quality and identify any contaminant migration. Samples from the well and nearby storm drainage should be analyzed for the parameters listed in Table 6.2, list B.

6. POL JP-4 Tank A has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Due to this site's location immediately adjacent to POL Tank C (see Item 3, below), it is recommended that the monitoring for these two sites be combined into one effort. Prior to the installation of ground-water monitoring wells surface geophysical techniques such as electrical resistivity, electromagnetic and/or magnetometer surveys should be employed. The surveys, if effective, should be used to guide the placement of one upgradient and three downgradient wells to characterize

the ground-water quality and identify any contaminant migration. Samples from the wells, storm drainage and standing water inside the berms should be analyzed for the parameters listed in Table 6.2, list A.

7. The JP-4 Tank Truck Spill Site has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Prior to the installation of ground-water monitoring wells, surface geophysical techniques such as electrical resistivity and/or electromagnetic surveys should be employed. The surveys, if effective, should be used to guide the placement of two downgradient soil borings and one upgradient soil boring to characterize the ground-water quality and identify any contaminant migration. Explosimeter readings should be observed while drilling the wells. Three samples from each boring should be analyzed for the parameters listed in Table 6.2, list A.

8. The Building 202 Drum Storage Yard has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Prior to the installation of ground-water monitoring wells, surface geophysical techniques such as electrical resistivity and/or electromagnetic surveys should be employed. The surveys, if effective, should be used to guide the placement of three downgradient wells and one upgradient well to characterize the ground-water quality and identify any contaminant migration. Samples from the well and nearby storm drainage should be analyzed for the parameters listed in Table 6.2, list B.

9. The Fire Training Facility No. 3 has a sufficient potential to create environmental contamination and monitoring of this site is recommended. Prior to the installation of ground-water monitoring wells, surface geophysical techniques such as electrical resistivity and/or electromagnetic surveys should be employed. The surveys, if effective, should be used to guide the placement of three downgradient wells and one upgradient well to characterize the ground-water quality and identify any contaminant migration. Samples from the wells and nearby stream should be analyzed for the parameters listed in Table 6.2, list C.

OTHER RECOMMENDATIONS

There are three underground waste storage tanks located at Niagara Falls AFRF (refer to Figure 4.3). It is recommended that the Installation Environmental Program empty these tanks and pressure-test them for leaks. If leaks are detected, then a ground-water monitoring progam should be established around the relevant tanks.

TABLE OF CONTENTS

APPENDICES

APPENDIX A

PROJECT TEAM QUALIFICATIONS

Biographical Data

DAVID L. GREGORY

Environmental Engineer

PII Redacted

[redacted]

Education

B.S. in Civil Engineering, 1976, University of Cincinnati, Ohio
M.E. in Environmental Systems Engineering, 1978, Clemson University, South Carolina

Professional Affiliations

Engineer-in-Training (Ohio)
Georgia Water Pollution Control Association
Water Pollution Control Federation

Honorary Affiliations

Chi Epsilon

Experience Record

1974-1975 State of Ohio, Department of Transportation, Lebanon, Ohio. Construction Inspector. Responsibilities included inspection of soil work and concrete structures for interstate highway I-471.

1976-1978 Clemson University, Clemson, South Carolina. Graduate Research Assistant (1976-1977). Conducted bench-scale treatability studies on an organic dye manufacturer's wastewater to determine the effects of ozone pretreatment on the kinetics of activated sludge.

Graduate Research Associate (1978). Served as research coordinator and treatment technologist for bench-scale treatability studies of organic dye manufacturing wastewater by ozonation, hyperfiltration, carbon absorption, activated sludge, and powdered activated carbon (PAC) processes. Performed analyses for toxic compounds using atomic absorption and gas chromatography.

1979-1981 GMP Associates, Inc., Honolulu, Hawaii. Project Engineer. Responsible for sampling, data evaluation, review of operating procedures, and development of design and operating modifications for a study on pollution potential of the naval drydock facilities at

David L. Gregory (Continued)

Pearl Harbor. Involved in a series of troubleshooting studies at municipal wastewater treatment plants which included collection and evaluation of performance data on pump stations, clarifiers, activated sludge units, trickling filters, aerobic and anaerobic digesters, and various dewatering devices and recommendations for improving plant performance through design and operational modifications.

Project Manager. Supervised a study on the source and control of hydrogen sulfide odors at a municipal treatment plant, involving investigation of the wastewater collection system and the treatment plant, an extensive wastewater characterization program, evaluation of ozonation, carbon absorption, and catalytic reduction treatment processes, and recommendation for alternative processes and operating strategies.

1981-Date Engineering-Science. Project Engineer. Developed stormwater control strategies, wastewater treatment design criteria, and a computer model for predicting the hydraulic impact of stormwater flows on the treatment system for an oil refinery NPDES permitting project. Conducted batch and continuous bench scale biological treatability studies on a wastewater stream containing 2,4-D, organic arsenic, and other herbicides, which included extensive wastewater characterization, jar testing of metal salt for arsenic precipitation, ammonia stripping testing, primary settling column testing, and development of a computer model to determine the alkalinity and distribution of carbonate and ammonia species in the wastestream under various conditions of pH and carbonate concentration. Involved in a waste compatability study, design of spill prevention and control features, and determination of health and safety requirements for a photographic lab chemical storage area and a hazardous waste collection system.

Project Manager. In charge of developing a comprehensive Spill Prevention Control and Countermeasure (SPCC) guidance manual and pollution contingency plans for U.S. Air Force bases which involved compliance with hazardous waste regulations and development of procedures for evaluating existing spill prevention and response capabilities. Directed a bioreactor treatability study to evaluate loading rates, PAC addition, and organics removal for the design of the wastewater treatment facilities at a plastics plant to be constructed by General Electric in The Netherlands.

David L. Gregory (Continued)

Papers and Presentations

"Biological Treatability of an Ozonated Dye Manufacture Waste," Master of Engineering Special Problem Report, Clemson University, Environmental Systems Engineering Department, Clemson, South Carolina, 1979.

Biographical Data

H. DAN HARMAN, JR.
Hydrogeologist

PII Redacted

[redacted]

Education

B.S., Geology, 1970, University of Tennessee, Knoxville, TN

Professional Affiliations

Registered Professional Geologist (Georgia NO.569)
National Water Well Association (Certified Water Well Driller No. 2664)
Georgia Ground-Water Association

Experience Record

1975-1977 Northwest Florida Water Management District, Havana, Florida. Hydrogeologist. Responsible for borehole geophysical logger operation and log interpretation. Also reviewed permit applications for new water wells.

1977-1978 Dixie Well Boring Company, Inc., LaGrange, Georgia. Hydrogeologist/Well Driller. Responsible for borehole geophysical logger operation and log interpretation. Also conducted earth resistivity surveys in Georgia and Alabama Piedmont Provinces for locations of water-bearing fractures. Additional responsibilities included drilling with mud and air rotary drilling rigs as well as bucket auger rigs.

1978-1980 Law Engineering Testing Company, Inc., Marietta, Georgia. Hydrogeologist. Responsible for ground-water resource evaluations and hydrogeological field operations for government and industrial clients. A major responsibility was as the Mississippi Field Hydrologist during the installation of both fresh and saline water wells for a regional aquifer evaluation related to the possible storage of high level radioactive waste in the Gulf Coast Salt Domes.

1980-1982 Ecology and Environment, Inc., Decatur, Georgia. Hydrogeologist. Responsible for project management of hydrogeological and geophysical investigations at uncontrolled hazardous waste sites. Also prepared Emergency Action Plans and Remedial Approach Plans for U.S. Environmental Protection Agency. Additional

H. Dan Harman, Jr. (Continued)

responsibilities included use of the MITRE hazardous ranking system to rank sites on the National Superfund List.

1982-1983 NUS Corporation, Tucker, Georgia. Hydrogeologist. Responsible for project management of hydrogeological and geophysical investigations at uncontrolled hazardous waste sites.

1983-Date Engineering-Science, Inc., Atlanta, Georgia. Hydrogeologist. Responsible for hydrogeological evaluations during Phase I Installation Restoration Program projects for the Department of Defense.

Publications and Presentations

"Geophysical Well Logging: An Aid in Georgia Ground-Water Projects," 1977, coauthor: D. Watson, The Georgia Operator, Georgia Water and Pollution Control Association.

"Use of Surface Geophysical Methods Prior to Monitor Well Drilling," 1981. Presented to Fifth Southeastern Ground-Water Conference, Americus, Georgia.

"Cost-Effective Preliminary Leachate Monitoring at an Uncontrolled Hazardous Waste Site," 1982, coauthor: S. Hitchcock. Presented to Third National Conference on Management of Uncontrolled Hazardous Waste Sites, Washington, D.C.

"Application of Geophysical Techniques as a Site Screening Procedure at Hazardous Waste Sites," 1983, coauthor: S. Hitchcock. Proceedings of the Third National Symposion and Exposition on Aquifer Restoration and Ground-Water Monitoring, Columbus, Ohio.

Biographical Data

ROBERT J. REIMER

Chemical Engineer

PII Redacted

[redacted]

Education

B.S. in Chemical Engineering, 1979, University of Notre Dame
B.A. in Art, 1979, University of Notre Dame
M.S. in Chemical Engineering, 1980, University of Notre Dame

Honors

Amoco Company Fellowship for Graduate Studies in Chemical Engineering, University of Notre Dame (1979-1980)

Professional Affiliations

American Institute of Chemical Engineers

Experience Record

1978-1979 PEDCo Environmental, Cincinnati. Engineer's Assistant. Responsible for compilation of data base report reviewing solid waste disposal in the nonferrous smelting industry. Participated in SO_2 scrubber emissions testing program, Columbus, Ohio. Worked on team establishing a computerized reference file on the overall smelting industry. Performed technical editing and report review.

1979-1980 Camargo Associates, Ltd., Cincinnati. Design Engineer and Draftsman. Responsible for HVAC design on numerous projects. Designed fire protection system for an industrial plastics press. Designer on various general plumbing jobs. Prepared EPA air pollution permit applications.

1980-Date Engineering-Science. Chemical Engineer. Responsible for the preparation of environmental reports and permit documents as well as providing general environmental assistance to clients to assure compliance with state and federal regulations.

Robert J. Reimer (Continued)

1980-Date Developed cost estimates for several hazardous waste management facility closures. Prepared several Interim Status Standards Manuals, including Manifest Plans, Waste Analysis Plans, Closure Plans and Contingency/ Emergency Plans. Provided technical assistance in the design of a one-million gallon per year fuel alcohol production facility.

Provided assistance for a water reuse/reduction plan at a major petroleum refinery. Conducted an extensive review of emerging energy technologies for the Department of Energy. Participated in several Installation Restoration Programs for the U. S. Air Force. Assisted in the design of a contaminated ground water air stripping column based on a lab model to be developed. Prepared several delisting petitions for the removal of industrial wastestreams from EPA's hazardous waste list. Assisted in a study of waste oil reuse for the U.S. Army CERL.

APPENDIX B

LIST OF INTERVIEWEES

APPENDIX B

LIST OF INTERVIEWEES

	Position and Group	Years of Service at Installation
1.	Environmental Planner/Coordinator, 914 TAG	4
2.	Base Civil Engineer, 914 TAG	21
3.	Civil Engineer, 107 NYANG	2
4.	CE Operations & Maintenance Superintendent, 914 TAG	17
5.	Aircraft Maintenance Worker, 914, TAG	25
6.	Aircraft Maintenance Worker, 914 TAG	28
7.	Supply Foreman, 914 TAG	22
8.	Fire Chief, 914 TAG	11
9.	Fireman, 914 TAG	17
10.	Plumber, 914 TAG	22
11.	Aircraft Instrumentation Worker, 914 TAG	31
12.	Electrical Engineer, Tech., 914 TAG	20
13.	Aircraft Maintenance Worker, 914 TAG	26
14.	Base Commander, 914 TAG	32
15.	Wastewater Treatment Plant Operator, 914 TAG	16
16.	Base Supply Worker, 914 TAG	24
17.	Sanitation Foreman, 914 TAG	15
18.	Roads and Grounds Foreman 914 TAG	29
19.	Fuels Maintenance Worker, 914 TAG	14
20.	Fuels Management Superintendent 914 TAG	26
21.	Aircraft Maintenance Worker, 107 NYANG/914 TAG	32

APPENDIX B

LIST OF INTERVIEWEES
(Continued)

Position and Group	Years of Service at Installation
22. Base Supply Worker, 914 TAG	30
23. Fire Chief, 914 TAG	29
24. Field Maintenance Manager, 914 TAG	24
25. Aircraft Maintenance Worker, 914 TAG	30
26. Civil Engineering, 107 NYANG	16
27. Installation Occupational Health Nurse, 914 TAG	20
28. Power Production Technician, 914 TAG	15
29. Assistant Chief Fire Department,	18

OUTSIDE AGENCY CONTACTS

Agency	Point of Contact
Frey Well Drilling, Alden, NY; Driller (716) 937-7977	Mike Frey
New York State Department of Environmental Conservation, Buffalo, NY; Associate Sanitary Engineer (716) 847-4585	Peter Bueche
New York Department of Environmental Conservation, Bureau of Wildlife, Buffalo, NY; Biologist (716) 847-4550	Jim Snider
New York Geological Survey, Oil and Gas Section, Albany, NY; Associate Scientist (518) 474-5841	Hank Bailey
New York State Department of Transportation, Region 5, Buffalo, NY; Oil Spill Engineer (716) 747-3213	John Hennessey
Niagara County Economic Development and Planning Department, Lockport, NY; Planner. (716) 439-6023	Dave Erso
Niagara County Environmental Management Council, Lockport, NY; Planner (716) 433-6721	Joe Erso
Niagara County Department of Health, Division of Environmental Health Services, Niagara Falls, NY; Assistant Public Health Engineer (716) 284-3124	Mike Hopkins
Niagara County Health Department, Lockport, NY; Public Health Engineer (716) 439-6158	Ron Gwazdek
Niagara Frontier Transportation Authority, Buffalo, NY; Planner (716) 855-7800	Dave Franko
Niagara Stone Division, Quarry Road, Niagara Falls, NY; General Manager (716) 297-3031	Dave Fittante
Town of Niagara Water Department, Niagara Falls, NY (716) 297-2150	(Receptionist)
Town of Wheatfield Water Division, Wheatfield, NY; Director (716) 693-4262	Norman Walk

U.S. Environmental Protection Agency, Region 2, Environmental Impact Branch, New York, NY, Chief (212) 264-1892	Ann Miller
U.S. Environmental Protection Agency, Region 2, Solid Waste Branch; Engineer (212) 264-2657	John Josephs
U.S. Geological Survey, Long Island, NY; Hydrologist (516) 938-8830	Ed Kozalka

APPENDIX C

INSTALLATION HISTORY, ORGANIZATION AND MISSIONS

APPENDIX C

INSTALLATION HISTORY, ORGANIZATION AND MISSIONS

BASE HISTORY

In 1928 the city of Niagara Falls purchased 230 acres of land approximately 3 miles east of the city line for use as a municipal airport. In 1940 the city acquired an additional 300 acres, making a total of 530 acres. In November 1942, the Government leased 468 acres of the airport for use and occupancy by the Army Air Corps. In 1946 the airport was declared surplus to the needs of the Army and the facilities were transferred to War Assets Administration. In 1947 the lease with the City was cancelled and War Assets Administration transferred to the city by a Quitclaim Deed two additional parcels of land totalling 132.3 acres.

In late 1951 and early 1952, the government acquired the fee to 350 acres when the 136th Fighter Interceptor Squadron of the New York National Guard was called to active Air Force duty, thus initiating the establishment of the Air Force Base at the Niagara Falls Municipal airport. The 136th was originally quartered at old Camp Bell, directly opposite the Bell Aircraft Plant. On 1 February 1952, the 76th Air Base Squadron was activated for the purpose of performing support services for the 136th Fighter Interceptor Squadron.

Construction of the present site of the base, occupying 600 acres of land on the northeast corner of the Niagara Falls Municipal Airport was completed and occupied early in 1953. On 16 February 1953, in an Air Defense Command-wide organization change, the 76th Air Base Squadron was deactivated and replaced by the 518th Air Defense Group and its component Air Base, Material and Infirmary Squadrons. Also, at this time, the 136th Fighter Interceptor Squadron reverted to the New York Air National Guard and was replaced by the 47th Fighter Interceptor Squadron.

In August 1955 the 518th Air Defense Group was deactivated and the 15th Fighter Group was recommissioned and assigned to Niagara Falls. On 1 July 1960 it was deactivated and the 4621st Support Group was born. The 4621st Support Group was redesignated the 4621st Air Base Group on 1 July 1964. In the early part of 1959, the newly activated 35th Air Defense Missile Squadron armed with the CIM-10B BOMARC missile was assigned to the base. The 35th ADMS was deactivated in December 1969. Recipient of the excessed land and facilities (refered to as the BOMARC Site) was the base 107th Tactical Fighter Group (ANG). Additional perpetual easements were acquired in 1963 to cover the restricted area commonly referred to as the AMMO Storage for use of DEt 1, 49th Fighter Interceptor Squadron in connection with Phase III of the ADC Fighter Dispersal Program.

In September 1965 the Niagara Falls Municipal Airport was designated by Customs as an International Airport thereby changing the official name of the airport to Niagara Falls International Airport. In 1968 the Airport was sold by the city of Niagara Falls to the Niagara Frontier Transportation Authority (NFTA).

In March 1970 the 4621st Air Base Group was deactivated and Det 1, 49th FIS (ADC) assumed responsibility of the base.

Concurrent with the operations of the Aerospace Defense Command (ADC), the 445th Fighter Bomber Wing (Reserve) was activated in July 1952. Originally equipped with F-51, "MUSTANGS", the Reserve modernized rapidly to the F-80, "SHOOTING STARS", and then to the F-84s. In October 1957 the 445th Fighter Bomber Wing was deactivated and the 328th Troop Carrier Squadron equipped with C-119s, "FLYING BOXCARS", was activated. This unit was called to active duty during the Cuban Crisis. A reorganization of the Air Force Reserve in February 1963 formed the 914th Tactical Airlift Group and the 328th Squadron became a part of the new group. In December 1970 the first C-130s arrived as a replacement for the C-119s for use by the 328th Squadron. On 1 January 1971 jurisdiction for the Air Base transferred from the Aerospace Defense Command (ADC) to the Air Force Reserve Command (AFR) and the 914th Tactical Airlift Group assumed "host" duties.

The history of the Niagara-based Air Guard unit dates back to 8 December 1948 when the 136th Fighter Squadron, New York Air National Guard, was formed and received federal recognition. The unit occupied space at the new demolished Naval Air Station Hangar, Niagara Falls Airport. In the Fall of 1950, the unit reorganized into a Wing complex and moved into Bell Company Test hangars; nicknamed "Camp Bell". On 1 March 1951, during the Korean Conflict, the 136th was ordered to active duty for 21 months initiating facilities designated as the Niagara Falls Air Base. In 1953 and 1954, the construction of the 900 series buildings was completed by the Corps of Engineers for the exclusive use of the Air National Guard. In 1958, the mission and aircraft (F-94 to F-86) was changed from Fighter Interceptor to Tactical Fighter. The unit again changed aircraft (F-100) in 1961 and was called to active duty to meet the Berlin Crisis. The change in aircraft and calls to active duty resulted in more stringent operational requirements. On 28 January 1968, the 107th was again called to active duty immediately following the Pueblo Crisis. They remained at Niagara Falls on active duty until early July of 1968 when personnel of the unit were transferred to South Korea and South Vietnam. On 19 June 1971 the unit mission and aircraft (F-101) was again changed to Fighter Interceptor. The assumption of this operational mission and the training associated with it required new licensing of additional Air Force buildings.

Currently, the 107th is designated as a Fighter Interceptor Group with a 24-hour Runway Alert commitment under the Air Defense TAC (ADTAC) jurisdiction with 20 F-4C "PHANTOM" jet fighters being assigned. (NFAFB, Real Property Survey.)

ORGANIZATIONS AND MISSIONS

Primary Organization and Mission

The 914th Tactical Airlift Group is the host unit at Niagara Falls AFB and provides base support operations for the Air Force Reserve and other tenant organizations. The 914th maintains C-130A "Hercules" transports for the following missions: (1) airlift troops, supplies and equipment into prepared and unprepared landing zones; (2) provide personnel and logistical support for front line troops; (3) long range airlifts; (4) provide medical evacuation of troops.

Tenant Organizations and Missions

Niagara Falls AFB is the host to a number of tenant organizations providing services, facilities, and other support to these organizations. The following list identifies the tenant units and their missions.

107th Fighter Interceptor Group (FIG)(NYANG)

The 107th FIG has a state as well as a federal mission. Its state mission is to provide protection of life and property and to preserve peace, order and public safety in time of natural disasters and/or civil disturbance. Its federal mission is to provide trained units to the United States Air Force capable and ready for mobilization in war or national emergency.

Detachment 1, 1998 Communication Group (AFCC)

The mission of the 1998 Communication Group is to provide telecommunication service and TACAN maintenance support to the 914th TAG and other tenants.

OL-D, Detachment 27, 12 Weather Squadron (AWS)

The Weather Squadron provides weather reporting for the military at Niagara Falls AFB.

380th CSG (SAC)

The 380th CSG provides dispersal operation in case of national emergencies.

U.S. Coast Guard

The U.S. Coast Guard unit on base provides administrative and operational support to the Coast Guard reserve units operating in New York, Pennsylvania and Ohio districts.

U.S. Army Corps of Engineers, Construction Division - EPA

The Corps of Engineers monitors EPA and military projects within Erie and Niagara counties.

New York Army National Guard

The Army National Guard unit maintains a hardstan area for storage of their bridging equipment and vehicles.

Additional Tenant Units

Civil Air Patrol (CAP)

New England Area Exchange

Federal Aviation Agency (FAA)

Niagara Falls Air Force Credit Union

APPENDIX D

POL TANK INFORMATION

APPENDIX D

POL TANK INFORMATION

Location (Facility No.)	Product	Volume (Gal)	Comment
AFRES:			
2513 (Tank A)	JP-4	158,400	Diked
2514 (Tank B)	JP-4	315,395	Diked
2515 (Tank C)	JP-4	215,161	Diked
616	MOGAS(Unleaded)	4,810	Underground
616	MOGAS(Unleaded)	4,810	Underground
616	MOGAS(Leaded)	11,600	Underground
616	MOGAS(Leaded)	11,600	Underground
405	MOGAS(Hi-Test)	6,000	Underground
405	MOGAS(Leaded)	6,000	Underground
405	MOGAS(Unleaded)	4,000	Underground
718	Diesel	5,000	Underground
NYANG:			
207	Fuel Oil	2,500	
207	Fuel Oil	2,500	
215	Fuel Oil	36,000	Underground
215	Fuel Oil	36,000	Underground
215	Fuel Oil	20,000	Underground
740	Fuel Oil	2,500	
751	Fuel Oil	5,000	Underground
950	Fuel Oil	575	Underground

APPENDIX D

POL TANK INFORMATION

(Continued)

Location (Facility No.)	Product	Volume (Gal)	Comment
NYANG: (Continued)			
952	Fuel Oil	350	Underground
960	Fuel Oil	575	Underground
200	Diesel Fuel	2,000	Underground
906	MOGAS	5,000	Underground

APPENDIX E

MASTER LIST OF INDUSTRIAL SHOPS

APPENDIX E

MASTER LIST OF SHOPS

Name	Present Location (Bldg. No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Current T.S.D. Methods
Roads & Grounds*	202	Yes	Yes	Sanitary Sewer/ Contractor
Engine Shop*	204	Yes	Yes	Contractor
AGE Shop*	207	Yes	Yes	Contractor
Life Support	324	Yes	No	--
Survival Equipment	324	Yes	No	--
Fire Department	327	Yes	No	--
Corrosion Control	400	Yes	Yes	Contractor
Fuel Distribution/ Lab	421/460	Yes	Yes	Contractor/ Fire Training Facility
Carpentry/Plumbing	426	Yes	No	--
Heating Plant	506	Yes	Yes	Sanitary Sewer
Roads & Grounds	612/626	Yes	Yes	Contractor
Vehicle Maintenance	620	Yes	Yes	Contractor
AGE Shop	706	Yes	Yes	Contractor
Engine Shop	706	Yes	Yes	Storm Sewer/ Contractor
Fuel Systems	706	Yes	No	--
Non-Destructive Inspection	706	Yes	No	--
Propeller Shop	706	Yes	Yes	Contractor
Clinic	802	Yes	Yes	DPDO at Griffiss AFB

APPENDIX E
MASTER LIST OF SHOPS
(Continued)

Name	Present Location (Bldg. No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Current T.S.D. Methods
Aerial Port Flight Facility	810	No	No	--
Aircraft Ordnance Systems*	816	Yes	Yes	Contractor
Missile Maintenance*	820	Yes	Yes	Contractor
Avionics Shop	850	Yes	Yes	DPDO at Kelly AFB
Battery Shop	850	Yes	Yes	Neutralized to Sanitary Sewer
Electrical Shop	850	Yes	No	--
Environmental Systems	850	Yes	No	--
Phase Dock	850	Yes	Yes	Contractor
Hydraulic Shop	850	Yes	Yes	Contractor
Machine Shop	850	Yes	No	--
Sheet Metal Shop	850	Yes	Yes	Contractor
Welding Shop	850	Yes	No	--
Wheel & Tire Shop	850	Yes	Yes	Contractor
Photo Laboratory*	901	Yes	Yes	DPDO at Griffiss AFB
Security Police*	901	Yes	Yes	General Refuse
Battery Shop*	902	Yes	Yes	Neutralized to Sanitary Sewer
Fuel Systems*	902	Yes	Yes	AGE Shop/Contractor

APPENDIX E
MASTER LIST OF SHOPS
(Continued)

Name	Present Location (Bldg. No.)	Handles Hazardous Materials	Generates Hazardous Wastes	Current T.S.D. Methods
Hydraulic Shop*	902	Yes	Yes	General Refuse/ Contractor
Mars/Fuel System*	902	Yes	Yes	Contractor
Metals Process*	902	Yes	Yes	Contractor
Survival Equipment*	902	Yes	No	--
Tire Shop*	902	Yes	Yes	Contractor
Vehicle Maintenance*	906	Yes	Yes	Contractor

*New York Air National Guard Facilities

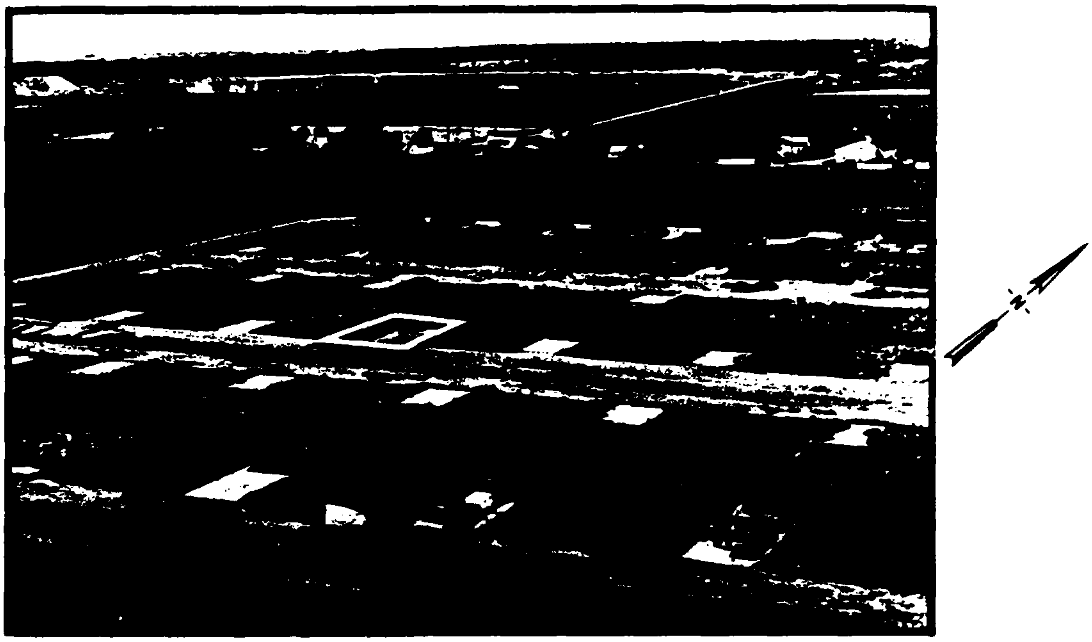
APPENDIX F

SITE PHOTOGRAPHS

NIAGARA FALLS AFRF

AFRES Hazardous Drum Storage Area

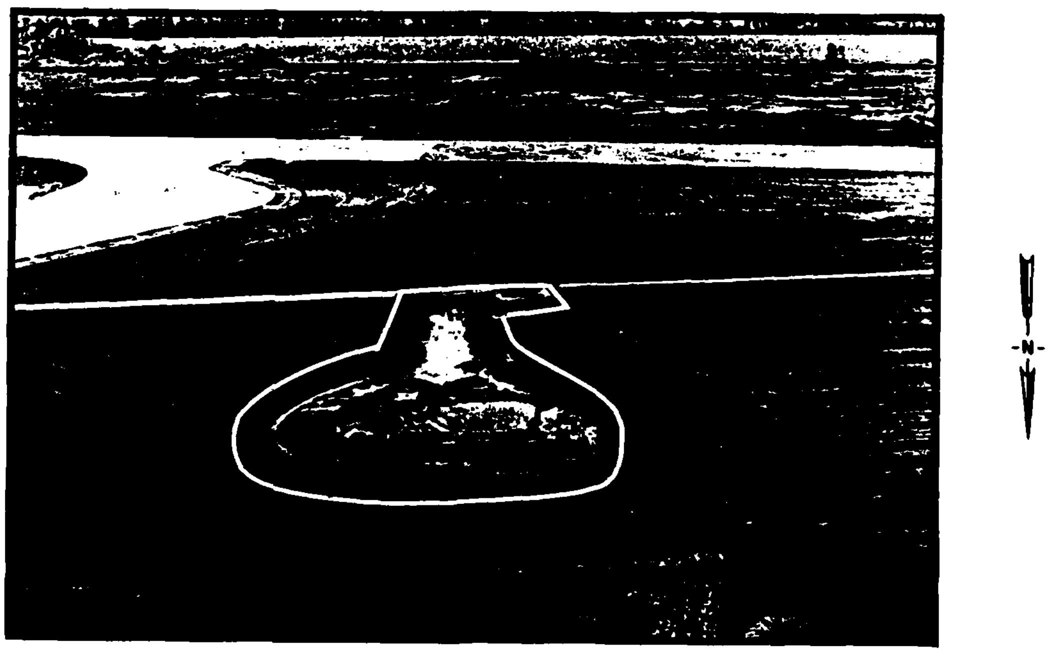
NIAGARA FALLS AFRF



NYANG Hazardous Drum Storage Area

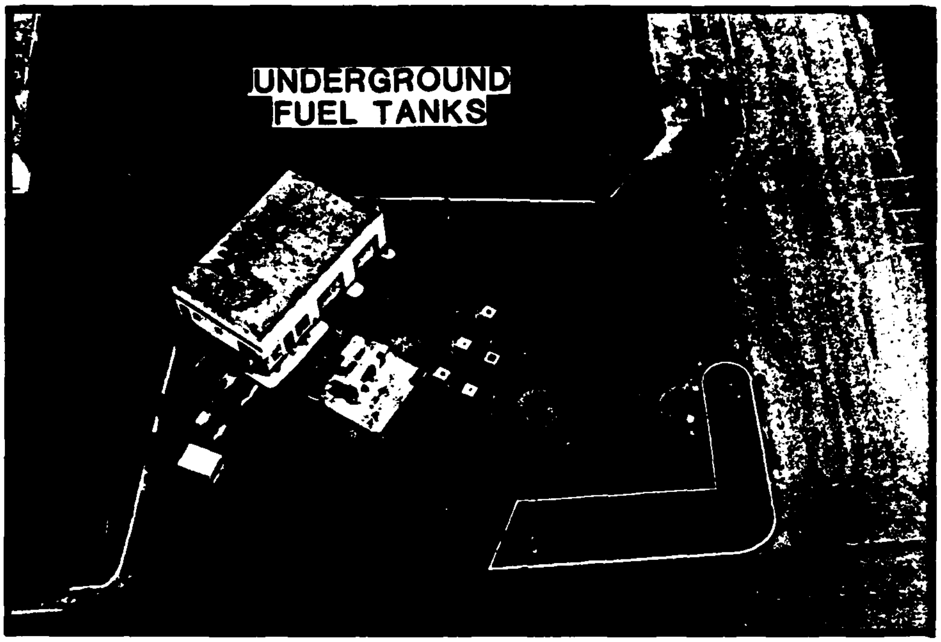
NYANG Hazardous Drum Storage Area

Fire Training Facility No. 3

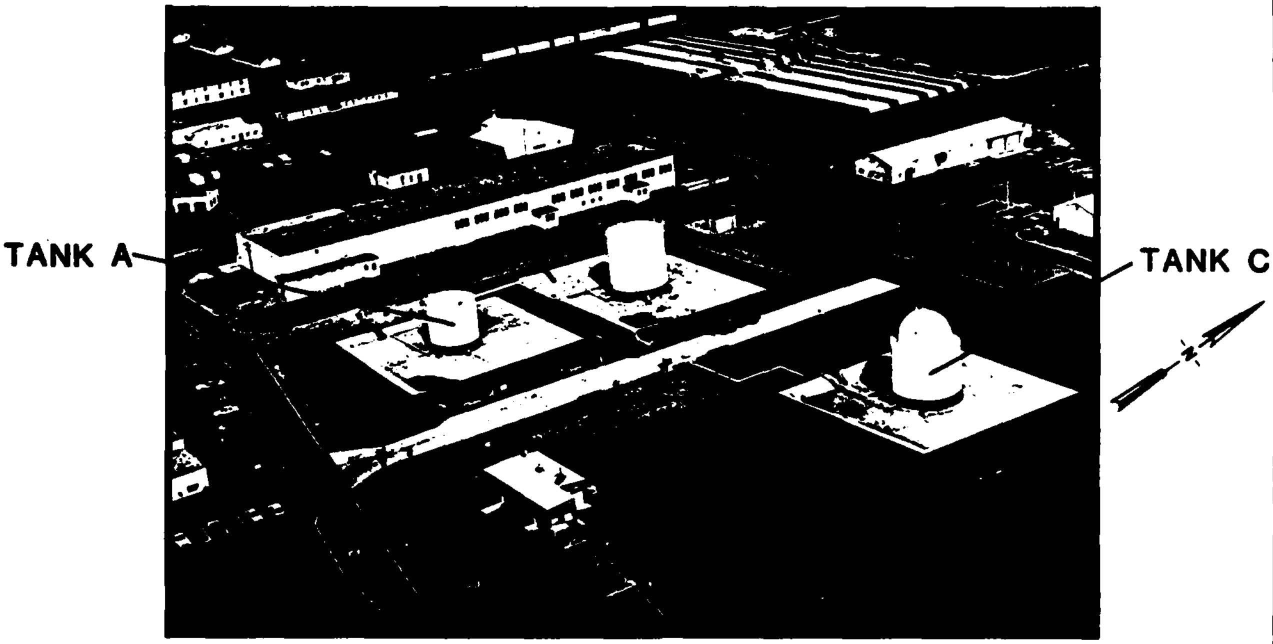


Fire Training Facility No. 3

NIAGARA FALLS AFRF

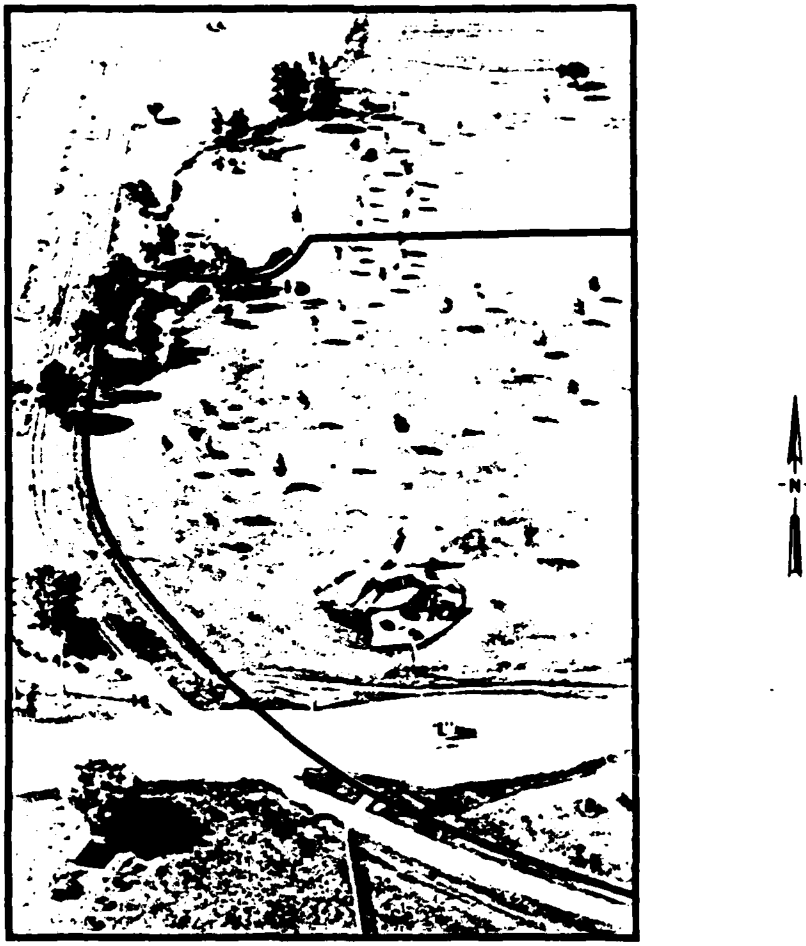


BX Service Station

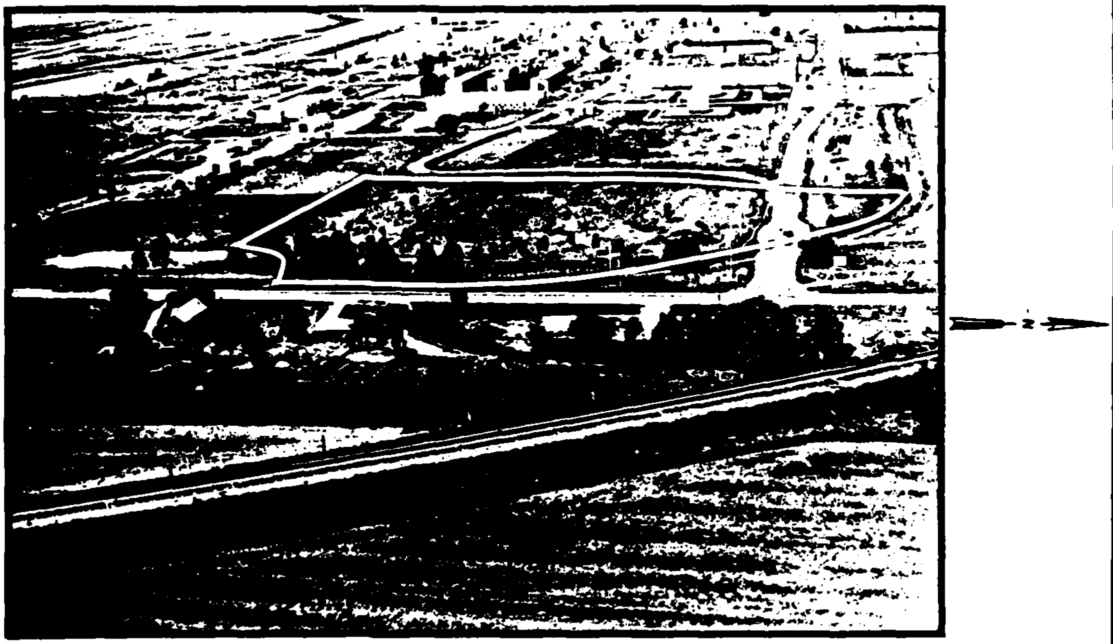


POL Storage Area

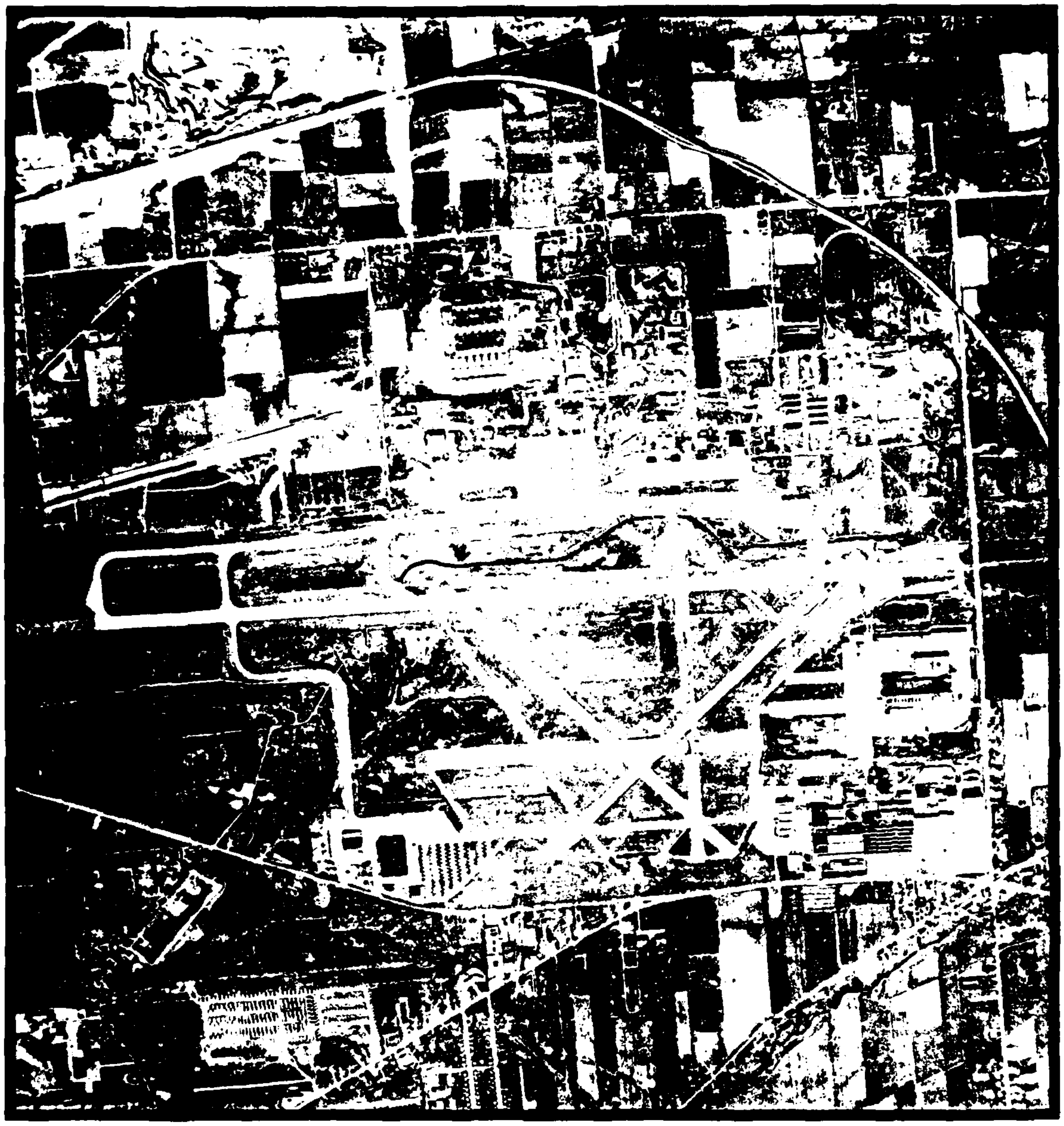
NIAGARA FALLS AFRF



Landfill

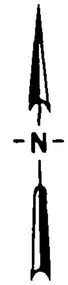


Landfill



NIAGARA FALLS AFRF

NOVEMBER 3, 1961



APPENDIX G

HAZARD ASSESSMENT RATING METHODOLOGY

APPENDIX G

USAF INSTALLATION RESTORATION PROGRAM

HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

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 Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with represenatives from USAF Occupational and Environmental Health Laboratory (OEHL), Air Force Engineering and Services Center (AFESC), Engineering-Science (ES) and CH2M Hill. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of USAF OEHL, AFESC, various major commands, Engineering-Science, and CH2M Hill met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

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 Force in setting priorities for follow-on site investigations and confirmation work under Phase II of the IRP.

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 Records Search portion (Phase I) of the IRP. Scoring judgments 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 at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination, the waste and its characteristics, potential pathways for waste contaminant migration, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant and adding the weighted scores to obtain a total category score.

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. 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 three possible routes is used. These routes are surface water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. 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 scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Sites at which there is no containment are not reduced in score. Scores for sites with limited 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.

FIGURE 1

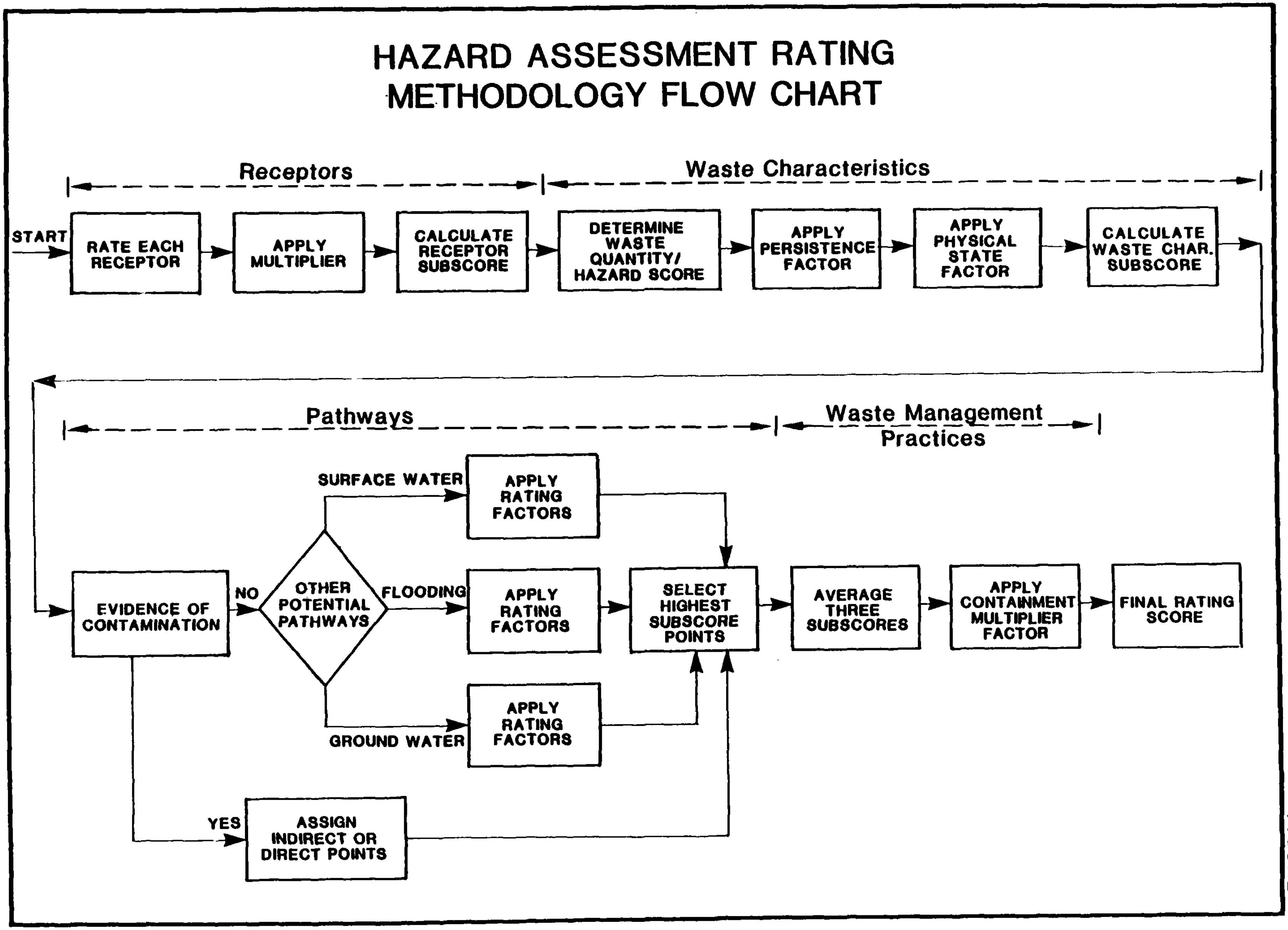

HAZARD ASSESSMENT RATING
METHODOLOGY FLOW CHART
Receptors
Waste Characteristics
START
RATE EACH RECEPTOR
APPLY MULTIPLIER
CALCULATE RECEPTOR SUBSCORE
DETERMINE WASTE QUANTITY/ HAZARD SCORE
APPLY PERSISTENCE FACTOR
APPLY PHYSICAL STATE FACTOR
CALCULATE WASTE CHAR. SUBSCORE
Pathways
Waste Management Practices
EVIDENCE OF CONTAMINATION
NO
OTHER POTENTIAL PATHWAYS
SURFACE WATER
FLOODING
GROUND WATER
APPLY RATING FACTORS
APPLY RATING FACTORS
APPLY RATING FACTORS
YES
ASSIGN INDIRECT OR DIRECT POINTS
SELECT HIGHEST SUBSCORE POINTS
AVERAGE THREE SUBSCORES
APPLY CONTAINMENT MULTIPLIER FACTOR
FINAL RATING SCORE

FIGURE 2

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE ______

LOCATION ______

DATE OF OPERATION OR OCCURRENCE ______

OWNER/OPERATOR ______

COMMENTS/DESCRIPTION ______

SITE RATED BY ______

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		
		Subtotals	______	______

Receptors subscore (100 X factor score subtotal/maximum score subtotal) ______

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) ______
2. Confidence level (C = confirmed, S = suspected) ______
3. Hazard rating (H = high, M = medium, L = low) ______

Factor Subscore A (from 20 to 100 based on factor score matrix) ______

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

______ X ______ = ______

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

______ X ______ = ______

FIGURE 2 (Continued)

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ______

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 (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		

Subtotals ______ ______

Subscore (100 X factor score subtotal/maximum score subtotal) ______

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding		1		

Subscore (100 x factor score/3) ______

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		

Subtotals ______ ______

Subscore (100 x factor score subtotal/maximum score subtotal) ______

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore ______

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors ______
Waste Characteristics ______
Pathways ______

Total ______ divided by 3 = ______
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

______ x ______ = [ ]

TABLE 1

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

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 of 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

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

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.
- o Based on the above, a determination of the types and quantities of waste disposed of at the site.

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records.
- o Logic based on a 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

Hazard Category	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

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

II. **WASTE CHARACTERISTICS (Continued)**

Waste Characteristics Matrix

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

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

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

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 directly 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 Factor	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes 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 in.	-10 to + 5 in.	+5 to +20 in.	Greater than +20 in.	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-hr rainfall	<1.0 inch	1.0-2.0 inches	2.1-3.0 inches	>3.0 inches	8

B-2 POTENTIAL FOR FLOODING

Rating Factor	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 25-year flood-plain	In 10-year flood-plain	Floods annually	1

B-3 POTENTIAL FOR GROUND-WATER CONTAMINATION

Rating Factor	0	1	2	3	Multiplier
Depth to ground water	Greater than 500 ft	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
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 submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

TABLE 1 (Continued)

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

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 Proection 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-B-3, then leave blank for calculation of factor score and maximum possible score.

APPENDIX H

SITE ASSESSMENT RATING FORMS

APPENDIX H

TABLE OF CONTENTS

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: BLDG. 600 JP-4 PIPELINE LEAK
Location: BLDG. 600
Date of Operation or Occurance: 1969
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: DETECTED WHEN LOCAL GRASS WOULDN'T GROW

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			97	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 54

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 (1=small, 2=medium, 3=large) 3
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.80 = 80

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.00 = 80

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	2	8	16	24
Direct access to ground water	2	8	16	24
Subtotals			84	114
Subscore (100 x factor score subtotal/maximum score subtotal)				74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		54	
Waste Characteristics		80	
Pathways		80	
Total	214 divided by 3 =		71 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

71 x 1.00 = 71

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: POL JP-4 TANK C
Location: POL STORAGE AREA
Date of Operation or Occurance: 1982
Owner/Operator: NIAGARA FALLS AFRF
Comments/Description: FUEL APPEARED IN DIKE AND OIL/WATER SEPARATER

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			97	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 54

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 (1=small, 2=medium, 3=large) 3
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.80 = 80

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.00 = 80

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	2	8	16	24
Direct access to ground water	2	8	16	24
Subtotals			84	114
Subscore (100 x factor score subtotal/maximum score subtotal)				74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		54	
Waste Characteristics		80	
Pathways		80	
Total	214 divided by 3 =		71 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

71 x 1.00 = 71

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: LANDFILL
Location: SOUTH OF MAINGATE TO WALMORE ROAD
Date of Operation or Occurance: 1952-1969
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: Closed landfill, trench and fill operation, some burning

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			107	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 59

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 (1=small, 2=medium, 3=large) 2
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.90 = 72

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

72 x 1.00 = 72

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	3	8	24	24
Direct access to ground water	3	8	24	24
Subtotals			100	114
Subscore (100 x factor score subtotal/maximum score subtotal)				88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		59
Waste Characteristics		72
Pathways		88
Total	219 divided by 3 =	73 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

73 x 0.95 = 69

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: BX MOGAS TANK LEAK
Location: BX SERVICE STATION
Date of Operation or Occurance: 1981
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: UNDERGROUND TANK LEAK

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			97	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 54

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 (1=small, 2=medium, 3=large) 2
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.80 = 64

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.00 = 64

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	3	8	24	24
Direct access to ground water	3	8	24	24
Subtotals			100	114
Subscore (100 x factor score subtotal/maximum score subtotal)				88

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 88

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54		
Waste Characteristics	64		
Pathways	88		
Total 206	divided by 3 =	69	Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

69 x 1.00 = 69

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: NYANG HAZARDOUS WASTE DRUM STORAGE
Location:OLD BOMARC MISSLE AREA
Date of Operation or Occurance: PRESENT
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: NO SECONDARY CONTAINMENT

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			110	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 61

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 (1=small, 2=medium, 3=large) 1
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 1.00 = 60

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.00 = 60

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			42	108
Subscore (100 x factor score subtotal/maximum score subtotal)				39
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	61	
Waste Characteristics	60	
Pathways	80	
Total	201 divided by 3 =	67 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

67 x 1.00 = \ 67 \

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: POL JP-4 TANK A
Location: POL STORAGE AREA
Date of Operation or Occurance: 1979
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: SOIL AROUND TRUCK UNLOADING AREA AND SOIL IN DIKE WALLS WERE CONTAMINATED WITH FUEL
Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			97	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 54

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 (1=small, 2=medium, 3=large) 2
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.80 = 64

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.00 = 64

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	2	8	16	24
Direct access to ground water	2	8	16	24
Subtotals			84	114
Subscore (100 x factor score subtotal/maximum score subtotal)				74

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		54	
Waste Characteristics		64	
Pathways		80	
Total	198	divided by 3 =	66 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

66 x 1.00 = 66

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: JP-4 TANK TRUCK SPILL
Location: AFRES TRANSIENT APRON
Date of Operation or Occurance: 1983
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: TRUCK OVERTURNED AND SPILLED ITS CONTENTS ONTO RUNWAY AND GRASS

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			97	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 54

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 (1=small, 2=medium, 3=large) 2
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.80 = 64

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.00 = 64

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			42	108
Subscore (100 x factor score subtotal/maximum score subtotal)				39
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		54		
Waste Characteristics		64		
Pathways		80		
Total	198	divided by 3 =	66	Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

66 x 1.00 = 66

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: BLDG. 202 DRUM STORAGE YARD
Location: BLDG. 202
Date of Operation or Occurance: MID 1970'- 1983
Owner/Operator: NIAGARA FALLS AFRF
Comments/Description: DRUMS WERE REMOVED JUST PRIOR TO SITE VISIT

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			110	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 61

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 (1=small, 2=medium, 3=large) 1
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 2

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.80 = 40

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.00 = 40

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		61	
Waste Characteristics		40	
Pathways		80	
Total	181 divided by 3 =		60 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

60 x 1.00 = \ 60 \

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: FIRE TRAINING FACILITY NO.3
Location: WEST END OF EAST/WEST RUNWAY
Date of Operation or Occurance: 1963 - PRESENT
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: CURRENTLY IN USE

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			112	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 62

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 (1=small, 2=medium, 3=large) 2
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 1

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.80 = 64

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.00 = 64

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			58	108
Subscore (100 x factor score subtotal/maximum score subtotal)				54
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 54

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		62
Waste Characteristics		64
Pathways		54
Total	180 divided by 3 =	60 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

60 x 0.95 = 57

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: FIRE TRAINING FACIT: NO. 1
Location: NEAR OLD BLDG. 726
Date of Operation or Occurance: 1955-1963
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: NO VISUAL EVIDENCE OF THIS SITE WAS OBSERVED DURING THE SITE VISIT

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			97	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 54

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 (1=small, 2=medium, 3=large) 2
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.80 = 64

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.00 = 64

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	1	1	1	3
Subscore (100 x factor score/3)				33
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 46

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		54
Waste Characteristics		64
Pathways		46
Total	164 divided by 3 =	55 Gross total score

B. Apply factor for waste containment from waste management practices.
Gross total score x waste management practices factor = final score

55 x 0.95 = 52

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: FIRE TRAINING FACILITY NO.2
Location: NEAR BLDG.'S 904 AND 905
Date of Operation or Occurance: 1950'S
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: ONLY USED TEN TO FIFTEEN TIMES

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundry	2	6	12	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			104	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 58

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 (1=small, 2=medium, 3=large) 1
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.80 = 48

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.00 = 48

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 46

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		58	
Waste Characteristics		48	
Pathways		46	
Total	152	divided by 3 =	51 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

51 x 1.00 = 51

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: BLDG. 850 DRUM STORAGE YARD
Location: BLDG. 850
Date of Operation or Occurance: 1950'S - EARLY 1960'S
Owner/Operator: NIAGARA FALLS AFRF
Comments/Description: NO VISUAL EVIDENCE OF THIS SITE WAS OBSERVED DURING THE SITE VISIT.

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	2	10	20	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundry	2	6	12	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			104	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 58

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 (1=small, 2=medium, 3=large) 1
2. Confidence level (1=confirmed, 2=suspected) 1
3. Hazard rating (1=low, 2=medium, 3=high) 2

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.80 = 40

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.00 = 40

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 46

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors		58
Waste Characteristics		40
Pathways		46
Total	144	divided by 3 = 48 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

48 x 1.00 = 48

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of Site: AFRES HAZARDOUS WASTE DRUM STORAGE
Location:OTIS DRIVE
Date of Operation or Occurance:
Owner/Operator: NIAGARA FALLS AFRB
Comments/Description: FENCED; NO DIKES

Site Rated by: GREGORY, HARMON & REIMER

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	1	10	10	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundry	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			97	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 54

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 (1=small, 2=medium, 3=large) 1
2. Confidence level (1=confirmed, 2=suspected) 2
3. Hazard rating (1=low, 2=medium, 3=high) 3

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.00 = 40

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.00 = 40

III. PATHWAYS

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 exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 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.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
Subtotals			50	108
Subscore (100 x factor score subtotal/maximum score subtotal)				46
2. Flooding	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			52	114
Subscore (100 x factor score subtotal/maximum score subtotal)				46

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 46

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54		
Waste Characteristics	40		
Pathways	46		
Total 140 divided by 3 =		47	Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

47 x 0.95 = 44

APPENDIX I

REFERENCES

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REFERENCES

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APPENDIX J

GLOSSARY OF TERMINOLOGY AND ABBREVIATIONS

APPENDIX J

GLOSSARY OF TERMINOLOGY AND ABBREVIATIONS

ABG: Air Base Group

AF: Air Force

AFB: Air Force Base

AFCS: Air Force Communications Service

AFFF: Aqueous Film Forming Foam, a fire extinguishing agent

AFR: Air Force Regulation

AFRF: Air Force Reserve Facility

AFS: Air Force Station

AFSC: Air Force Systems Command

AGE: Air-Ground Equipment

AMS: Avionics Maintenance Squadron

ANG: Air National Guard

APS: Aerial Port Squadron

ARTESIAN: Ground water contained under hydrostatic pressure significantly greater than atmospheric. The water level in an artesian well stands above the top of the artesian water body it taps

AQUIFER: a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs

AVGAS: Aviation Gasoline

BASALT: A dark-grey to black, fine-grained igneous rock.

BEE: Bioenvironmental Engineer

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act

CES: Civil Engineering Squadron

CIRCA: About; used to indicate an approximate date

COD: Chemical Oxygen Demand, a measure of the amount of oxygen required to oxidize organic and oxidizable inorganic compounds in water

COE: Corps of Engineers

CONFINING BED: A body of impermeable material stratigraphically adjacent to one or more aquifers

CONTAMINATION: The degradation of natural water quality to the extent that its usefulness is impaired; there is no implication of any specific limits since the degree of permissible contamination depends upon the intended end use or uses of the water

DET: Detachment

DFSA: Defense Fuel Supply Agency

DFSP: Defense Fuel Support Point

DISPOSAL FACILITY: A facility or part of a facility at which hazardous waste is intentionally placed into or on land or water, and at which waste will remain after closure

DISPOSAL OF HAZARDOUS WASTE: The discharge, deposit, injection, dumping, spilling, or placing of any hazardous waste into or on land or water so that such waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground water

DOD: Department of Defense

DOWNGRADIENT: In the direction of lower hydraulic static head; the direction in which ground water typically flows

DPDO: Defense Property Disposal Office, formerly Redistribution and Marketing

DUMP: An uncovered land disposal site where solid and/or liquid wastes are deposited with little or no regard for pollution control or aesthetics; dumps are susceptible to open burning and are exposed to the elements, disease, vectors and scavengers

EFFLUENT: A liquid waste discharge from a manufacturing or treatment process, in its natural state, or partially or completely treated, that discharges into the environment

EOD: Explosive Ordnance Disposal

EP: Extraction procedure, the EPA's standard laboratory procedure for leachate generation

EPA: Environmental Protection Agency

EROSION: The wearing away of land surface by wind, water or chemical processes

FAA: Federal Aviation Administration

FACILITY: Any land and appurtenances thereon and thereto used for the treatment, storage and/or disposal of hazardous wastes

FELDSPATHIC: Containing feldspar, an aluminum silicate mineral

FIS: Fighter Interceptor Squadron

FLOW PATH: The direction or movement of ground water as governed principally by the hydraulic gradient

FMS: Field Maintenance Squadron

FPTA: Fire Protection Training Area

GATR: Ground/Air Transmitter-Receiver Site

GC/MS: Gas chromatograph/mass spectrophotometer, a laboratory procedure for identifying unknown compounds

GROUND WATER: Water beneath the land surface in the saturated zone that is under atmospheric or artesian pressure

GROUND-WATER RESERVOIR: The earth materials and the intervening open spaces that contain ground water

GPD: Gallons per day

GPD/FT: Gallons per day per foot

GPM: Gallons per minute

HARDFILL: Disposal sites receiving construction debris, wood, miscellaneous spoil material

HARM: Hazardous Assessment Rating Methodology

HAZARDOUS WASTE: As defined in RCRA, a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

HAZARDOUS WASTE GENERATION: The act or process of producing a hazardous waste

HEAVY METALS: Metallic elements, including the transition series, which include many elements required for plant and animal nutrition in trace concentrations but which become toxic at higher concentrations

HQ: Headquarters

HWMF: Hazardous Waste Management Facility

INCOMPATIBLE WASTE: A waste unsuitable for commingling with another waste or material because the commingling might result in generation of extreme heat or pressure, explosion or violent reaction, fire, formation of substances which are shock sensitive, friction sensitive, or otherwise have the potential for reacting violently, formation of toxic dusts, mists, fumes, and gases, volatilization of ignitable or toxic chemicals due to heat generation in such a manner that the likelihood of contamination of ground water or escape of the substance into the environment is increased, any other reaction which might result in not meeting the air, human health, and environmental standards.

INFILTRATION: The movement of water through the soil surface into the ground

IRP: Installation Restoration Program

JP-4: Jet Propulsion Fuel Number Four

LEACHATE: A solution resulting from the separation or dissolving of soluble or particulate constituents from solid waste or other man-placed medium by percolation of water

LEACHING: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water

LINER: A continuous layer of natural or man-made materials beneath or on the sides of a surface impoundment, landfill, or landfill cell which restricts the downward or lateral escape of hazardous waste, hazardous waste constituents or leachate

LOAM: A soil consisting of varying proportions of clay, sand and organic matter.

MEK: Methyl Ethyl Ketone

MGD: Million gallons per day

MOGAS: Motor gasoline

MONITORING WELL: A well used to measure ground-water levels and to obtain water-quality samples

MWR: Morale-Welfare and Recreation

NCO: Non-commissioned Officer

NCOIC: Non-commissioned Officer In-Charge

NDI: Non-destructive inspection

NGVD: National Geodetic Vertical Datum of 1929

NPDES: National Pollutant Discharge Elimination System

NYANG: New York Air National Guard

NYDEC: New York Department of Environmental Conservation

OEHL: Occupational and Environmental Health Laboratory

OMS: Organizational Maintenance Squadron

OPNS: Operations

ORGANIC: Being, containing or relating to carbon compounds, especially in which hydrogen is attached to carbon

OSI: Office of Special Investigations

PCB: Polychlorinated Biphenyls; liquids used as dielectrics in electrical equipment

PERCOLATION: Movement of moisture by gravity or hydrostatic pressure through interstices of unsaturated rock or soil

PMEL: Precision Measurement Equipment Laboratory

PERMEABILITY: The measure of the relative ease with which a porous medium can transmit a liquid under a potential gradient

PD-680: Cleaning solvent

pH: Negative logarithm of hydrogen ion concentration

PL: Public Law

POL: Petroleum, Oils and Lubricants

POLLUTANT: Any introduced gas, liquid or solid that makes a resource unfit for a specific purpose

POTENTIOMETRIC SURFACE: A surface which represents the static head. Pertaining to an aquifer, it is the level to which water will rise in tightly cased wells.

PPB: Parts per billion by weight

PPM: Parts per million by weight

RCRA: Resource Conservation and Recovery Act

RECHARGE AREA: A surface area in which surface water or precipitation percolates through the unsaturated zone and eventually reaches the zone of saturation. Recharge areas may be natural or manmade

RECHARGE: The addition of water to the ground-water system by natural or artificial processes

SANITARY LANDFILL: A land disposal site using an engineered method of disposing solid wastes on land in a way that minimizes environmental hazards

SATURATED ZONE: That part of the earth's crust in which all voids are filled with water

SCS: U.S. Department of Agriculture Soil Conservation Service

SLUDGE: Any garbage, refuse, or sludge from a waste treatment plant, water supply treatment, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations and from community activities, but does not include solid or dissolved materials in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges which are point source subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 USC 880); or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954 (68 USC 923)

SOIL USE LIMITATIONS:

SLIGHT: Only a few limitations, if any, and these can be easily overcome.

MODERATE: Limitations are present and must be recognized, but it is practical to overcome them.

SEVERE: Limitations are difficult to overcome and therefore the suitability for the specified use is questionable.

VERY SEVERE: Limitations are so restrictive that it may not be practical to overcome them.

SPILL: Any unplanned release or discharge of a hazardous waste onto or into the air, land, or water

SS: Supply Squadron

STORAGE OF HAZARDOUS WASTE: Containment, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste

STP: Sewage Treatment Plant

TAC: Tactical Air Command

TACC: Tactical Air Control Center

TASS: Tactical Air Support Squadron

TCE: Trichloroethylene

TFW: Tactical Fighter Wing

TOC: Total organic carbon; an analytical parameter measuring the total organic content of a sample

TOXICITY: The ability of a material to produce injury or disease upon exposure, ingestion, inhalation, or assimilation by a living organism

TRANSMISSIVITY: The rate at which water is transmitted through a unit width of aquifer under a unit hydraulic gradient

TREATMENT OF HAZARDOUS WASTE: Any method, technique, or process including neutralization designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize the waste or so as to render the waste nonhazardous

TSD: Treatment, storage or disposal

UNCONFINED GROUND WATER: Water in an aquifer that has a water table

UPGRADIENT: In the direction of increasing hydraulic static head; the direction opposite to the prevailing flow of ground water

USAF: United States Air Force

USAFSS: United States Air Force Security Service

USGS: United States Geological Survey

WATER TABLE: Surface in an unconfined water body at which the pressure is equal to that of the atmosphere

APPENDIX K

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APPENDIX K

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