

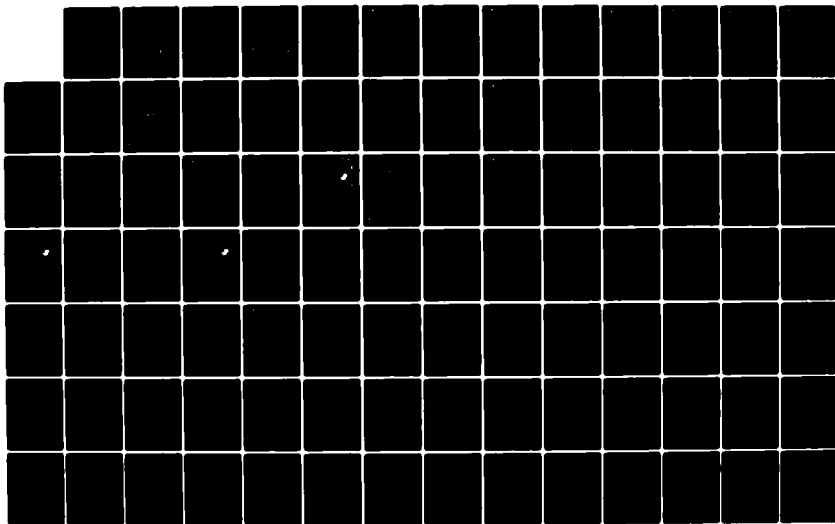
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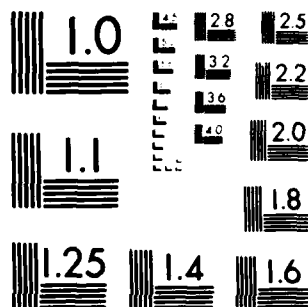
INSTALLATION RESTORATION PROGRAM PHASE I RECORDS LORING 1/3
AFB MAINE(U) CH2M HILL INC GAINESVILLE FL JAN 84
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INSTALLATION RESTORATION PROGRAM RECORDS SEARCH

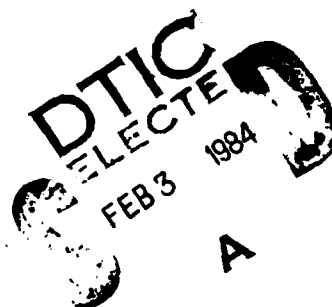
For
Loring Air Force Base, Maine



Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403
AND
STRATEGIC AIR COMMAND
DIRECTORATE OF ENGINEERING AND ENVIRONMENTAL PLANNING
OFFUTT AIR FORCE BASE, NEBRASKA 68113

JANUARY 1984



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INSTALLATION RESTORATION
PROGRAM RECORDS SEARCH

FOR

LORING AIR FORCE BASE, MAINE

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

AND

STRATEGIC AIR COMMAND
DIRECTORATE OF ENGINEERING
AND ENVIRONMENTAL PLANNING
OFFUTT AIR FORCE BASE, NEBRASKA 68113

Prepared by

CH2M HILL
7201 N.W. 11th Place
Gainesville, Florida



January 1984

Contract No. F08637-80-G0010-5005

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CONTENTS

	<u>Page</u>
LIST OF TABLES	vii
LIST OF FIGURES	viii
EXECUTIVE SUMMARY	
A. Introduction	-1-
B. Major Findings	-2-
C. Conclusions	-3-
D. Recommendations	-8-
I. INTRODUCTION	I-1
A. Background	I-1
B. Authority	I-2
C. Purpose of the Records Search	I-3
D. Scope	I-3
E. Methodology	I-5
II. INSTALLATION DESCRIPTION	II-1
A. Location	II-1
B. Organization and Mission	II-1
III. ENVIRONMENTAL SETTING	III-1
A. Meteorology	III-1
B. Physical Geography	III-3
C. Hydrology	III-14
D. Ecology	III-22
1. Habitat	III-22
2. Threatened and Endangered Species	III-23
IV. FINDINGS	IV-1
A. Activity Review	IV-1
1. Industrial Waste Disposal Practices	IV-1
2. Industrial Operations	IV-4
3. Fuels	IV-16
4. Fire Department Training Exercises	IV-20
5. Polychlorinated Biphenyls (PCBs)	IV-21
6. Pesticides	IV-22
7. Wastewater Treatment	IV-23
8. Available Water Quality Data	IV-26
9. Other Activities	IV-32
B. Disposal Sites Identification and Evaluation	IV-32
1. Landfills	IV-33
2. Other Sites	IV-41
C. Environmental Stress	IV-51

CONTENTS--Continued

	<u>Page</u>
V. CONCLUSIONS	V-1
VI. RECOMMENDATIONS	VI-1
VII. OFF-BASE FACILITIES	VII-1
APPENDICES	
A RESUMES OF TEAM MEMBERS	A-1
B OUTSIDE AGENCY CONTACT LIST	B-1
C LORING AFB RECORDS SEARCH INTERVIEW LIST	C-1
D INSTALLATION HISTORY	D-1
E MASTER LIST OF INDUSTRIAL OPERATIONS	E-1
F INVENTORY OF EXISTING POL STORAGE TANKS	F-1
G HAZARD ASSESSMENT RATING METHODOLOGY	G-1
H SITE RATING FORMS	H-1
I GLOSSARY OF TERMS	I-1
J LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT	J-1
K REFERENCES	K-1



TABLES

<u>Table</u>		<u>Page</u>
1	Priority Listing of Disposal Sites	-5-
2	Meteorological Data Summary for Loring AFB, Maine	III-2
3	Geologic Units in the Lower Aroostook River Basin and Their Water- Bearing Characteristics	III-11
4	Summary of Well Data	III-20
5	Major Industrial Operations Summary	IV-7
6	Water Quality Data for Raw and Treated Water at the Little Madawaska River Water Treatment Facility	IV-27
7	Recent Water Quality Data for Greenlaw Brook in the Vicinity of the Wastewater Treatment Plant, Loring AFB, Maine	IV-29
8	Water Quality Data from Wells on Loring AFB Developed in the Carys Mills Formation	IV-31
9	Disposal and Spill Sites Summary	IV-34
10	Summary of Disposal and Spill Site Ratings	IV-35
11	Priority Listing of Disposal and Spill Sites	V-4
12	Recommended Phase II Analyses	VI-3
13	Rationale for Recommended Analyses	VI-4



FIGURES

<u>Figure</u>		<u>Page</u>
1	Location Map of Identified Disposal and Spill Sites at Loring AFB	-4-
2	Records Search Methodology	I-6
3	Location Map of Loring AFB and Off-Base Facilities	II-2
4	Site Map of Loring AFB	II-3
5	Surface Drainage, Topography, and Well Location Map	III-4
6	Geologic Map	III-6
7	Map of Sand and Gravel Aquifers Associated with Esker Deposits	III-8
8	General Soil Map--Caribou--Conant Series	III-9
9	Typical Geologic Log and Well Construction Detail	III-18
10	Location Map of Identified Disposal and Spill Sites at Loring AFB	IV-36
11	Historical Summary of Activities at Landfills and Fire Department Training Areas at Loring AFB	IV-37
12	Recommended Preliminary Sampling Locations for Site No. 10--Flightline Drainage Ditch	VI-6
13	Recommended Preliminary Sampling Locations for Site No. 6--Fuels Tank Farm	VI-7
14	Recommended Preliminary Sampling Location for Site No. 8--Railroad Maintenance Site	VI-8
15	Recommended Preliminary Sampling Locations for Site No. 12--Flightline Area	VI-9
16	Recommended Preliminary Sampling Location for Site No. 13--BX Service Station	VI-10
17	Typical Bedrock Monitoring Well Installation	VI-11



EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

A. INTRODUCTION

1. CH2M HILL was retained on June 24, 1983 to conduct the Loring Air Force Base (AFB) records search under Contract No. F08637-80-G0010-5005, with funds provided by Strategic Air Command (SAC).

2. Department of Defense (DoD) policy, directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DoD facilities, control the migration of hazardous contamination from such facilities, and control hazards to health and welfare that may have resulted from these past operations.

3. To implement the DoD policy, a four-phase Installation Restoration Program has been directed. Phase I, the records search, is the identification of potential problems. Phase II (not part of this contract) consists of follow-on field work to determine the extent and magnitude of contaminant migration. Phase III (not part of this contract) consists of technology base development to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

4. The Loring AFB records search included a detailed review of pertinent installation records, 13 outside agency contacts for documents relevant to the records search effort, and an onsite base visit conducted by CH2M HILL during the

week of September 26 through 30, 1983. Activities conducted during the on-site base visit included interviews with 25 past and present base employees, a ground tour of the installation, and a detailed search of relevant installation records. (The Public Affairs Office provided a press release announcing the study and requesting persons knowledgeable of past disposal practices at the installation to contact Loring AFB.) The installations addressed in the records search include Loring AFB; the housing areas at Caribou, Caswell, Connor, Limestone and Presque Isle; the Blotner Radar Site; the Ashland RBS Site; the Scope Control Site near Caribou; the Madawaska Dam and Water Treatment Plant; and the Dow Pines Recreation Area near Bangor, Maine.

B. MAJOR FINDINGS

1. The total quantity of waste oils, recoverable fuels, spent solvents, and cleaners generated at Loring AFB is estimated to be approximately 35,000 gallons per year. This quantity could have been higher in the late 1950s and early 1960s when, based on a higher installation population, activity at the base was greater.

2. Standard procedures for past and present industrial waste disposal practices have been as follows: (1) fire department training exercises and landfills (1952-1968), (2) fire department training exercises (1968-1974), (3) fire department training exercises, burned as fuel at the central heating plant, and contractor removal (1974-1980) and (4) fire department training exercises and contractor removal (1980-present).

3. Interviews with past and present base employees resulted in the identification of 19 disposal or spill sites

at Loring AFB and the approximate dates that these sites were active. Figure 1 shows the locations of the identified sites.

C. CONCLUSIONS

1. Table 1 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other Loring AFB Sites) for environmental concerns.

- o Site No. 2--Landfill No. 2
- o Site No. 11--Nose Dock Area
- o Site No. 10--Flightline Drainage Ditch
- o Site No. 6--Fuels Tank Farm
- o Site No. 5--Quarry Site
- o Site No. 1--Landfill No. 1
- o Site No. 8--Railroad Maintenance Site
- o Site No. 7--Fire Department Training Area
- o Site No. 12--Flightline Area
- o Site No. 13--BX Service Station
- o Site No. 4--Receiver Site
- o Site No. 3--Landfill No. 3 (Active)

FIGURE 1.
Location Map of Identified Disposal and Spill Sites at Loring AFB.

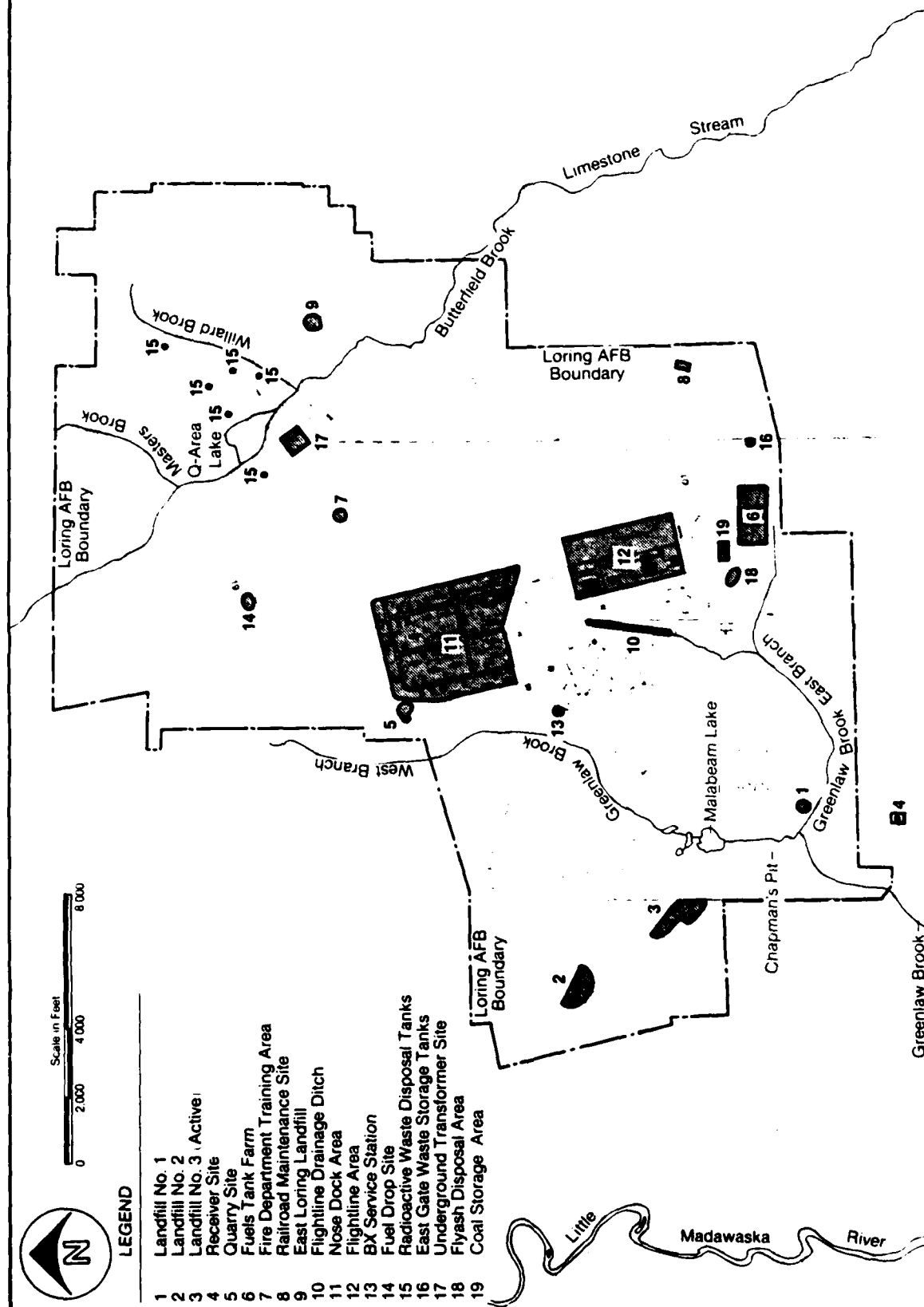


Table 1
PRIORITY LISTING OF DISPOSAL AND SPILL SITES

<u>Ranking</u>	<u>Site No.</u>	<u>Site Description</u>	<u>Overall Score</u>
1	2	Landfill No. 2	80
2	11	Nose Dock Area	75
3	10	Flightline Drainage Ditch	74
4	6	Fuels Tank Farm	72
5	5	Quarry Site	69
6	1	Landfill No. 1	65
7	8	Railroad Maintenance Site	65
8	7	Fire Department Training Area	64
9	12	Flightline Area	62
10	13	BX Service Station	61
11	4	Receiver Site	60
12	3	Landfill No. 3 (Active)	59
13	17	Underground Transformer Site	56
14	18	Flyash Disposal Area	50
15	19	Coal Storage Area	50
16	9	East Loring Landfill	49
17	14	Fuel Drop Site	47

o Site No. 17--Underground Transformer Site

2. Evidence of environmental stress due to past disposal/spills of hazardous wastes was observed at Loring AFB. At Site No. 8, the Railroad Maintenance Site, all of the vegetation that had been contacted by the spilled liquid wastes was either dead or severely stressed. At Site No. 13, the BX Service Station, a number of cedar trees in the area of the fuel-saturated soil appear to have been dead for several years.

3. Information obtained through interviews with 25 past and present base personnel, base records, shop folders, and field observations indicates that hazardous wastes have been disposed of on Loring AFB in the past.

4. The potential for ground-water migration of hazardous contaminants is moderate to high, primarily due to: (1) shallow depth to ground water, (2) the lack of a confining bed, and (3) proximity to nearby wells. The lack of data on ground-water movement, the large number of abandoned or out-of-service wells, and the lack of ground-water quality data raise the priority for monitoring at Loring AFB.

5. No direct evidence was found to indicate that migration of hazardous contaminants exists beyond the Loring AFB boundary. Indirect evidence of contamination and/or contaminant migration within the installation boundary was found at six sites:

o Nose Dock Area (Site No. 11):

During the base visit, oily liquid was observed on the ground at the Engine Test Cell located within the Nose Dock Area. In addition, a recent

engineering study (Reference No. 2) confirmed the presence of pockets of liquid wastes below the ground.

o Flightline Drainage Ditch (Site No. 10):

Strong fuel/solvent type odors were detected at this site during the base visit.

o Fuels Tank Farm (Site No. 6):

JP-4 fuel is known to be present in the ground in the vicinity of the main pump house located at this site.

o Railroad Maintenance Site (Site No. 8):

A large oily area was noted on the ground during the base visit. Also, a patch of dead weeds and grass was observed adjacent to the oily area, suggesting environmental stress.

o BX Service Station (Site No. 13):

Fuel-saturated soil was observed at this site during the base visit. Signs of environmental stress (dead trees) were also observed.

o Receiver Site (Site No. 4):

Fuel odors have been detected in the water well located at this site.

6. The remaining sites (Sites No. 9, 14, 15, 16, 18, and 19) are not considered to present significant concern for adverse effects on health or the environment.

7. The records search did not indicate any significant concerns for the off-base facilities consisting of the Blotner Radar Site, the Ashland RBS Site, the Scope Control Site, the Madawaska Dam and Water Treatment Plant and the Dow Pines Recreation Area. Therefore, no Phase II work is recommended for these facilities.

8. Numerous underground tanks store heating fuel at each of the off-base housing facilities. No evidence exists of ground-water contamination; however, the age of the tanks (approximately 25 years) increases the potential for ground-water contamination through metallic corrosion and resultant leaks.

D. RECOMMENDATIONS

1. A Phase II program that includes development of ground-water information for the base and site-specific monitoring is recommended to confirm or rule out the presence and/or migration of hazardous contaminants. The program includes developing a potentiometric map to indicate direction of ground-water movement. Selective water sampling analysis of these wells is also recommended. The potentiometric map will be used to locate upgradient and downgradient monitoring wells in connection with the site-specific monitoring recommendations. Site-specific monitoring recommendations include: (1) installation of upgradient and downgradient monitoring wells for sampling ground water at the zone consisting of Landfills No. 2 and 3 (active); (2) installation of monitoring wells to sample ground water in the Nose Dock Area (Site No. 11); (3) soil borings and surface water sampling at the Flightline Drainage Ditch (Site No. 10); (4) ground-water (via bore hole) and surface water sampling at the Fuels Tank Farm (Site No. 6); (5) installation of upgradient and downgradient monitoring wells for sampling ground water at Landfill No. 1 (Site No. 1); (6) surface liquid sampling at the Railroad Maintenance Site (Site No. 8);

(7) soil sampling at the Fire Department Training Area (Site No. 7); (8) ground water and soil sampling (via bore holes) at the Flightline Area (Site No. 12); (9) ground-water sampling (via bore hole) at the BX Service Station (Site No. 13); (10) ground-water sampling at the Receiver Site (Site No. 4); and (11) ground- water sampling at the Underground Transformer Site (Site No. 17).

Site No. 2, Landfill No. 2, is currently under investigation by EPA as a possible hazardous waste site; however, analyses of samples collected at the site were not available at the writing of this report. These analyses (priority pollutants), once received, should be used to supplement the monitoring efforts.

The priority for monitoring at Loring AFB is considered moderate to high. Details of the proposed Phase II monitoring program are provided in Section VI of this report.

2. The specific details of the monitoring program, including the exact locations of monitoring and sampling points should be finalized as part of the Phase II program. In the event that contaminants are detected at significant levels, a more extensive field survey program should be implemented to determine the extent of contaminant migration.

3. Other IRP recommendations include: (1) removal and analysis of tank contents at the East Gate Waste Storage Tanks (Site No. 16), proper disposal of the liquid, and securing of the tanks; (2) resampling and analysis of the radioactive waste disposal tanks (Site No. 15) contents to confirm or rule out the presence of radioactive materials; (3) securing of all inactive fuel tanks located in the October, 1983 tank survey; and (4) connection of the aircraft washrack discharge to the Loring AFB wastewater treatment facility.



I. INTRODUCTION

I. INTRODUCTION

A. BACKGROUND

The United States Air Force (USAF), 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 disposers identify the locations and contents of disposal sites and take action to eliminate the 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 and 3012 of the Act, Federal agencies are directed to assist the Environmental Protection Agency (EPA) and state agencies to inventory past disposal sites and make the information available to the requesting agencies.

The Department of Defense (DoD) developed the current Installation Restoration Program (IRP) to ensure compliance with these hazardous waste regulations. The current DoD IRP policy is contained in Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, dated 11 December 1981 and implemented by Headquarters Air Force message dated 21 January 1982. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the IRP. DoD policy is to identify and fully evaluate suspected problems associated with past hazardous material contamination, and to control hazards to health and welfare that may have resulted from these past operations. The IRP will be the basis for remedial 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. CERCLA is the primary Federal

legislation governing remedial actions at uncontrolled hazardous waste sites.

To conduct the IRP Hazardous Materials Disposal Sites Records Search for Loring AFB, Maine, CH2M HILL was retained on June 24, 1983 under Contract No. F08637-80-G0010-5005 with funds provided by Strategic Air Command.

The records search comprises Phase I of the DoD IRP and is intended to review installation records for the purpose of identifying possible hazardous waste-contaminated sites and assessing the potential for contaminant migration. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase II consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants and, if necessary, additional field work to determine the extent and magnitude of the contaminant migration. Phase III (not part of this contract) consists of technology base development to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous environmental conditions.

B. AUTHORITY

The identification of hazardous waste disposal sites at Air Force installations was directed by Defense Environmental Quality Program Policy Memorandum 81-5 (DEQPPM 81-5) dated 11 December 1981, and implemented by Headquarters Air Force message dated 21 January 1982, as a positive action to ensure compliance of Air Force installations with existing environmental regulations.

C. PURPOSE OF THE RECORDS SEARCH

The purpose of the Phase I records search is to identify and evaluate suspected problems associated with past hazardous material disposal sites and spill sites on DoD facilities. The existence and potential for migration of hazardous material contaminants were evaluated at Loring AFB by reviewing the existing information and conducting an analysis of installation records. Pertinent information included the history of operations, the geological and hydrogeological conditions which may have contributed to the migration of contaminants, and the ecological settings which indicated environmentally sensitive habitats or evidence of environmental stress. The evaluation is to determine which identified sites, if any, exhibit a significant potential for environmental impact and warrant further investigation. No sampling or field work is conducted during Phase I.

D. SCOPE

The records search program included a pre-performance meeting, an onsite installation visit, a review and analysis of the information obtained, and preparation of this report.

The pre-performance meeting was held at Loring AFB, Maine, on August 30, 1983. Attendees at this meeting included representatives of the Air Force Engineering and Services Center (AFESC), the Strategic Air Command Headquarters (SAC), Loring AFB, and CH2M HILL. The purpose of the pre-performance meeting was to provide detailed project instructions, to provide clarification and technical guidance by AFESC, and to define the responsibilities of all parties participating in the Loring AFB records search.

The onsite installation visit was conducted by CH2M HILL from September 26 through 30, 1983. Activities performed

during the onsite visit included a detailed search of installation records, ground tours, and interviews with installation personnel. At the conclusion of the onsite visit, the Base Commander, the Deputy Base Commander, the Civil Engineering Commander, and Base Bioenvironmental Engineer were briefed on the preliminary findings. The following individuals comprised the CH2M HILL records search team:

1. Mr. David Moccia, Project Manager (B.S., Chemical Engineering, 1971)
2. Mr. Gary Eichler, Hydrogeologist (M.S., Engineering Geology, 1974).
3. Dr. Robert Knight, Ecologist (M.S., Environmental Chemistry and Biology, 1973; Ph.D. Systems Ecology, 1980)

Resumes of these team members are included in Appendix A.

Government organizations were contacted for information and relevant documents. Appendix B lists the organizations contacted.

Individuals from the Air Force who assisted in the Loring AFB records search include the following:

1. Mr. Myron Anderson, AFESC, Program Manager, Phase I
2. Lt. James R. Krier, SAC, Command Representative

3. Mr. David Strainge, Loring AFB, Environmental Planner

4. Capt. Douglas Anderson, Loring AFB, Chief of Bioenvironmental Engineering Services

E. METHODOLOGY

The methodology used in the Loring AFB records search is shown in Figure 2. First, a review of past and present industrial operations was conducted at the installation. Information was obtained from available records such as shop files and real property files, as well as interviews with past and present base employees from the various operating areas of the installation. The information obtained from interviewees on past activities was based on their best recollection. A list of 25 interviewees from Loring AFB, with areas of knowledge and years at the installation, is shown in Appendix C.

The next step in the activity review process was to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from all the industrial operations on the base. This part of the activity review included the identification of past landfill sites and burial sites; as well as other possible sources of contamination such as major PCB or solvent spills, or fuel-saturated areas resulting from significant fuel spills or leaks.

A general ground tour of identified sites was then made by the records search team to gather site-specific information including evidence of environmental stress and the presence of nearby drainage ditches or surface-water bodies. These

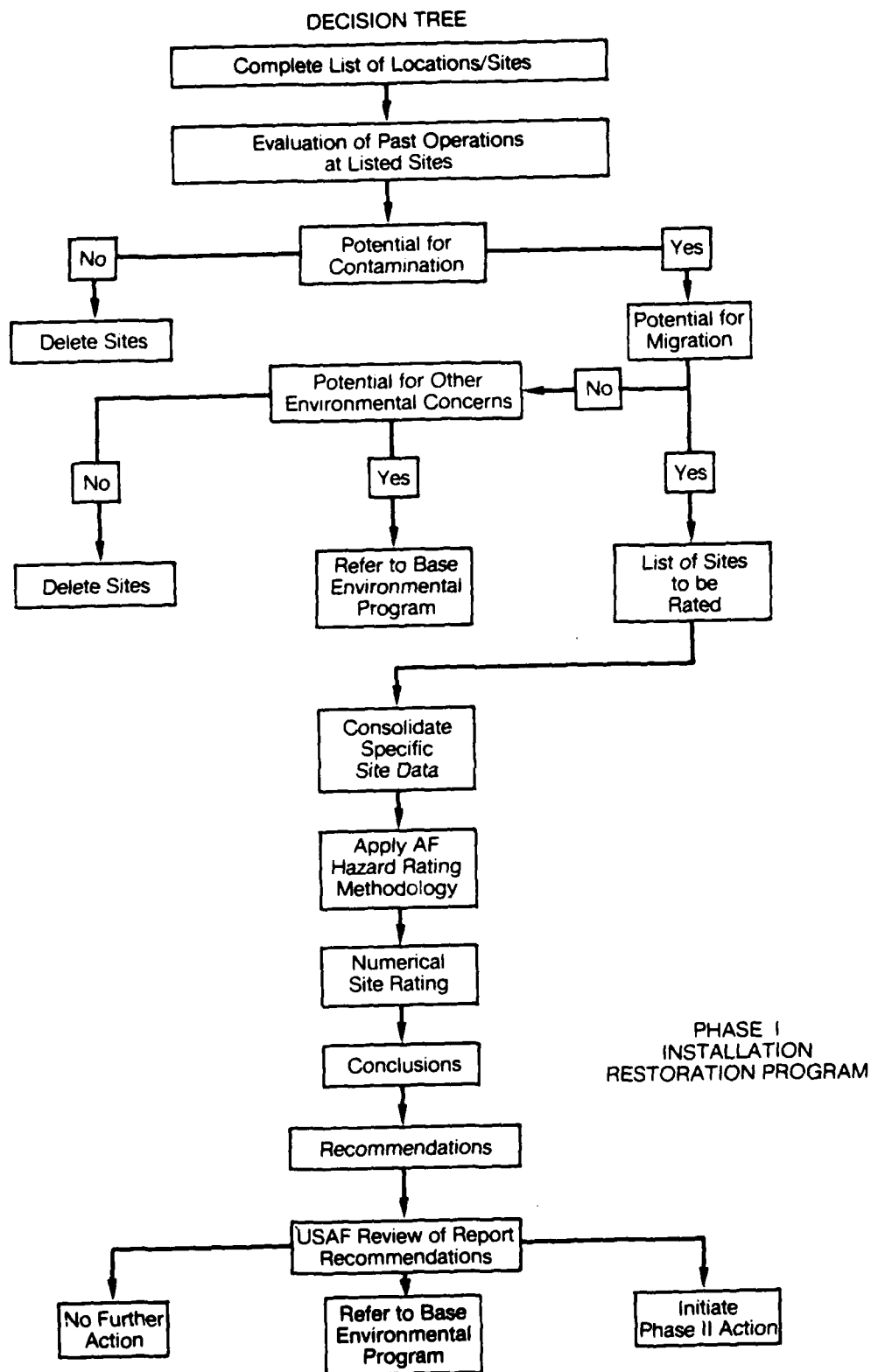


FIGURE 2.
Records Search Methodology.



water bodies were visually inspected for any evidence of contamination or leachate migration.

A decision was then made, based on all of the above information, as to whether a potential existed for hazardous material contamination from any of the identified sites. If not, the site was deleted from further consideration.

For those sites at which a potential for contamination was identified, the potential for migration of this contamination was evaluated by considering site-specific soil and ground-water conditions. If there was no potential for contaminant migration, but other environmental concerns were identified, the site was referred to the base environmental monitoring program. If no further environmental concerns were identified, the site was deleted from consideration. If the potential for contaminant migration was identified, then site specific information was evaluated and the site was rated and prioritized using the site rating methodology described in Appendix G, "Hazard Assessment Rating Methodology."

The site rating indicates the relative potential for adverse environmental impact at each site. For those sites showing a significant potential, recommendations were made to conduct a more detailed investigation of the potential contaminant migration problem under Phase II of the Installation Restoration Program. For those sites showing a low potential, no Phase II work was recommended.

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II. INSTALLATION DESCRIPTION

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A. LOCATION

Loring AFB is located on nearly 9,000 acres of land in Aroostook County, in northeastern Maine only 3 miles from the border with New Brunswick, Canada (see Figure 3). Nearby towns include Caribou, 8 miles to the west, and Limestone, approximately 2 miles to the east. The nearest commercial jet airport is located at Presque Isle, about 23 miles to the south along U.S. Highway 1. State Highway 89 provides access to Loring AFB via a west gate on Sawyer Road and an east gate on Corrow Road. The current base boundaries are shown in Figure 4. Off-base facilities include housing areas at Caribou, Caswell, Connor, Limestone, and Presque Isle; the Blotner Radar Site; the Ashland RBS Site; the Scope Control Site near Caribou; the Madawaska Dam and Water Treatment Plant; and the Dow Pines Recreation Area near Bangor, Maine. Locations and descriptions of these facilities are presented in Section VII, Off-Base Facilities, and, except for the Dow Pines Recreation Area, are shown in Figure 3.

B. ORGANIZATION AND MISSION

Loring AFB is the home of the Strategic Air Command's 42nd Heavy Bombardment Wing and is the U.S. base closest to any potential aggressor in Europe. The 42nd Bombardment Wing has direct control over the tactical units based at Loring AFB. These are the 69th Bomb Squadron, which flies the B-52 Stratofortress, and the 42nd and 407th Air Refueling Squadrons, which fly the KC-135 Stratotankers. Support services are provided by the 42nd Combat Support Group which includes the following units: administration, chaplain, civil engineers, base operations and training, personnel, services,

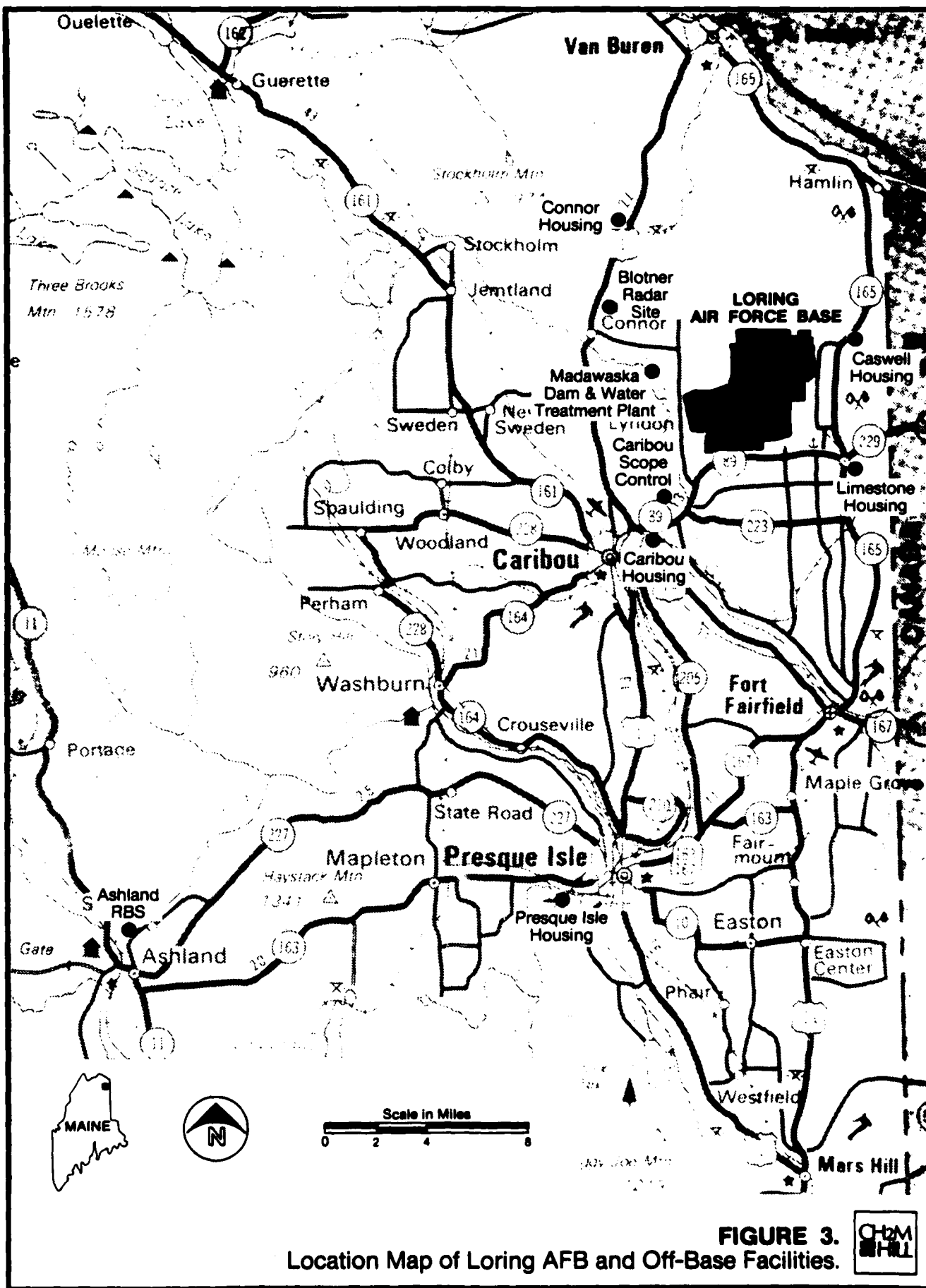


FIGURE 3.
Location Map of Loring AFB and Off-Base Facilities.



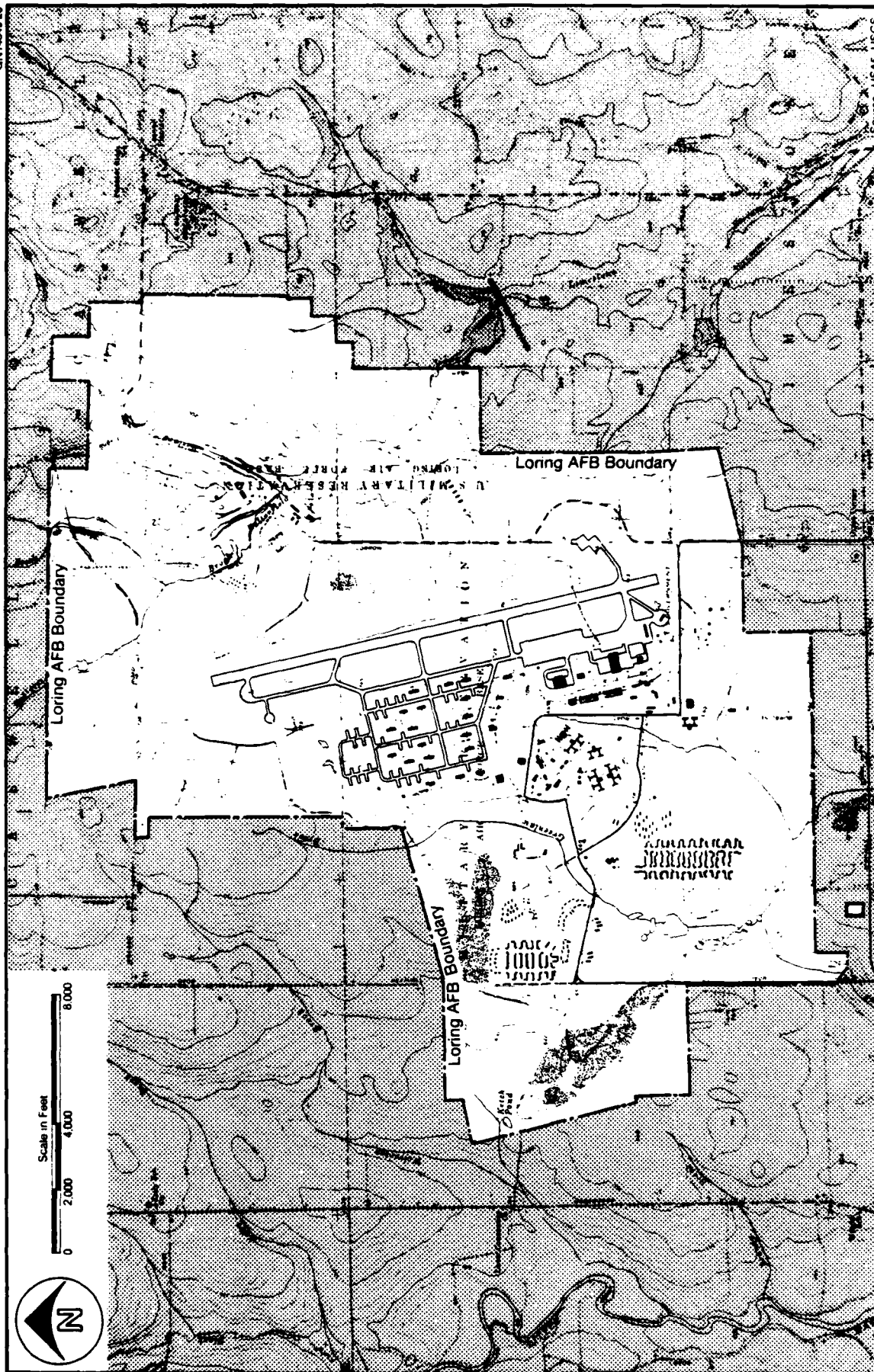


FIGURE 4.
Site Map of Loring AFB.

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special services, security police, and staff judge advocate. The total work force present at Loring AFB is approximately 3,200 military and 600 civilian personnel. A more detailed history of Loring AFB is included in Appendix D, Installation History.



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III. ENVIRONMENTAL SETTING

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A. METEOROLOGY

Loring AFB is located near 47° north latitude, in the northern temperate zone. This is the region of "prevailing westerlies" which bring frequently changing weather conditions resulting from intermittent passages of cold, dry polar air masses and warm, moist air streaming over the continent from the Gulf of Mexico. The procession of contrasting air masses and the relatively frequent passage of storms often bring about abrupt changes in temperature, sunshine, moisture, and wind. The only consistent feature of northern Maine's weather is its changeability; therefore, average values are of limited usefulness for predicting daily weather conditions.

The average annual temperature for Loring AFB is 39°F (Table 2) and monthly mean temperatures vary from 11°F in January to 66°F in July. The average daily minimum temperature in January is 3°F and the lowest recorded temperature at Loring AFB is -30°F. The average daily maximum temperature in July is 75°F while the highest temperature in 32 years of record is 95°F. On the average, freezing temperatures are recorded at Loring AFB 181 days per year .

Mean annual precipitation recorded at Loring AFB is about 39 inches. This rain and snow is evenly distributed throughout the year with no month averaging less than 2.5 inches. A considerable percentage of precipitation at Loring AFB results from snowfall, with an average of 118 inches per year. On the average, measurable snowfall occurs on 69 days per year . Lake evaporation at Loring AFB is estimated to be approximately 20 inches per year.

Table 2
METEOROLOGICAL DATA SUMMARY FOR LORING AFB, MAINE^a

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Ann.
<u>Temperature (°F)</u>													
Mean	11	14	25	37	50	60	66	63	54	43	32	17	39
Average Daily Maximum	19	23	33	45	60	70	75	72	63	51	38	24	48
Average Daily Minimum	3	6	17	29	40	50	56	53	44	35	25	10	31
Highest Recorded	47	57	72	77	89	93	95	94	85	79	67	58	95
Lowest Recorded	-30	-29	-16	2	19	32	37	35	23	17	-4	-24	-30
<u>Precipitation (inches)</u>													
Mean	2.6	2.5	2.6	2.6	3.0	3.4	4.0	4.4	3.7	3.3	3.5	3.3	38.9
Maximum Monthly	5.4	5.5	5.8	5.2	6.0	7.4	6.5	11.1	7.7	7.4	7.4	6.7	11.1
Minimum Monthly	0.4	0.3	0.5	0.4	0.5	1.3	1.8	1.1	1.1	1.1	1.4	1.0	0.3
Maximum in 24 hours	2.1	1.9	1.8	1.9	2.4	2.0	2.6	5.4	4.8	4.1	2.9	2.0	5.4
<u>Snowfall (inches)</u>													
Mean	25	24	21	9	1	b	b	b	b	2	11	25	118
Maximum Monthly	47	47	52	36	11	b	b	b	1	13	33	58	58
Maximum in 24 hours	14	19	14	19	6	b	b	b	1	11	15	17	19
<u>Relative Humidity (%)</u>													
Mean	65	63	52	64	62	67	69	69	72	68	73	73	67
<u>Surface Winds (Knots)</u>													
Mean	7	7	8	7	6	6	5	5	6	6	7	7	6
Maximum	51	50	48	52	51	40	50	48	45	45	48	47	52
Prevailing Direction	W	NNW	S	NW	S	S	S	S	S	S	S	NW	S

^aSource: United States Air Force, Loring AFB, Maine. Period of Record: 1950-1982.

^bLess than one inch.

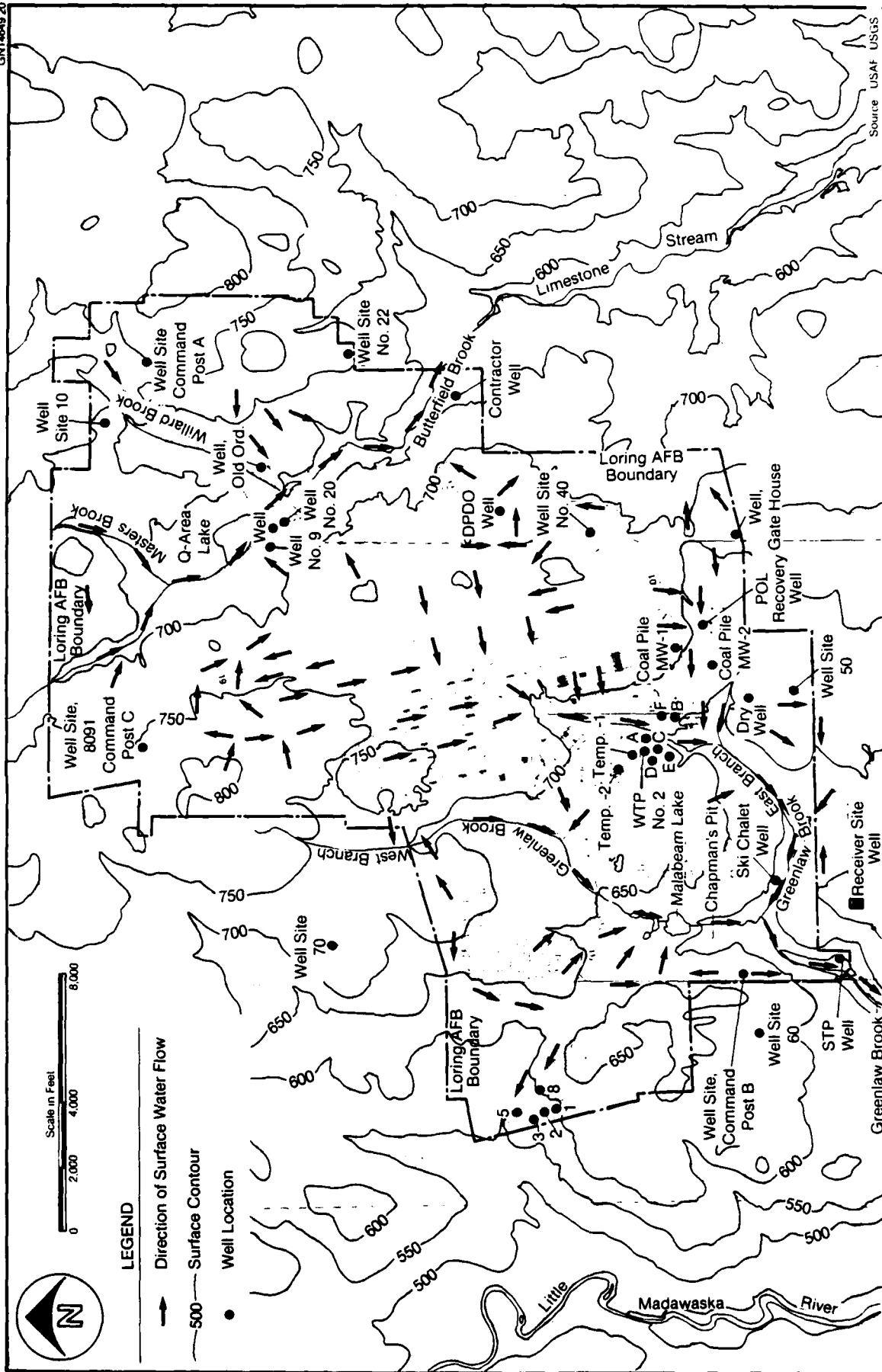
Evapotranspiration over land areas may be greater or less than lake evaporation depending on vegetative cover type and moisture availability. Average net precipitation is expected to be equal to the difference between average total precipitation and average lake evaporation, or approximately 19 inches per year.

An average of 17 thunderstorms per year have been recorded at Loring AFB. Extreme storm events such as tornadoes and hurricanes are infrequent in northern Maine; however, other severe storms, such as hail and ice storms, occasionally strike Loring AFB. The maximum precipitation recorded in a 24-hour period is 5.4 inches.

Mean cloud cover averages between 70 and 80 percent throughout the year at Loring AFB, and some fog is present on an average of 129 days per year. Wind speed averages 6 knots; however a maximum wind speed of 52 knots has been recorded. Wind direction is generally from the west and north in the winter and spring and from the south during the rest of the year.

B. PHYSICAL GEOGRAPHY

Loring AFB is located in the Lower Aroostook River Valley in an area of undulating hills. The base itself is located on a relatively flat plateau which slopes gently to the southwest. Elevations at the base range from approximately 800 feet msl in the northern portion to approximately 550 feet msl in the southwest corner (see Figure 5). The Lower Aroostook River Valley is characterized by alluvium, swamp deposits, lacustrine deposits, glacial outwash, ice-contact deposits, glacial till, and carbonate bedrock.



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FIGURE 5.
Surface Drainage, Topography, and Well Location Map.

Source USAF USGS

Soils occurring at the base are predominantly Caribou-Conant association (see Figure 6). This association is described by the U.S.D.A. Soil Conservation Service as follows:

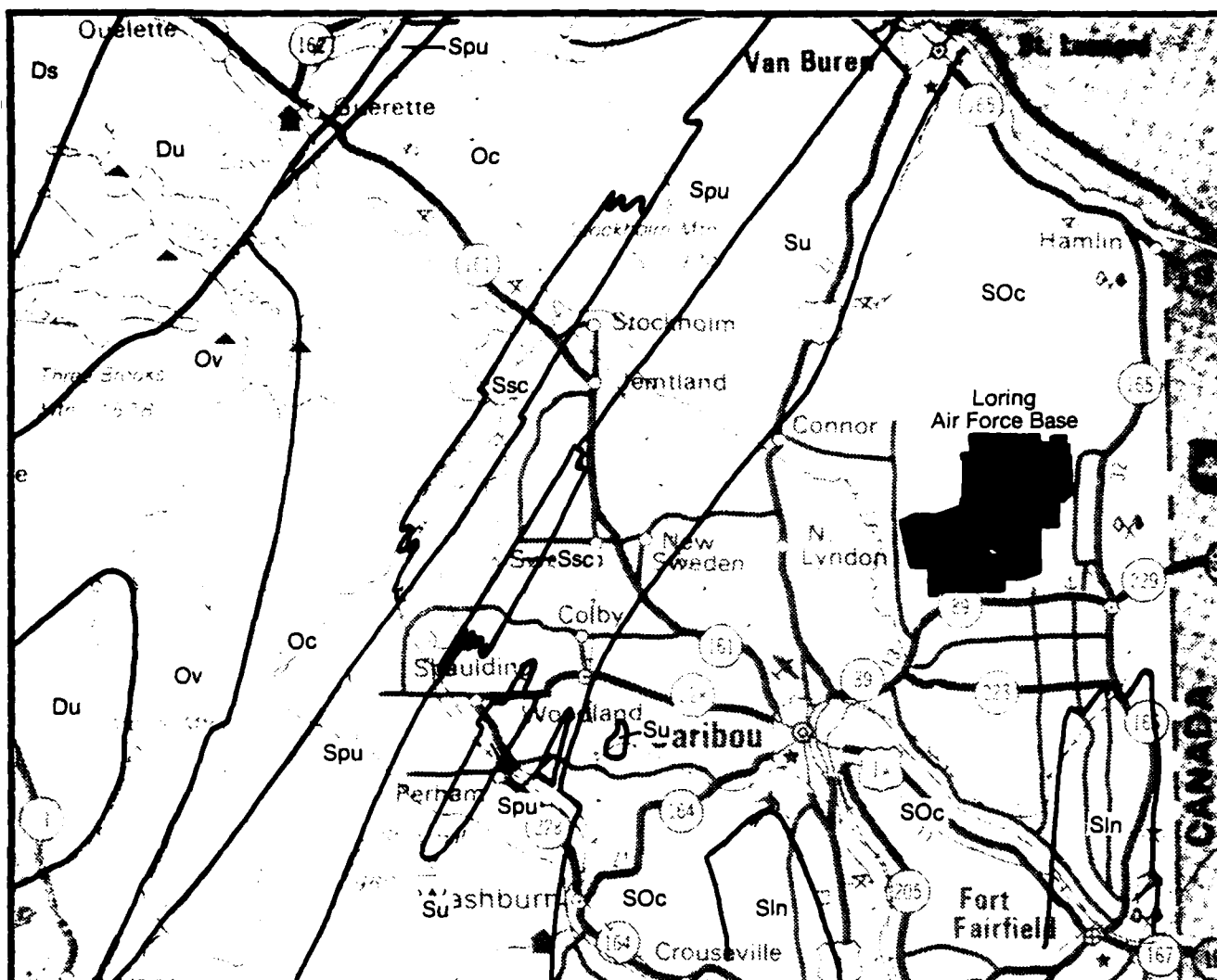
1. Caribou Soil Series

The Caribou series consists of deep, well-drained, friable, medium-textured soils that have a firm gravelly loam subsoil. The soils have developed from calcareous glacial till derived from limestone and shale. The till is generally 3 to 5 feet deep over limestone and shale bedrock, and about 40 percent of it is angular fragments of shale and limestone. Many of the limestone fragments have been leached of free carbonates and can be easily broken into very fine particles. Caribou soils that occur close to streams and near the southern boundary of the survey area have subrounded gravel in the parent material and are generally 10 or more feet deep.

2. Conant Soil Series

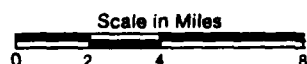
The Conant series consists of moderately well drained medium-textured soils that have developed on firm, calcareous glacial till. The till was derived mainly from mixture of weathered limestone and shale. It is generally 4 to 6 feet thick over dark-gray shale or limestone bedrock.

Geologically, Loring AFB occurs in an area of unconsolidated glacial deposits consisting of ground moraine or till and, on the west side of the base, glacial esker or ice-contact deposits. The ground moraine or till consists of a heterogeneous mixture of clay, silt, sand, gravel, cobbles, and boulders deposited during Pleistocene glacial ice advances and compacted by the weight of the overlying ice mass. Glacial till tends to be low in permeability



LEGEND

- Ds - Cyclically Bedded Dark Gray Slate and Metasandstone
- Du - Metamorphosed Shale, Siltstone, Sandstone and Conglomerate—Aroostook Co.
- Oc - Metamorphosed Shale, Siltstone, Sandstone and Conglomerate—N. Aroostook & Piscataquis Co.'s
- Ov - Metamorphosed Felsic to Mafic Volcanic Rocks with Interbedded Metasedimentary Rocks
- Su - Metamorphosed Siltstone, Sandstone, Shale, Graywacke, Conglomerate, and Sedimentary Iron-Manganese Deposits
- Sin - Calcareous Metasiltstone—Spragueville Formation
- SOc - Metamorphosed Limestone, Calcareous Sandstone and Shale
- Spu - Calcareous Metasiltstone—Perham Formation
- Ssc - Conglomerate, Sandstone and Siltstone



Source: Maine Geologic Survey.

FIGURE 6.
Geologic Map.



because of the unsorted mixture of fine, medium, and coarse sediments and the high in-place density caused by ice overburden. Glacial till typically exhibits little or no stratification. Table 3 provides information on the typical geologic formation occurring in the Loring AFB vicinity.

Esker or ice-contact deposits typically are better sorted by the action of glacial melt water than are till deposits. An esker is formed as a sinuous ridge of somewhat stratified sand and gravel deposited along streams flowing beneath the melting glacial ice (see Table 3). Figure 7 illustrates the trace of an esker which is identified as a sand and gravel aquifer due to the occurrence of recoverable ground water within the more permeable glacial esker deposit.

Bedrock occurring below the surface glacial deposits consists of metamorphosed limestone of Ordovician Age (see Figure 8). These strata, known as the Carys Mills Formation, can be observed in local outcrop and consists of grayish, layered limestone which is extensively fractured. Observations made at Loring AFB at Site No. 5, an abandoned quarry, indicate that the Carys Mills Formation consists of dark gray limestone with calcite stringers. The unit appeared fractured with silt and oxidation stains observed along the fracture surfaces (See Table 3).

The Carys Mills Formation, consisting primarily of calcareous strata, was deposited during the Ordovician and Silurian periods approximately 410 million years ago. During this period, Loring AFB and North Central Aroostook County were under a salt-water sea which occurred within a large depositional basin. Periods of deposition were interrupted by periods of tectonic activity which resulted in elevated areas occurring primarily west of Loring AFB. Further tectonic activities during the Devonian Period (360 million years ago) resulted in a general uplifting of the basin, the formation of granitic mountains from igneous intrusions, and

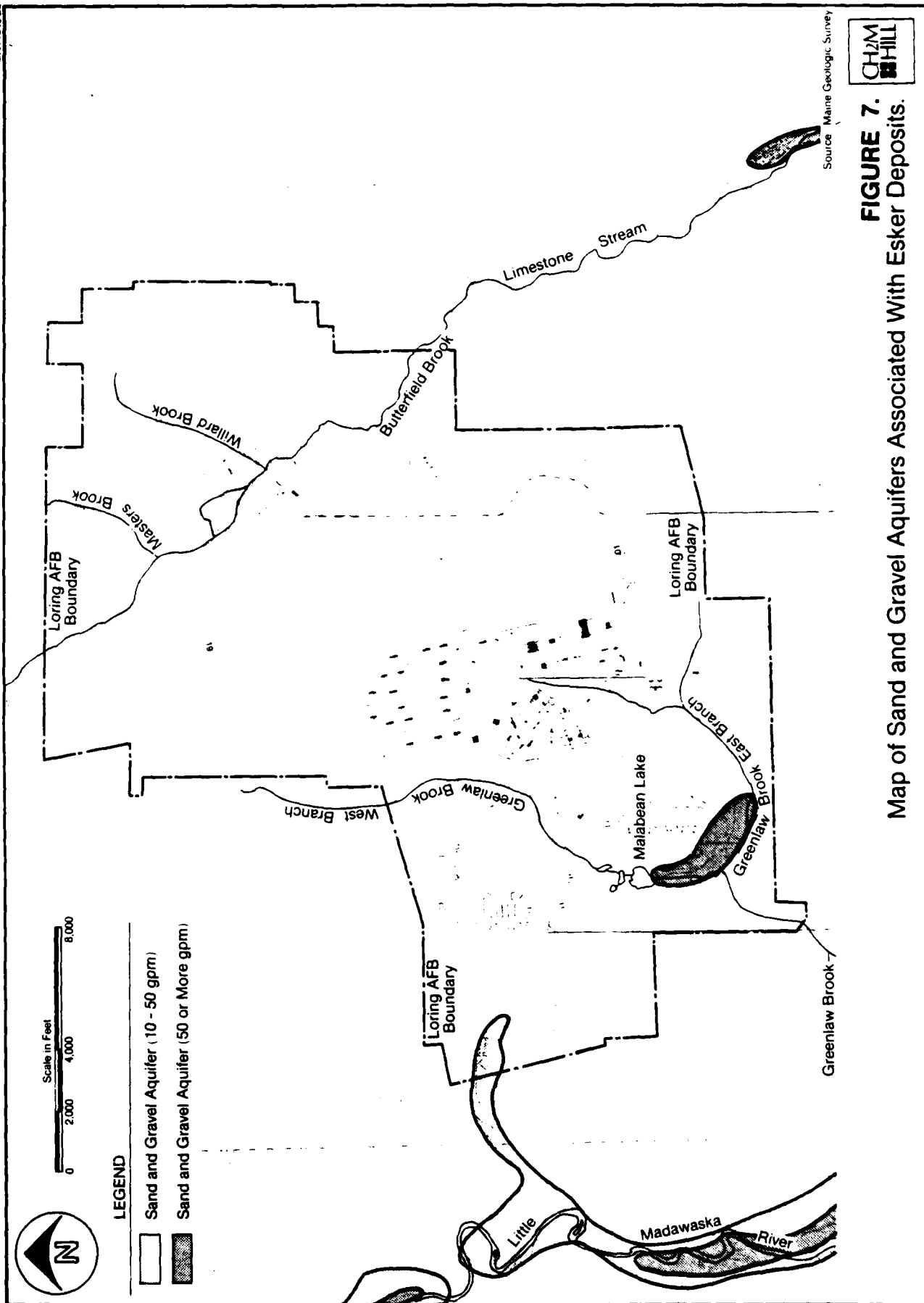
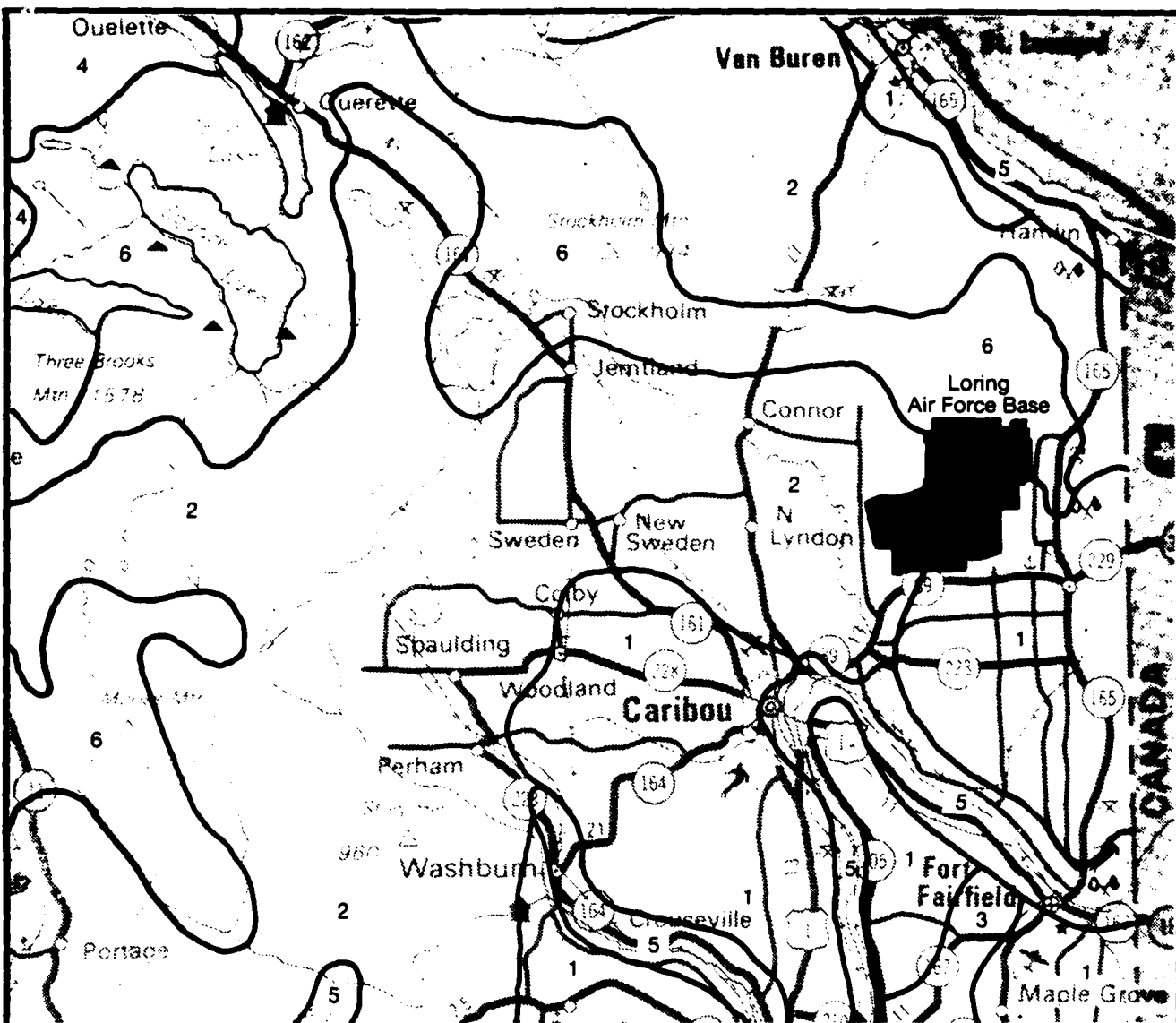
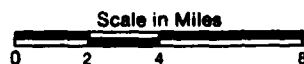


FIGURE 7.
Map of Sand and Gravel Aquifers Associated With Esker Deposits.



LEGEND

- 1 Smoothly sloping soils on till derived chiefly from shale and limestone.
- 2 Smoothly sloping soils on till derived chiefly from acid rocks.
- 3 Irregularly sloping, shallow to moderately deep soils on till derived from calcareous rocks.
- 4 Irregularly sloping soils on till derived chiefly from acid rocks.
- 5 Nearly level to sloping soils of the flood plains and terraces.
- 6 Nearly level to gently sloping, poorly drained and very poorly drained soils on firm till.



Source: U.S.D.A. Soil Conservation Survey.

FIGURE 8. General Soil Map—Caribou-Conant Series. 

the occurrence of numerous folds, faults, and joints in the sedimentary bedrock. This tectonic activity has resulted in highly fractured bedrock which, in turn, controls the flow of ground water in these deposits.

From the Devonian period until the start of the Pleistocene Ice Age, the area was subjected to long periods of erosion and shorter periods of uplift which established the basic river drainage pattern within the Aroostook Basin.

The Pleistocene epoch, beginning approximately 1 to 1-1/2 million years ago, represents a period of extensive glaciation in the vicinity of Loring AFB. This epoch was typified by the advance and retreat of several ice sheets resulting in extensive modification to the pre-glacial topography. As glacial ice advanced, it scoured and eroded bedrock, after removing existing soils and unconsolidated material left during previous ice advances. As the glacial ice melted and retreated, glacial drift consisting of sand, clay, gravel, boulders, and cobbles were redeposited over bedrock. During the final retreat of ice, which occurred approximately 8,000 to 10,000 years ago, large amounts of glacial drift were deposited, forming the present surface cover (see Table 3).

Special note should be made of glacial till and esker (ice contact) deposits along with the calcareous bedrock (Carys Mills Formation) as they relate to the base. At Loring AFB, the glacial till deposits range from 6 to more than 40 feet in thickness. The ice contact deposits (eskers) occurring in the southeast portion of the base are approximately 40 to 50 feet in thickness. The Carys Mills Formation extends to a depth of greater than 700 feet at Loring AFB.

Table 3
GEOLOGIC UNITS IN THE LOWER AROOSTOOK RIVER BASIN
AND THEIR WATER-BEARING CHARACTERISTICS

<u>Geologic Unit</u>	<u>Thickness (feet)</u>	<u>Character</u>	<u>Water-Bearing Characteristics</u>
Alluvium	0-40 <u>1/</u>	Sand, gravel, cobbles, silt, and clay, underlying stream channels, floodplains, and low river terraces.	In valleys of small streams, alluvium may occur as small discontinuous patches, but in places, particularly along the Aroostook and Little Madawaska Rivers, and along Presque Isle Stream, forms a mappable unit. Where alluvium underlies the stream channels, it is not considered an aquifer because of its generally submerged position. Where alluvium underlies flood plains or low terraces adjacent to stream channels it is generally thin or fine grained and not a significant aquifer. In places along the Aroostook River, alluvium overlies outwash which may yield several hundred gallons per minute to individual wells.
Swamp deposits	0-10 <u>2/</u>	Peat and muck consisting of partly decayed organic matter--leaves, moss, rushes, heath plants, and grass and some intermixed silt, clay, and sand of alluvial or colluvial origin. Many of the ribbon-like deposits lie along streams that have been dammed by beavers and are probably only a foot or two feet in thickness.	Not known to yield water to wells in the area. In places holes dug to store water to be used for potato spraying apparently obtain water from swamp deposits. Swamp deposits also release water slowly to underlying formations or to streams flowing through or issuing from them.
Lacustrine Deposits	0-90 <u>3/</u>	Blue to gray laminated silt clay of late glacial or early post-glacial age occurring in a few outcrops and in the subsurface in the valley of the Aroostook River in the area from Washburn to Presque Isle.	Not known to yield water to wells.
Outwash	0-110 <u>1/</u>	Stratified sand and gravel deposits in valley trains or outwash plains. Contains some silt and clay and cobbles.	Outwash yields water to dug, drilled, or driven wells. From 20 to 70 gpm (gallons per minute) have been obtained from drilled wells of 6-inch diameter. Large supplies of water (as much as 1,700 gpm) have been obtained from several properly screened and developed wells from 12 to 18 inches in diameter in areas, particularly along the Aroostook River, where the deposits have

Table 3--continued

<u>Geologic Unit</u>	<u>Thickness (feet)</u>	<u>Character</u>	<u>Water-Bearing Characteristics</u>
Ice-contact deposits	0-100 <u>4/</u>	Well-stratified to poorly stratified deposits of sand, gravel, and cobbles, with some silt, clay, and boulders. Land forms consist largely of kames and kame terraces, but also include some deltas and eskers or crevasse fillings.	a thick zone of saturation and are in hydraulic continuity with an adjacent body of surface water for recharge. The water is of good quality but hard. Many of the outcrops of ice-contact deposits are isolated and topographically too high relative to nearby bodies of surface water to be important aquifers. In a few places along the Little Madawaska and Aroostook Rivers, probably several hundred gallons per minute would be available to individual wells. Largest known yield from ice-contact deposits in this area is 75 gpm. Water is good quality but hard.
Till	0-80 <u>1/</u>	Till is a heterogeneous mixture of clay, silt, sand, gravel, cobbles, and boulders. In some exposures upper few feet appear to have been crudely sorted by running water. In some potato fields erosion has removed the finer materials from the soil zone leaving a gravelly soil which resembles stratified glacial deposits. The till is generally very dense.	Till is the source of water to some dug wells and springs and from gravelly zones to a few drilled wells. Substantial yields of dug wells are generally less than 1 gpm. Dug wells are likely to go dry in summer and late winter. The water is hard.
Bedrock	-----	Bedrock consists largely of blue-gray limestone and and calcareous shale and and siltstone of the Carys Mills and Spragueville Formations. Bedrock also includes shale, siltstone and argillite of the Perham Formation; sandstone and mudstone of the Chapman Sandstone; and sandstone, siltstone and conglomerate of the Mapleton Sandstone. Outcrops of intrusive igneous rocks such as granite and diabase, and volcanic rocks such as andesite, rhyolite, and tuff also occur.	Bedrock nearly everywhere contains enough water for farm and home use within a reasonable drilling depth of the land surface. The average depth of 453 bedrock wells for which information is available is 142 feet but the mean depth is only 98 feet. Depths range from 23 to 800 feet. The yields of 317 wells range from 0 to 560 gpm and average 34 gpm. The median yield is 15 gpm. The greatest depths and highest yields are for wells drilled for industrial purposes or for public supply (at military installations). These

Table 3--continued

<u>Geologic Unit</u>	<u>Thickness (feet)</u>	<u>Character</u>	<u>Water-Bearing Characteristics</u>
			<p>wells required more water than farm and home wells and consequently were drilled deeper than such wells. The water in bedrock is contained primarily in secondary openings such as cleavage or bedding planes, joints, fractures, or solution openings. The sandstone formations may contain some water between sand grains where cementing is poor. It is not possible to predict accurately the depth at which water-bearing zones will be encountered or how much water will be available to wells. The Carys Mills Formation is very widespread and constitutes the principal bedrock aquifer. Rather incomplete data suggest that larger yields are available from wells drilled in the Carys Mills than in other formations. The water in bedrock is generally confined under artesian conditions--that is, the water will rise to a level in a well above that at which it is reached by the drill. Several wells for which information is available flowed. The water is of good chemical quality but is hard.</p>

1/ Maximum value estimated from well record.

2/ Maximum value from driller's log.

3/ Maximum value from: "Glacial geology of Maine," v. 2 of "A survey of road materials and glacial geology of Maine," by H. W. Leavitt and E. H. Perkins: Maine Tech. Exp. Sta. Bull. 30, p. 174, 1935.

4/ Maximum value estimated.

C. HYDROLOGY

As discussed above, Loring AFB is located within the Lower Aroostook River Valley. The Aroostook River discharges to the St. John River in Canada. Loring AFB is situated on a gently sloping plateau on a drainage divide between tributaries of the Aroostook River. The runway is located approximately at the crest of the divide. Drainage from the runway and that portion of the base west of the runway is collected by Greenlaw Brook. On base, Greenlaw Brook has two tributaries which merge just southwest of the Ski Chalet (see Figure 5). One of the tributaries, herein referred to as the East Branch of Greenlaw Brook, collects most of the runoff from the flightline and runway. This branch has an oil/water separator in operation at Rhode Island Road. The West Branch of Greenlaw Brook drains parts of the housing and cantonment area. Greenlaw Brook also receives discharge from the Sewage Treatment Plant located in the southwest corner of the base. Greenlaw Brook leaves the base, flowing southwest, discharging into the Little Madawaska River which, in turn, flows south to the Aroostook River.

The east side of the base, including East Loring, is drained by Butterfield Brook and its tributary Willard Brook. Butterfield Brook, flowing southeast, discharges to Limestone Stream which flows into New Brunswick, Canada, eventually discharging to the St. John River.

The low permeability of the glacial till and the relatively young age of these deposits have resulted in poorly developed surface drainage pattern in the vicinity of Loring AFB. Perched surface water ponds, such as Malabeam Lake and the Q Area Lake, and several wetland areas occur at Loring AFB.

The runway was constructed partially on a wetland area. The esker deposits occurring west of the base were extensively mined to provide fill to build up the runway and flightline area in the swampy natural wetland.

Ground water occurs within the glacial till deposits, the ice-contact deposits and the bedrock carbonate formation at Loring AFB. Within the glacial till, which covers most of the base, ground water occurs under perched, water table conditions. As discussed above, glacial till is low in permeability because of the heterogenous mixture of fine, medium, and coarse grain sediments and the compaction resulting from glacial ice overburden (see Table 3).

No use of this ground water is made at Loring AFB nor in the immediate vicinity. Some of this ground water moves slowly through the glacial till recharging the underlying bedrock aquifer. Ground water occurring within the glacial till also discharges to surface streams and is lost to evapotranspiration.

The runway and flightline area were constructed by building up the area using esker or ice-contact deposits located west of the base. This fill material is much more permeable than the underlying glacial till. Also, a system of underdrains was installed within the fill material to convey infiltration away from the built-up area. As a result, water (or contaminants) which infiltrate into the fill along the runway and flightline area move vertically to the base of the fill and laterally, either through the fill or the underdrains, discharging to the surface streams which drain the area.

The ice-contact (esker) deposits are an important source of ground water throughout much of northern Maine. One such deposit, occurring at the west side of the base has been

extensively mined for fill material used in the construction of the base. Figure 7 illustrates the remaining, unmined portion of the deposit in the vicinity at Loring AFB. The mined portion of this deposit has been used in the past and is currently being used as a solid waste disposal area.

Ground water occurs under unconfined or water table conditions in the ice-contact deposits. Recharge is direct and local from precipitation. The ice-contact deposits are mapped along with younger alluvium deposits in Figure 7 as "sand and gravel aquifers." The deposit west of Loring AFB, is an esker formed by stream channel fill beneath the melting glacial ice. Although a glacial feature, the winnowing action of melt water sorted and removed most of the very fine and fine sediments, leaving behind a deposit which is much more permeable than the surrounding glacial till (see Table 3). In areas where head conditions are appropriate and the permeable deposits are in contact with underlying bedrock aquifers, ice-contact deposits are important recharge areas.

The bedrock aquifer occurring at Loring AFB is developed within the limestones of the Carys Mills Formation. This aquifer was extensively used during construction and throughout the early history of the base until a surface water supply was developed on the Little Madawaska River in 1960. The Carys Mills Formation, which extends to a depth greater than 800 feet, is still used extensively for private potable water supply and irrigation in the vicinity of Loring AFB (see Table 3).

Ground water occurs under leaky artesian, or in places of bedrock outcrop, unconfined conditions. The limestone of the Carys Mills Formation is very low in permeability. Ground-water flow within this aquifer is controlled almost

entirely by a fairly well developed secondary permeability, i.e., permeability developed within the bedrock mass along joints, fractures and faults after the rock was consolidated.

This flow regime is controlled by geologic structure including joints, fractures, and bedding planes occurring within the bedrock. These structural features have been enhanced by dissolution of the limestone and enlargement of solution features along these openings or partings in the bedrock. This structural control of the bedrock ground-water flow regime plays an important role, not only in developing ground-water supplies, but also in predicting the flow path of ground-water contamination. Well placement (both vertically and horizontally) in this type of geologic setting is important.

Although the Carys Mills Formation was used extensively in the early years at Loring AFB, only three wells are in service at this time. An additional well is currently being equipped for use.

Exhaustive attempts were made during the site visit to locate records of the numerous wells installed at Loring AFB. Local well drillers were contacted as well as the state hydrogeologist. Base files were also searched in an attempt to locate data. However, few records remain regarding wells at Loring AFB even though more than 35 are known to exist at this base. Figure 5 illustrates well locations which were identified during the site visit. Figure 9 illustrates the assumed well construction details and geologic log for a typical well completed in the Carys Mills Formation. Figure 5 probably does not identify all the wells, especially those that may be located at East Loring.

Depth
in Feet

0
50
100
150
200
250
300

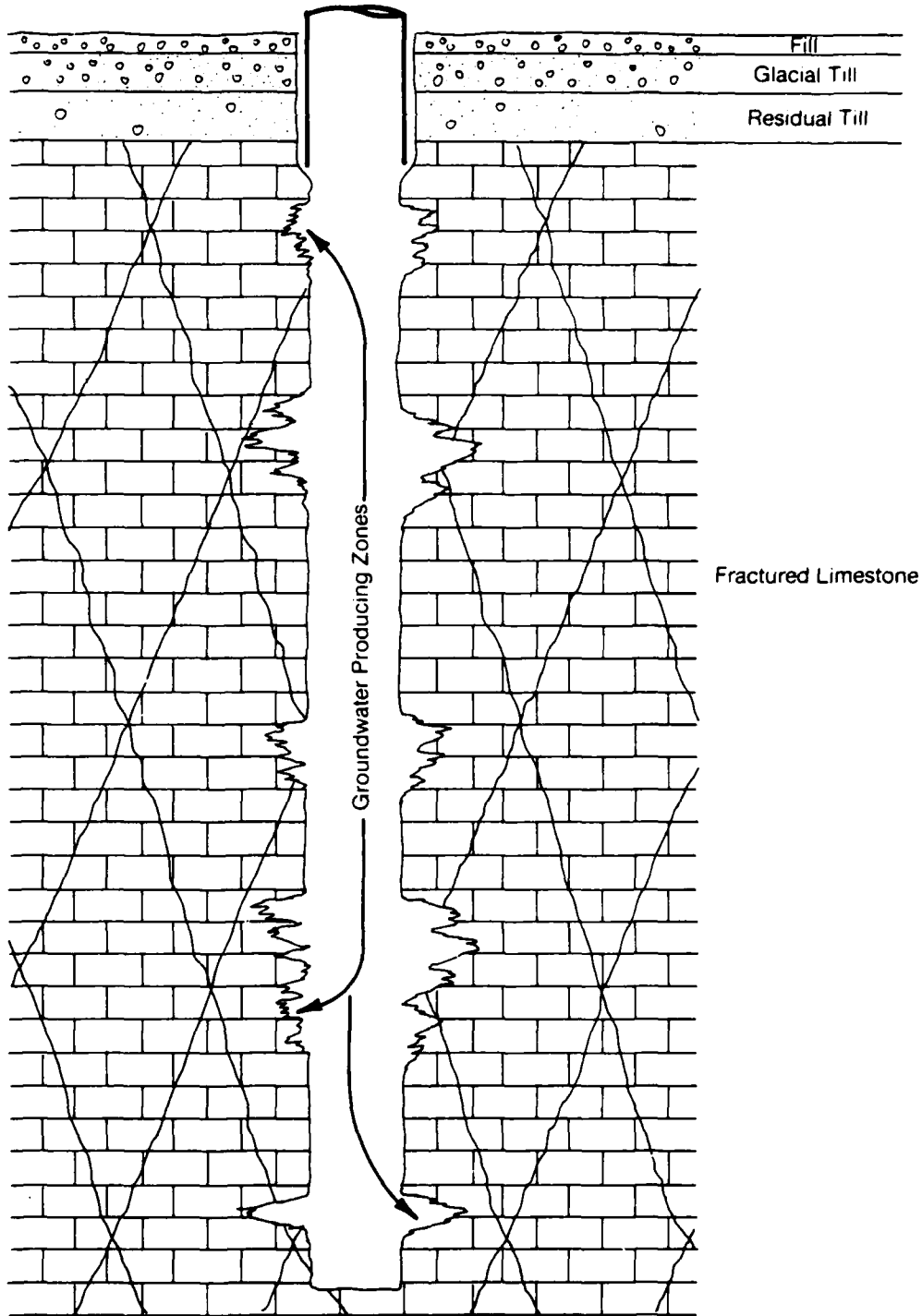


FIGURE 9. Typical Geologic Log and Well Construction Detail.



During the time when wells provided potable water to the base, the system consisted of two well fields (No. 1 and No. 2). Records from the base indicate that Well Field No. 1 located near Ketch Pond was the original source of water for construction and later the base. Initially, eight wells were installed for construction and five of the best were equipped for later use as the base supply. Table 4 lists data obtained from an early base Master Plan on Well Fields No. 1 and No. 2.

Well Field No. 2 located near the old water treatment plant was constructed later as demand at Loring AFB continued to increase.

In addition to the two main well fields, East Loring, then called Caribou AFS, had its own supply consisting of at least 3 wells. One of these wells, No. 20, is still in service today. Another, Well No. 9, is currently being put back into service.

Other wells occurring around the base are illustrated in Figure 5. Many of the smaller, remote operations, such as the Ski Chalet, DPDO, WSA, and the wastewater treatment plant had or have potable water wells. Also, Loring AFB was the site of a number of out-of-service anti-aircraft missile sites, each of which had its own well.

Most, if not all, of the wells at Loring AFB were installed in the late 1940's and 1950's. In addition, most of these wells are completed in the bedrock aquifer (Carys Mills Formation).

At this time, no information exists regarding ground-water flow conditions in the vicinity of Loring AFB. The State of Maine, Geological Survey has recognized this

Table 4
SUMMARY OF WELL DATA

WELL FIELD NO. 1 (1948) NEAR KETCH POND

<u>Well No.</u>	<u>Building No.</u>	<u>Depth (ft)</u>	<u>Yield (GPM)</u>	<u>Pump Capacity (GPM)</u>	<u>Drawdown (ft)</u>
1	1001	500	110	80	166
2	1002	500	102	80	125
3	1003	400	84	60	153
5	1005	468	110	100	153
8	1008	650	325	300	11

Notes: Three other wells were drilled at the time these wells were constructed. They were low producers and subsequently capped.

WELL FIELD NO. 2

<u>Well No.</u>	<u>Building No.</u>	<u>Date Construction</u>	<u>Depth (ft)</u>	<u>Yield (GPM)</u>
Temp. 1	6502	1947	175	205
Temp. 2	6501	1947	308	80
A	6504	1954	300	300
B	6610	1955	300	273
C	6505	1954	300	280
D	6503	1954	762	168
E	6506	1954	300	560
F	6605	1955	300	520

Source: USAF

and is making plans for groundwater studies in Northern Maine in the near future. One critical piece of information with regard to contaminant migration which is missing is the potentiometric surface of the bedrock aquifer. Flow within the surfacial materials (glacial till) most likely follows topographic contours. Therefore, water flows to the west, parallel to Greenlaw Brook on the west side of the base and east, parallel to Butterfield Brook on the east side of the base.

Within the ice contact deposit (esker), ground water probably flows northwest then west to the Little Madawaska River then south parallel to the river.

Flow within the bedrock aquifer is most difficult to predict. Locally, flow could be in any direction moving parallel to some structural geologic control (joints, fracture, bedding planes). Regionally, flow is probably parallel to the regional surface water courses, which is generally southeast.

The large number of wells is one factor contributing to the possibility of contaminant migration to the bedrock aquifer. These wells were probably constructed by cable tool methods and many, although not in use, are not likely to be properly capped or plugged. This could provide a rapid and sure pathway to the bedrock aquifer. Another contributing factor to contaminant migration is the location of past and current landfill operations within permeable ice-contact deposits which most likely directly overlie the bedrock aquifer.

Most of the base is underlain by glacial till which, although low in permeability, will transmit water (and

contaminants). The presence of a layer of glacial till 10 feet thick or less over much of the base is no assurance of ground-water protection.

D. ECOLOGY

1. Habitat

Approximately 53 percent or 4,751 acres of Loring AFB is considered unimproved, indicating the presence of semi-natural to natural ecological conditions. Major habitats found on-base include coniferous forest, hardwood forest, mixed forest, forested bogs, streams, and ponds.

Managed timber lands total 4,635 acres on Loring AFB. Major harvested tree species include: spruce (white, black, and red), yellow birch, sugar maple, aspen (quaking and big tooth), tamarack, northern white cedar, hemlock, balsam fir, and pine. The understory in these forested areas includes many herbaceous species as well as shrubby species such as alder, thimbleberry, and dogwoods.

Wildlife is abundant on the unimproved areas of the base. Some of the common mammals include woodchucks, rabbits, racoons, red fox, white tailed deer, moose, beaver, and striped skunks. About 90 species of birds are resident on base or in the surrounding areas. Hunting and trapping are allowed on Loring AFB for a few bird and mammal species. Loring AFB includes an estimated 26 miles of streams and 310 acres of lakes or ponds. Most common fish species include brook trout, bullhead, white sucker, creek chub, and dace. The major recreational fishing locations are Malabeam Lake, (10 acres), Chapman Pit (4 acres), East Loring Lake (21 acres), and Butterfield Brook.

2. Threatened and Endangered Species

No federally-listed threatened or endangered plant or animal species are known to occur on or proximate to Loring AFB. However, both the federal government and the State of Maine have proposed lists of rare plant and animal species which are candidates for future listing. These proposed lists are more comprehensive than the existing ones and may include species present in the Loring AFB area. No inventory of rare plant and animal species has been made at Loring AFB.



IV. FINDINGS

IV. FINDINGS

A. ACTIVITY REVIEW

1. Industrial Waste Disposal Practices

The majority of industrial operations at Loring AFB have been in existence since about 1952. Construction of the base began in 1947 and limited base operations were active in 1950. With the completion of several maintenance hangars and aircraft maintenance shops, major industrial operations began about 1952 and have been continuous since. The major industrial operations include maintenance of jet engines, aerospace ground equipment (AGE), fuel cells, and pneudraulics systems; maintenance of general and special purpose vehicles; corrosion control; and the non-destructive inspection (NDI) lab. These industrial operations generate varying quantities of waste oils, recoverable fuels, spent solvents, and cleaners.

The total quantity of waste oils, recoverable fuels, spent solvents, and cleaners currently generated at Loring AFB is estimated to be 35,000 gallons per year. This quantity could have been higher in the late 1950's and early 1960's when, based on a higher installation population, activity at the base was greater.

Based on information obtained from shop files and on the best recollection of interviewees, practices for past and present industrial waste disposal are presented below:

- o 1952 - 1968: Most waste oils, recoverable fuels, spent solvents and cleaners were either burned in fire department training exercises or taken to the

base landfills for burning and burial. Waste materials were stored in 55-gallon drums and periodically transported by shop personnel to the fire department training area (Site No. 7) or to the landfill in use at that time (Sites No. 1 and 2). At the fire department training site, the wastes were stored in the 55-gallon drums until needed by the fire department to ignite a practice burn during training exercises. Wastes transported to the landfills were typically burned and buried.

PD-680 cleaning solvent, used at the arch hangar aircraft wash area, typically flowed into floor drains connected to the storm-water collection system. The system discharges to an open drainage ditch that parallels Pennsylvania Road and that has been identified in this report as Site No. 10 (see Section IV.B, Disposal Sites Identification and Evaluation).

- o 1968 - 1974: The majority of waste oils, recoverable fuels, spent solvents and cleaners were burned during fire department training exercises. Wastes generated at the shops were collected in 55-gallon drums and bowzers. Some segregation of wastes was practiced; however, wastes were typically commingled. The wastes were periodically taken to the fire department training area (Site No. 7) and stored in the 55-gallon drums until needed by the fire department to ignite a practice burn during training exercises.

PD-680 cleaning solvent used in cleaning aircraft in the arch hangar continued to discharge into the storm-water collection system.

- o 1974 - 1980: During this period of time, waste liquids were burned at the heating plant (Facility No. 7310), removed by a contractor, and burned in fire department training exercises or accepted by DPDO for recycle or contract disposal. Some waste oils, thinners, and solvents were taken directly to the heating plant and transferred into slop tanks. These waste oils, thinners, and solvents were subsequently mixed with fuel oil and burned as a fuel. Waste oils, thinners, and solvents were also taken to two waste storage tanks near the east gate to the Loring AFB. The tanks are underground fuel tanks located at the site of a previous service station (Site No. 16). Once stored, wastes were either disposed of by contractor removal or transferred to the heating plant to be mixed with fuel and burned. Some waste oils, particularly synthetic motor oils, were taken to DPDO for recycle or contract disposal.

Recovered fuels were taken to the fire department training area (Site No. 7) and burned or stored in slop tanks located at the POL tank farm and held for subsequent contractor removal.

PD-680 cleaning solvent continued to discharge into the storm-water collection system; however, in 1976, an oil/water separator facility was installed downstream on the storm collection ditch. The purpose of the installation was to remove materials lighter than water, such as PD-680.

- o 1980 - Present: The majority of waste oils, recovered fuels, spent solvents and cleaners are disposed of through DPDO. Waste oils, such as crankcase motor oils, are delivered to the

6,000-gallon underground tank located behind the Auto Hobby Shop. From here, DPDO arranges for contractor removal. Synthetic motor oils are segregated and turned over to DPDO for contractor removal. Segregated and some commingled spent solvents and cleaners are accumulated in 55-gallon drums and transferred to DPDO for contractor removal.

Recovered fuels, such as JP-4 and MOGAS, are taken to the slop storage tanks (two above ground tanks, each approximately 42,000 gallons in capacity) at the POL tank farm or delivered to the fire department training area. At the fire department training area (Site No. 7), the recovered fuel is stored in an approximately 3,000 to 4,000-gallon above ground tank until needed to ignite or burn during training exercises.

About 1982, the PD-680 cleaning solvent, used in aircraft washing in the arch hangar, was replaced by B&B 2020 NV, a cleaning compound considered to be just as effective, and to require less quantity. This compound, described by the manufacturer as an alkaline, water based, biodegradable soap, is still discharged into the floor drains and subsequently the storm-water collection ditch paralleling Pennsylvania Road.

2. Industrial Operations

The industrial operations at Loring AFB have been involved primarily with the maintenance and servicing of bomber and fuel tanker aircrafts. The types and approximate dates are shown in the table below.

o <u>1953 - 1956:</u>	B-36	(Bomber)
o <u>1956 - 1957:</u>	B-52 C	(Bomber)
	KC-97 G	(Tanker)
o <u>1957 - 1959:</u>	B-52 D	(Bomber)
	KC-135	(Tanker)
o <u>1959 - Present:</u>	B-52 G	(Bomber)
	KC-135	(Tanker)

With the exception of the B-36 and KC-97G, the above aircraft are jet engine powered. The B-36 had both reciprocating engines and jet engines. Servicing and maintenance of the KC-135 and the B-52, with its much larger fuselage and its eight jet engines, is responsible for the generation of the majority of waste liquids at Loring AFB. A master list of the industrial operations is contained in Appendix E of this report.

Most of the liquid wastes generated by the industrial operations can be categorized as waste oils, recoverable fuels, spent solvents and cleaners. Waste oils generally refer to lubricating fluids, such as crankcase oils and synthetic turbine oils. Hydraulic fluids have also been included in this category. Recoverable fuels refers to fuels drained from aircraft tanks and vehicles, such as JP-4 and MOGAS. Spent solvents and cleaners refer to liquids used for degreasing and general cleaning of aircraft, aircraft systems, electronic components, vehicles, etc. Included in this category are PD-680 and various chlorinated organic compounds such as carbon tetrachloride, trichloroethylene (TCE) and 1,1,1-trichloroethane. Specific types of solvents in use by the Air Force have changed over the years. In the 1950's, carbon tetrachloride was in common use. Its use was

replaced by TCE about 1960. Since then, TCE and 1,1,1-trichloroethane have been commonly used; however, TCE usage has decreased in favor of 1,1,1-trichloroethane. Today, PD-680 (Type II), 1,1,1-trichloroethane and, to a limited extent, TCE are in common use.

In addition, Methyl Ethyl Ketone (MEK) and toluene are commonly used as paint solvents or thinners in paint shops.

A review of base records and interviews with base personnel resulted in the identification of the industrial operations in which the majority of industrial chemicals are handled and hazardous wastes are generated. Table 5 summarizes the major industrial operations, including the current estimated quantities of wastes generated and the waste management practices (i.e., treatment, storage and disposal) since 1952 when industrial operations began. The information reported on the waste quantities and past waste management practices is based on data extracted from shop files and interviews with shop personnel. Data furnished by shop personnel are based on their best recollection.

a. 42nd Transportation Squadron

i. General and Special Purpose and Refueling Vehicle Maintenance Shops

The General and Special Purpose and Refueling Vehicle Maintenance Shops provide maintenance to base vehicles and refueling trucks and are located in Building No. 7500 (General and Special Purpose) and No. 7600 (Refueling Vehicle). Wastes generated by these two shops include waste oils and hydraulic fluids (about 5,000 gallons/year), PD-680 (Type II)

Table 5
MAJOR INDUSTRIAL OPERATIONS SUMMARY

Shop Name	Present Location (Bldg. No.)	Waste Material	Current Estimated Quantity (gal/yr)	Treatment/Storage/Disposal Methods										
				1950	1955	1960	1965	1970	1975	1980	1985			
<u>42nd Transportation Squadron</u> General Purpose Maintenance Special Purpose Maintenance Refueling Vehicle Maintenance	7500 & 7600	Engine Oils Hydraulic Fluids	5,000					FDT	HP, WST		HS			
		FD-680 (Type II)	500					FDT	HP, WST		DPDO			
		Paint Thinner Waste Paint	10								DPDO			
		Ethylene Glycol	500											
Battery Shop	7500	Battery Electrolyte	200											
<u>42nd Field Maintenance Squadron</u> Corrosion Control Shop	8250	FD-680 Methylene Chloride MEK, MBK, Toluene, Xylene Waste Paint	1,500											
NDI Lab	8250	FD-680 (Type II) Penetrant	300 110											

LEGEND

LF = Landfill.
FDT = Fire Department Training Exercises.
HP = Heating Plant.
WST = Waste Storage Tanks, East Loring (ultimate disposal via burning at heating plant or contractor removal).
HS = Hobby Shop Oil Storage Tank (storage prior to contractor removal).
ST = POL Tank Farm Slop Tanks (storage prior to contractor removal).
DPDO = Defense Property Disposal Office.

Table 5--Continued

Shop Name	Present Location (Bldg. No.)	Waste Material	Current Estimated Quantity (gal/yr)	Treatment/Storage/Disposal Methods										
				1950	1955	1960	1965	1970	1975	1980	1985			
Aircraft Washrack		Emulsifier Developer	75											
		Fixer	110											
			200											
Jet Engine Shop	8250	BGB 2020 NV	2,500											
		PD-680 (Type II) Aircraft Cleaning Compound	6,000											
Engine Test Cell	8260	7808 Engine Oil	300											
		PD-680 (Type II)	150											
		JP-4	600											
		7808 Engine Oil	60											
		JP-4	300											

LEGEND

LF = Landfill.
 FDT = Fire Department Training Exercises.
 HP = Heating Plant.
 WST = Waste Storage Tanks, East Loring (ultimate disposal via burning at heating plant or contractor removal).
 HS = Hobby Shop Oil Storage Tank (storage prior to contractor removal).
 ST = POL Tank Farm Slop Tanks (storage prior to contractor removal).
 DPDO = Defense Property Disposal Office.

Table 5--Continued

Shop Name	Present Location (Bldg. No.)	Waste Material	Current Estimated Quantity (gal/yr)	Treatment/Storage/Disposal Methods										
				1950	1955	1960	1965	1970	1975	1980	1985			
AGE Repair/Inspection Shop	8510	Hydraulic Fluid	60		LF, FDT			FDT	HP, WST	HS				
		PD-680 (Type II)	600		LF, FDT			FDT	HP, WST	DPDO				
		Engine Oils	100					FDT	HP, WST	HS				
		7808 Engine Oils	150					FDT		DPDO				
Fuel Systems	8744	JP-4	2,500					FDT		ST, FDT				
Pneudraulics Shop	8280	PD-680 (Type II)	600		LF, FDT			FDT	HP, WST	DPDO				
		Hydraulic Fluid	300		LF, FDT			FDT	HP, WST	HS				
Wheel/Tire Shop	8280	PD-680 (Type II)	1,000		LF, FDT			FDT	HP, WST	DPDO				
		Hydraulic Fluid	1,000		LF, FDT			FDT	HP, WST	HS				

LEGEND

LF = Landfill.
 FDT = Fire Department Training Exercises.
 HP = Heating Plant.
 WST = Waste Storage Tanks, East Loring (ultimate disposal via burning at heating plant or contractor removal).
 HS = Hobby Shop Oil Storage Tank (storage prior to contractor removal).
 ST = POL Tank Farm Slop Tanks (storage prior to contractor removal).
 DPDO = Defense Property Disposal Office.

cleaning solvent (about 500 gallons/year), waste paints (about 10 gallons/year), and ethylene glycol antifreeze (about 500 gallon/year). Under current management practices, the waste oils and hydraulic fluids are stored in 55-gallon drums behind Building No. 7600 prior to transfer to the hobby shop oil tank. From there, DPDO arranges for disposal of the oil via contractor removal. Spent PD-680 (Type II) cleaning solvent is drummed and delivered to DPDO for contractor removal. Waste paints are delivered to DPDO for contractor removal. Ethylene glycol drained from vehicles is discharged to the sanitary sewer and ultimately the wastewater treatment plant.

Until about 1968, waste oils and PD-680 were taken to the landfills or to the fire department training area for use in practice burning exercises. From about 1968 to 1974, the common means of disposal was by burning at the fire department training area. Starting around 1974, waste oils and PD-680 were disposed of by contractor removal or burning at the central heating plant. Prior to 1974, waste paints were taken to the landfills or to the fire department training area.

The General Purpose Vehicle Shop has a small lead acid battery shop located in Building No. 7500. The only waste generated in this shop is approximately 200 gallons/year of battery electrolyte. The material is neutralized with sodium bicarbonate and discharged into the sanitary sewer. This has also been the common practice of the past.

b. 42nd Field Maintenance Squadron

i. Corrosion Control Shop

The Corrosion Control Shop is located in Building No. 8250, the arch hangar. Corrosion control activities include cleaning, stripping, sanding, wiping, priming, and repainting portions of aircraft and AGE equipment. Wastes generated by corrosion control activities includes PD-680 (Type II), methylene chloride, methyl ethyl ketone (MEK), methyl butyl ketone (MBK), toluene, xylene, waste paint, and paint particles (1,500 gallons/year). Under current practices, these waste materials are segregated in 55-gallon drums and stored temporarily in a small building located outside the northeast corner of the arch hangar. From here, the materials are turned over to DPDO for disposal by contractor removal.

Until about 1968, disposal practices for these waste materials included landfilling at the base or burning at the fire department training area during practice burns. From 1968 to 1974, the common method of disposal was thorough burning at the fire department training area. From 1974 to 1980, the wastes were either burned as a fuel supplement at the central heating plant or disposed of by contractor removal.

ii. NDI Lab

The NDI Lab is located in Building No. 8250, the arch hangar. Non-destructive testing methods including x-ray, magnaflux, and ultrasound are performed to determine structural integrity and material defects of aircraft structures, component parts, and related ground equipment. Wastes generated by the processes involved include PD-680 (Type II)

(300 gallons/year), penetrant (110 gallons/year), emulsifier (75 gallons/year) developer (110 gallons/year) and fixer (200 gallons/year). Under current practice, the PD-680 (Type II) and penetrant are stored in 55-gallon drums and turned over to DPDO for contractor removal. The emulsifier and developer solutions are discharged to the sanitary sewer. After silver recovery, fixer is discharged to the sanitary sewer.

Past disposal practices included disposing of the PD-680 and penetrant at the landfill or burning at the fire department training area until about 1968. From 1968 to 1974, the method of disposal was burning at the fire department training area during practice burns. From 1974 to 1980, the PD-680 and penetrant were disposed of by burning at the central heating plant or through contractor removal.

The current method of disposal of emulsifiers, developers and fixers has also been the common practice in the past.

iii. Aircraft Washrack

The Aircraft Washrack is located in the northeast corner of the arch hangar (Building No. 8250). All KC-135 and B-52 aircraft cleaning is conducted at this washrack. Until 1982, PD-680 and aircraft cleaning compound were used to wash aircraft. An estimated 6,000 gallons per year of PD-680 and cleaning compound were discharged through the floor drain into the storm-water collection system. In 1982, use of PD-680 was replaced by B&B 2020 NV, a cleaning compound that was considered just as effective for cleaning aircraft and required smaller quantities. Approximately 2,500 gallons/per year of this material are currently discharged to the storm-water collection system.

The material has been described by the manufacturer as an alkaline, water based, biodegradable soap. It also contains hexylene glycol, pine oil, and surfactants. Due to the components and the biodegradable nature of this material, consideration should be given to treating this discharge in the wastewater treatment plant.

iv. Jet Engine Shop

The Jet Engine Shop is located in Building No. 8260. Activities include draining, maintenance, repair, tear down, and modification of jet engines. Wastes generated include synthetic engine oil (300 gallons/year), PD-680 (150 gallons/year), and JP-4 (600 gallons/year). Under current practice, the synthetic engine oil (7808) and PD-680 (Type II) are segregated in 55-gallon drums and turned over to DPDO for contractor removal. Recovered JP-4 is taken to the fire department training area to be burned in fire training exercises or is stored in one of two slop tanks at the POL tank farm for subsequent contractor removal.

In the past, synthetic engine oil and PD-680 were landfilled or at the base or burned in fire department training exercises until about 1968. From 1968 to 1974, most of the synthetic oil and PD-680 was burned at the fire department training area. Since 1974, the synthetic oil has been segregated and delivered to DPDO for contractor removal. From 1974 to 1980, the PD-680 was either burned at the central heating plant or disposed of through contractor removal. Since 1980, PD-680 has been segregated and delivered to DPDO for contractor removal. The disposal practice for recovered JP-4 fuel was burning in fire department training exercises until 1974. Since 1974, disposal has been by burning in fire department training exercises or contractor removal.

v. Engine Test Cell

The Engine Test Cell is located in Building No. 8720. Approximately 20 to 30 jet engines per month are tested. Wastes generated from these activities include synthetic engine oil (60 gallons/year), recovered JP-4 (300 gallons/year) and hydraulic fluid (60 gallons/year). Under current disposal practices synthetic engine oil (7808) is delivered to DPDO for contractor removal. Recovered JP-4 is burned during fire department training exercises or is stored at the POL tank farm slop tanks for subsequent contractor removal. Hydraulic fluid is delivered to the Auto Hobby Shop storage tank for subsequent contractor removal.

Until 1968, the synthetic engine oil and recovered hydraulic fluid were disposed of at the base landfills or burned at the fire department training area. From 1968 to 1974, these materials were commonly disposed of through burning at the fire department training area. From 1974 to 1980, the hydraulic fluids were either burned at the central heating plant or disposed of through contractor removal. The common disposal practice for recovered JP-4 was generally through burning at the fire department training area until the more current practice began in 1974.

vi. AGE Repair/Inspection Shop

The AGE Repair/Inspection Shop is located in Building No. 8510. Activities include repair and maintenance of aerospace ground equipment. Wastes generated include PD-680 (Type II, 600 gallons/year), engine oils (100 gallons/year), and synthetic engine oils (150 gallons/year). Under current disposal practices, PD-680 (Type II) and the

synthetic engine oils (7808) are segregated and delivered in 55-gallon drums to DPDO for contractor removal. Other engine oils are delivered to the Auto Hobby Shop where they are stored in an underground tank for subsequent contractor removal.

Until 1968, disposal practices included landfilling these materials at the base or burning them in fire department training exercises. From 1968 to 1974, the common method of disposal was through fire department training exercises. From 1975 to 1980, PD-680 (Type II) and engine oils were either burned as a fuel supplement at the heating plant or disposed of by contractor removal.

vii. Fuel Systems Shop

The Fuel Systems Shop is located in Building No. 8744. Activities include draining, repairing and maintaining aircraft fuel systems and fuel tanks. The only waste generated is JP-4 (2,500 gallons/year) drained from the tanks prior to repair. Current disposal practice since 1974 has been to burn the residual JP-4 during burn exercises at the fire department training area or delivery of the fuel to the POL tank farm slop tanks for subsequent contractor removal. Prior to 1974, the recovered JP-4 was burned at the fire department training area.

viii. Pneudraulics Shop

The Pneudraulics Shop is located in Building 8280. Activities include the maintenance and repair of aircraft pneumatic and hydraulic systems. Wastes generated include PD-680, Type II (600 gallons/year), and hydraulic fluid (300 gallons/year). Under current practices, PD-680 is stored in 55-gallon drums and turned over to DPDO for contractor removal. Hydraulic fluid is taken to the

Auto Hobby Shop and stored in the underground waste oil tank for subsequent contractor removal.

Until 1968, disposal practices included landfilling the PD-680 and hydraulic fluid at the base or burning it at the fire department training area. From 1968 to 1974, the common disposal practice was burning at the fire department training area. From 1974 to 1980, the wastes were burned at the central heating plant or disposed of through contractor removal.

ix. Wheel/Tire Shop

The Wheel/Tire Shop is located in Building No. 8280. Activities include the inspection, maintenance, and repair of aircraft wheels and bearings. Wastes generated include PD-680, Type II (1,000 gallons/year) and hydraulic fluid (1,000 gallons/year). Under current practices, PD-680 is stored in 55-gallon drums and turned over to DPDO for contractor removal. Hydraulic fluid is taken to the Auto Hobby Shop and stored in the underground waste oil tank for subsequent contractor removal.

Until 1968, disposal practices included landfilling the PD-680 and hydraulic fluid at the base or burning them at the fire department training area. From 1968 to 1974, the common practice was burning at the fire department training area. From 1974 to 1980, the wastes were burned at the central heating plant or disposed of through contractor removal.

3. Fuels

The major fuel storage area on Loring AFB is the POL bulk storage area located near the south end of the base.

JP-4 and No. 2 fuel oil are received from the Searsport Defense Fuels Depot by pipeline. Other fuels are received by tank car. JP-4 is stored in three above ground tanks (two-80,000 barrels each; one-55,000 barrels). It is pumped by pipeline to 37 underground storage tanks (50,000 gallons each) located at pump houses in the flightline area. From there, the fuel is pumped to 28 hydrant outlets where individual aircraft are refueled. No. 2 fuel oil used for heating basewide and for operation of the Diesel Power Plant is stored in two aboveground tanks, one at the POL storage area (55,000 barrels) and one located near the Central Heating Plant (15,000 barrels). The POL area storage is distributed by truck to 182 underground tanks basewide and 210 underground tanks off-base at various locations. The other bulk storage tank serves the heating plant and the power plant by direct pipeline. MOGAS is stored in one underground bulk tank (50,000 gallons) at the POL storage area and in numerous other buried supply tanks around the base. The complete inventory of existing POL storage tanks presented in Appendix F provides location, using agency, type of POL stored, capacity, type of tank (i.e., whether above ground or below ground), age, and condition.

Fuels recovered from aircraft during defueling operations are stored in defueling tanks located at each fuel pump house and subsequently pumped back into aircraft during refueling operations. Other recovered fuels are delivered to the POL bulk storage area and stored in two slop tanks (Tanks No. 7825 and No. 7826, each 42,000 gallons) for subsequent disposal by contractor removal.

POL tanks at the flightline pump houses and at the bulk storage area are routinely inspected and cleaned as necessary. Tanks located at the pump houses are inspected every five years. Tanks located at the bulk storage area

are inspected and cleaned according to the following schedule:

1. Tanks equipped with filters and epoxy inner coating: every 8 years
2. Tanks equipped with filter only: every 6 years
3. Tanks without filter or epoxy inner coating: every 4 years

According to records maintained by the Liquid Fuels personnel, the last tank to be cleaned was No. 6, an 80,000-barrel JP-4 storage tank. This tank was cleaned in early 1983. Liquid recovered from the bottom of the tank was transferred to the POL slop tanks. Approximately ten 55-gallon drums of sludge was collected from the tank and turned over to DPDO for subsequent contractor removal. In the past, sludges recovered from cleaning operations were both weathered and buried within the bermed areas of the tanks. Information to indicate that weathering or burial of tank sludges occurred elsewhere on the base did not exist.

Major fuel spills have occurred in the flightline areas and the POL bulk storage area. Flightline area spills are normally washed down by Fire Department personnel. Runoff would have seeped into the ground in the flightline areas, with some entering storm drains and subsequently into the Flightline Drainage Ditch (Site No. 10). Major spills at the POL bulk storage area have included a 12,000-gallon JP-4 spill at Tank No. 2 in 1975; a 1,000-gallon fuel oil (No. 2) spill; an estimated 10,000-gallon JP-4 spill beneath the main pump house (Facility No. 7800); and a 1979 or 1980 JP-4 spill of unknown quantity due to a corroded pipe line.

The 1975 spill was due to a tank overfilling. The fuel was contained within the tank diked area and recovered. The 1,000-gallon spill of No. 2 fuel oil was also due to overfilling. The oil escaped and entered an adjacent tributary to Greenlaw Brook. The spill below the main pump house was the result of a broken floor drain pipe. Fuel contained within fuel filters was routinely dumped into the floor drains during periodic cleaning of fuel filters. The drain connects to an underground tank that is periodically pumped out. In 1978, fuel was discovered beneath the pump house. A recovery well was installed and operations are continuing to recover the spilled fuel. Records are not available on the quantity of fuel recovered to date; however, it is estimated to be several thousand gallons.

Numerous small spills occur in the flightline and POL bulk storage areas. A survey report covering the period August 1981 to January 1982 listed a total of 194 spills, 3 of which were greater than 25 gallons. The largest reported spill occurred at the POL storage area and was 120 gallons.

Information provided by interviewees during the records search base visit indicated that numerous abandoned tanks exist at Loring AFB, many of which are partially full. A survey to locate these tanks was completed by base personnel in October 1983. The survey located 34 inactive fuel tanks that contained 35,000 to 40,000 gallons of fuel and most contained 2 to 12 inches of water. The fuels have been removed from these tanks. All inactive tanks should be removed or properly secured. If evidence of leaking tanks is found, consideration should be given to sampling ground water at the site for evidence of fuel saturation (see Section VI, "Recommendations").

A chromate substance which was reportedly used in the past may have been added as a pickling agent to some of the inactive tanks at Pump House No. 3. Due to the potential of ground-water contamination from chromium, these tanks should be emptied and inspected. If inspection of any of the tanks shows evidence of leaking, consideration should be given to sampling ground water beneath the respective site for signs of fuel and/or chromium contamination (see Section VI "Recommendations").

4. Fire Department Training Exercises

Since activation of the base, fire department training exercises have been conducted at one site, located east of the runway. The training exercises have been conducted in a cleared, unlined circular area using a mock aircraft. From 1952 until 1974, contaminated fuels, oils, and solvents were burned at the site. Since 1974, only recovered or new JP-4 fuel has been burned at the site. Wastes brought to the training area for burning were generally stored on-site in 55-gallon drums or in an above ground storage tank installed in 1966. The common practice has been to spill the fuels and other liquids onto the burn site, a shallow bermed area approximately 150 feet across, just prior to a practice burn. More recent practice includes presaturation of the ground with water prior to spilling the wastes. Most of the liquid wastes would have been consumed in the fire; however, small quantities would have infiltrated into the ground. The quantity of wastes infiltrating the ground during a practice burn has probably been reduced substantially since improvements to the training area were made. In 1981, the burn area was upgraded, underdrains were installed beneath the burn area, and an oil/water separator was installed to separate fuels from the water collected by the underdrains.

This fuel is stored on-site and reused in subsequent training exercises.

Prior to about 1974, fire training exercises were conducted approximately once per week. Quantities burned varied depending on the amount of stored wastes accumulated at the site. However, based on the quantities of materials reportedly taken to the fire department training area and the frequency of practice burns, it is estimated that about 100-200 gallons of waste fuels and other liquids were burned per week. Since about 1974, practice burns have been conducted on a quarterly basis. Generally, 300-500 gallons of JP-4 (per burn) are burned 3 to 4 times a day for 2 days each quarter, for a total of about 12 to 16 burns per year.

5. Polychlorinated Biphenyls (PCBs)

Typical sources of PCBs at Loring AFB are electrical transformers and capacitors. Presently, there are approximately 8 out-of-service PCB transformers stored on base at Building No. 9062. This has been the designated storage area since 1980. Prior to that time, no specific storage location was designated for PCB or other transformers. All out-of-service PCB transformers are turned over to DPDO for proper disposition. Prior to 1980, all out-of-service transformers were turned into DPDO for proper disposition.

All in-service transformers on base have been inventoried for PCB's. At present, approximately 31 identified PCB transformers are in service and these are routinely inspected for leakage. When leakage is detected, the spill is cleaned with rags which are then containerized. The containers are labeled PCB-contaminated materials and subsequently stored at Building No. 9062 along with out-of-service PCB transformers.

There is no record or report of any major PCB spills on base. However, one interviewee reported that oils suspected of containing PCB's were landfilled at the base from 1958 until 1968. This was oil routinely drained by a contractor from oil-cooled switches located at the electrical generating plant. As much as 3,000 gallons of oil may have been disposed of in the base landfill (Landfill No. 2, Site No. 2).

Three out-of-service transformers were recently removed from the demolished U.S. Army barracks located on East Loring and taken to Building 9062. The barracks were constructed during the 1950's and demolished about 1972. Due to the concern for the potential of PCB oil leaking into surrounding groundwater, the transformers were removed. Two of the transformers had been previously drained, either into containers or into floor drains. It was believed, based on the age of the units and labeling, that the oil did contain PCB's. The third transformer was still full and was confirmed to contain PCB contaminated oil. Additional discussion of this site, identified as the Underground Transformer Site, is given in Section IV.B; and recommendations for actions at the site are given in Section VI.

6. Pesticides

Pesticides have been in common use since activation of the base. The Entomology Shop controls the use of all pesticides used to control bees, wasps, ants, crickets, roaches, bird mites, plant pests, and weeds.

The major pesticides in use at Loring AFB and estimates of yearly usage are shown below:

Baygon (bait)	50 lb/year
Baygon	5-10 gal/year
B-Gone	5-10 gal/year
Diazinon	10 gal/year
Diazinon (dust)	75 lb/year
Dursban	4 gal/year
Malathion	150 gal/year
Pyrethrum	25 gal/year

No information was obtained during the records search to indicate that the pesticide DDT had been in common use at Loring AFB in the past.

Proper preparation and application procedures are followed. All empty pesticide containers are triple rinsed, punctured with holes and disposed of in the base landfill (Landfill No. 3, Site No. 3). According to one interviewee, this has been the common practice for at least 8 years. Empty pesticide bags are also landfilled. All pesticide preparation and rinsing of application equipment is conducted in Building No. 8390, commonly referred to as the "snow barn". The rinse waters reportedly drain to the sanitary sewer system. No pesticide-related spills have been reported at Loring AFB.

7. Wastewater Treatment

Wastewater treatment at Loring AFB is provided by a 1.5 mgd trickling filter secondary plant. Wastes receive primary clarification prior to trickling filter treatment for the reduction of organic contaminants. Trickling filter effluent receives secondary clarification for removal of

suspended solids and is subsequently discharged into Greenlaw Brook. Disinfection of the effluent with chlorine is provided prior to discharge. Sludges collected from the primary and secondary clarifiers are stabilized in anaerobic digesters, dried in enclosed sludge drying beds, and subsequently disposed of at the base landfill (Landfill No. 3, Site No. 3). Disposal of sludge at the landfill has also been the common practice in the past. Approximately 40 tons of sludge per year are disposed of at the current landfill. No data exist on the characteristics of the sludge.

Wastewaters received at the plant consist of typical domestic sewage from housing and base facilities and limited industrial discharges from four oil/water separators located at several industrial shop areas. The locations of these oil/water separators and the installation dates are shown below.

<u>Facility No. & Description</u>	<u>Date Installed</u>
7600 Refueling Vehicle Shop	1980
8744 Fuel Systems	1982
8748 Fuel Systems	1980 (2 separators)

Other oil/water separators installed on the base include the separator on the flightline drainage ditch and the POL Fuels Tank Farm separator. A third oil/water separator was installed in 1983 at the recently completed Consolidated Maintenance Complex (Facility 8713). Discharge from this separator is into the storm sewers which eventually flow into the flightline drainage ditch downstream from the flightline drainage ditch oil/water separator.

In the past, the plant received dry cleaning solvents from the base laundry. This practice, however, was terminated about 1980. Antifreeze (ethylene glycol) drained from radiators at the Vehicle Maintenance Building (7500) is received at the treatment plant but no detrimental effect on the treatment plant has been reported. Occasional oil or fuels have also been received at the plant.

During the spring snow melt periods, a considerable quantity of wastewater, as much as 2 to 6 mgd, is bypassed around the treatment plant into Greenlaw Brook. The extra hydraulic load is due to infiltration of melting snow and ice into the sanitary sewer collection lines. Because of this bypass problem and also due to plans to increase the wastewater organic load, the existing treatment plant will be modified in the near future and the discharge will be pumped to the Little Madawaska River. The modifications, scheduled to be completed by the spring of 1985, are designed to increase the treatment efficiency and the hydraulic capacity of the system. Improvements include new primary treatment units, Rotating Biological Contactors (RBC), new secondary clarifiers, and ultraviolet radiation for disinfection of the wastewater prior to discharge.

The treatment plant is currently operating under NPDES permit No. ME0090174. Typical effluent characteristics along with permit limits on flow, BOD, TSS, and fecal coliform are shown in the table below:

	Monthly <u>Average</u>	<u>Permit Limits</u>	
		<u>Daily Maximum</u>	<u>Monthly Average</u>
Flow, mgd	1.5	--	1.5
BOD ₅ , ppm	20	45	25
TSS, ppm	15	45	25
Fecal Coliform, No./100 ml	150-200	400	200

8. Available Water Quality Data

The major water supply for Loring AFB is a small impoundment on the Madawaska River approximately two miles west of the base boundary. Treatment is provided by a rapid sand filter plant. Table 6 lists raw and treated water quality data for samples collected on two different dates. The quality of this water is excellent. The rapid sand filter treatment plant provides an average flow of 1.2 mgd to Loring AFB, and flows up to 2.0 mgd have been recorded. Pumping capacity is 1,500 gpm. Water storage capacity on base is provided by two 500,000-gallon elevated tanks and one 1,000,000-gallon underground tank. In addition, a 750,000-gallon underground tank is located in the Flightline Area as a fire storage reservoir.

Surface waters on base include: Greenlaw Brook and tributaries, Butterfield Brook and tributaries, Masters Brook, Willard Brook, and several storm water ditches (Figure 5). Also, several man-made impoundments and beaver ponds occur on Loring AFB. These include Malabeam Lake, Chapman's Pit, and the Q Area Lake. Surface water quality samples are taken on Greenlaw Brook and its tributaries, especially the east branch up to the flightline stormdrain culverts and to the POL Tank Farm. Recent data from Greenlaw

Table 6
WATER QUALITY DATA FOR RAW AND TREATED WATER AT THE
LITTLE MADAWASKA RIVER WATER TREATMENT FACILITY

Parameter	February 10, 1964		July 22, 1983	
	Raw	Treated	Raw	Treated
Nitrate as N	3.3 ^a	3.4	0.1	0.1
Nitrite as N	-- ^b	--	<0.02	<0.02
Organic Carbon	--	--	15	8
Arsenic	--	--	<0.01	<0.01
Barium	--	--	<0.2	<0.2
Cadmium	--	--	<0.01	<0.01
Calcium	27	26	15.3	16.1
Chromium	--	--	<0.05	<0.05
Copper	--	--	<0.02	<0.02
Hardness	78	74	48	50
Iron	0.11	0.02	<0.10	<0.10
Lead	--	--	<0.02	<0.02
Magnesium	2.5	2.2	2.3	2.3
Manganese	0.03	0.03	<0.05	<0.05
Mercury	--	--	<0.001	<0.001
Potassium	--	--	1.0	1.0
Selenium	--	--	<0.01	<0.01
Silver	--	--	<0.01	<0.01
Sodium	5.5	11	1.9	11.2
Zinc	--	--	<0.05	<0.05
Acidity	--	--	4	3
Alkalinity	78	83	58	56
Chloride	7.1	7.7	4	4
Fluoride	0.1	0.1	<0.1	0.2
Dissolved Solids	103	118	96	104
Total Residue	--	--	101	111
Specific Conductance (µmhos/cm)	169	201	124	180
Sulfate	13	17	7	33
Surfactants	--	--	<0.1	<0.1
Turbidity (JTU)	--	--	2	<1
pH (units)	7.3	7.7	--	--

^aUnits in mg/L unless otherwise indicated.

^bDash indicates that no data was available.

Source: USAF Hospital Loring AFB, Maine; USGS (1970).

Brook above and below the wastewater treatment plant are presented in Table 7. These data indicate elevated levels of ammonia nitrogen, COD, oil and grease, and iron in the stream after mixing with the treatment plant effluent. There are also reports of elevated residual chlorine (2-4 mg/L) in the stream below the treatment plant, which have been linked to the absence of viable fish populations in this reach.

The Maine Water Pollution Control Law classifies all surface water bodies in the state on the basis of most appropriate usage. Greenlaw Brook and the Little Madawaska River downstream of Stockholm are designated as Class B-2 streams. Waters of this class are considered suitable for water contact recreation, drinking water supply after treatment, industrial water supply, fish and wildlife habitat, and fish propagation. Butterfield Brook on East Loring has a slightly higher designation as Class B-1, which restricts industrial water supply usage. Current usage of Greenlaw Brook by Loring AFB for sewage disposal appears to be incompatible with the stream's existing classification and Maine's Department of Environmental Protection is currently reviewing this stream for a lower water quality classification.

Several nearby municipalities off-base are also largely dependent on surface water supplies. The City of Caribou uses treated water from the Aroostook River for its supply, and the City of Limestone receives the majority of its supply from Silver Spring Brook, east of Loring AFB. A small percentage of the population in these cities, as well as most of the rural population around Loring is dependent upon wells for their water supply. Within the State of Maine, no municipal water supplies withdraw surface waters downstream from Greenlaw Brook.

Table 7
RECENT WATER QUALITY DATA FOR GREENLAW BROOK
IN THE VICINITY OF THE WASTEWATER TREATMENT PLANT,
LORING AFB, MAINE

Parameter	Upstream WWTP	Downstream WWTP	
	11/4/82	11/4/82	6/22/83
Ammonia as N	<0.2 ^a	2.1	5.25
COD	-- ^b	--	35
Nitrate as N	--	--	0.68
Nitrite as N	0.02	<0.02	<0.02
Oil and Grease	0.4	1.3	--
Cyanide (total)	<0.01	0.01	<0.01
Cyanide (free)	<0.01	<0.01	--
Phenols	<0.01	<0.01	<0.01
Arsenic	<0.01	<0.01	<0.01
Barium	<1.0	<1.0	<0.2
Cadmium	<0.01	<0.01	<0.01
Chromium	<0.05	<0.05	<0.05
Copper	<0.02	0.026	<0.02
Iron	0.106	0.527	0.533
Lead	<0.05	<0.05	<0.02
Manganese	0.100	<0.05	0.124
Mercury	<0.005	<0.005	<0.001
Selenium	<0.01	<0.01	<0.01
Silver	<0.01	<0.01	<0.01
Zinc	<0.05	0.096	<0.05
Chloride	--	20	8
Color (units)	--	15	15
Fluoride	--	<0.1	<0.1
Sulfate	--	13	13
pH (units)	8.2	7.2	7.4

^aUnits in mg/L unless otherwise indicated.

^bDash indicates that no data was available.

Source: USAF Hospital, Loring AFB, Maine.

Groundwater is the major water supply in the Loring area for farms and residences not dependent upon municipal supplies. Most of these wells are developed into the Carys Mills Formation which forms the limestone bedrock below Loring AFB. Groundwater in this formation is largely present in joints, fractures, bedding planes, or solution cavities in the limestone. At least 35 wells on Loring AFB are developed into this formation. As shown in Figure 5 most of these wells are present in three well fields, while several others are scattered about the base at isolated locations. These well fields have been used in the past to supply Loring with potable water and some are currently used to supply potable water to isolated locations. At least one well may be reactivated in the near future for water supply to East Loring (see Section III.C, Hydrology).

Water quality analyses from these wells have been provided by the USGS and representative data are presented in Table 8. The quality of water in the Carys Mills formation is generally good although the hardness is high and the water may have elevated levels of nitrate. Wells at nearby Caswell AFS (excessed in 1981) have elevated nitrate levels that are well above Federal and State drinking water standards.

More recent water quality data were available from a few of the wells still active at Loring AFB. Based on the parameters analyzed, no water quality problems are apparent at the: WSA Fire Station Well, East Loring Well No. 20, the Fountain (Receiver) Site, or the Ski Chalet Wells. Two wells that showed potential problems were East Loring Well No. 9 which had an elevated level of lead, and the potable water well at the Wastewater Treatment Plant, which exceeded the maximum contaminant level for nitrates in two analyses available to this study.

Table 8
WATER QUALITY DATA FROM WELLS ON LORING AFB
DEVELOPED IN THE CARYS MILLS FORMATION

Parameter	Well No. ^a		
	Ar25 (Well F)	Ar36 (Well 3)	Ar45 (Well 20)
Depth (feet)	300	468	275
Data of Collection	5/13/59	1/19/60	4/24/63
Temperature (°C)	7	-- ^c	10
Silica	9.6 ^b	7.5	9.5
Iron	0.03	0.17	0.00
Manganese	0.00	0.15	0.00
Calcium	62	39	68
Magnesium	17	9.4	12
Sodium	19	6.7	4.6
Bicarbonate	209	121	250
Carbonate	0	0	0
Sulfate	16	32	16
Chloride	54	10	4.2
Fluoride	0.2	0.0	0.1
Nitrate	2.5	4.7	1.3
Dissolved Solids	328	185	246
Hardness (Ca,Mg)	225	136	219
Hardness (noncarbonate)	53	37	14
Specific Conductance	525	305	418
Color (units)	2	2	2
pH (units)	7.4	7.7	7.3
Free CO ₂	13	3.9	20

^a"Ar" well identification corresponds to the USGS source of data. Identification in parentheses corresponds to Air Force identification of well as shown in Figure 5.

^bUnits in mg/L unless otherwise indicated.

^cDash indicates that no data were available.

Source: USGS 1970.

9. Other Activities

The records and information obtained during the interviews produced no evidence of the past or present storage, disposal, or handling of biological or chemical warfare agents at Loring AFB.

Explosive ordnance disposal (EOD) activities are conducted at the EOD area located near the northeast corner of the installation. It is believed that explosive ordnance disposal has always been conducted at this same location. Under current practice, bomb ejection cartridges, engine starter cartridges, pen gun flares, and small munitions are burned at the site. After burning, the remaining slag is detonated and vaporized. No residual is left for burying. The explosive limit at the site is 25 pounds net explosive weight (Class 1.1). Burn limit is 175 pounds net explosive weight (Class C).

B. DISPOSAL SITES IDENTIFICATION AND EVALUATION

Interviews were conducted with past and present base personnel (Appendix C) to identify disposal and spill sites at Loring AFB. A preliminary screening was performed on all the identified sites based on the information obtained from the interviews and available records from the base and outside agencies. Using the decision tree process described in the "Methodology" section, a determination was made whether a potential exists for hazardous material contamination in any of the identified sites. For those sites where hazardous material contamination was considered significant, a determination was made whether significant potential exists for contaminant migration from these sites. These sites were then rated using the U.S. Air Force Hazard Assessment Rating

Methodology (HARM), which was developed jointly by the Air Force, CH2M HILL, and Engineering-Science for specific application to the Air Force Installation Restoration Program. The HARM system considers four aspects of the hazard posed by a specific site: (1) the receptors of the contamination, (2) the waste and its characteristics, (3) potential pathways for waste contaminant migration, and (4) any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating. A more detailed description of the HARM system is included in Appendix G.

A total of 19 disposal and spill sites were identified at Loring AFB. Of these, 17 were rated using the HARM rating system. A complete listing of all of the sites, indicating potential hazards, is shown in Table 9. Copies of the completed rating forms are included in Appendix H, and a summary of the hazard ratings for the sites are summarized in Table 10.

Descriptions of each site, including a brief discussion of the rating results, are presented below. Approximate locations of the sites are shown in Figure 10. The approximate operating dates for the identified landfills and the Fire Department Training Area are shown in Figure 11.

1. Landfills

Landfill sites at Loring AFB have been in use since construction of the base (starting in 1947) until the present time. Several large gravel borrow areas were created on-base during construction of the runway and flightline areas, and have subsequently been used as landfill areas after the gravel was depleted. Four landfill sites were confirmed to be present at Loring AFB and are described below.

Table 9
DISPOSAL AND SPILL SITES SUMMARY

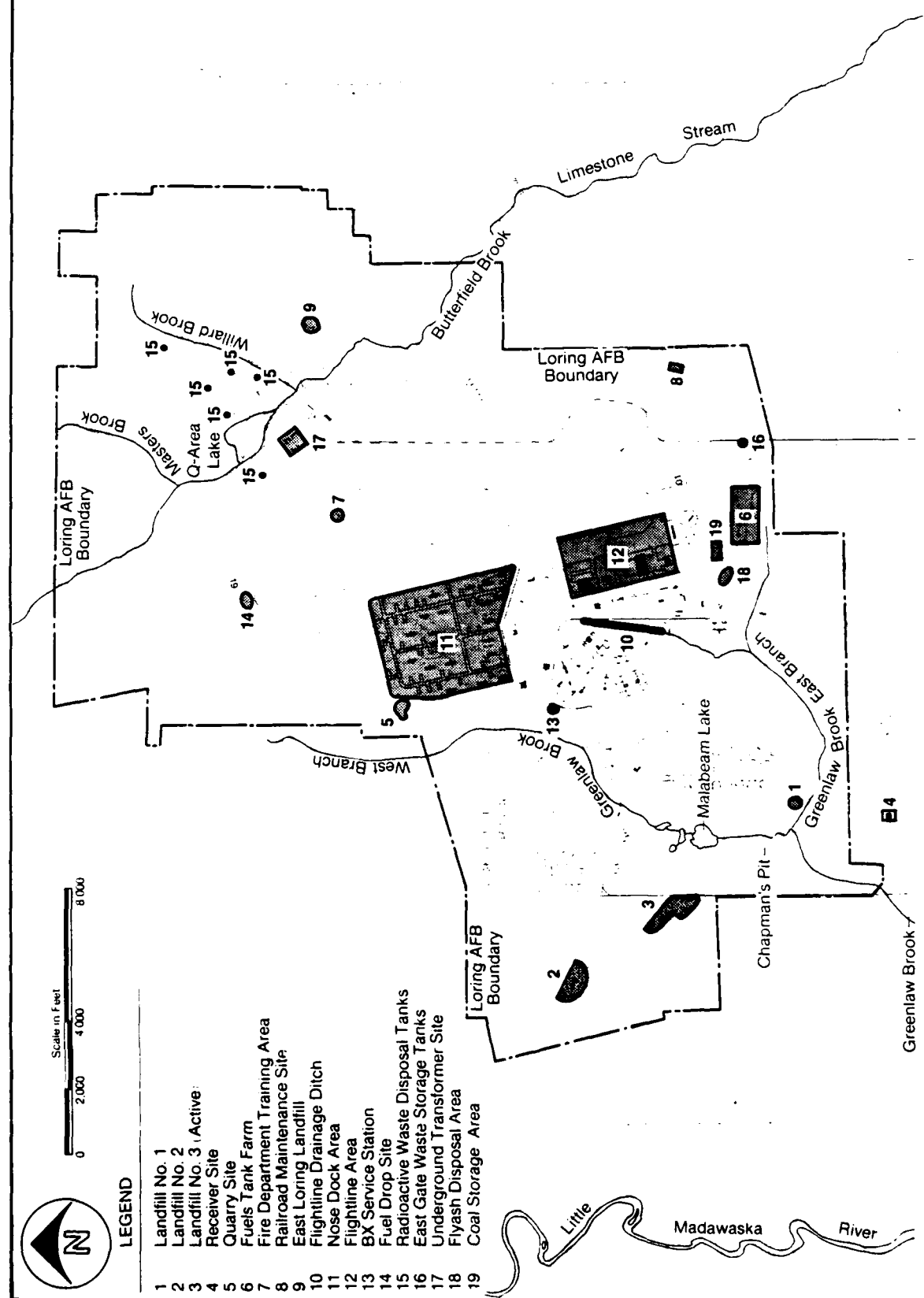
Site No.	Site Description	Potential Hazard		Rating
		Contamination	Migration	
1	Landfill No. 1	Yes	Yes	Yes
2	Landfill No. 2	Yes	Yes	Yes
3	Landfill No. 3 (Active)	Yes	Yes	Yes
4	Receiver Site	Yes	Yes	Yes
5	Quarry Site	Yes	Yes	Yes
6	Fuels Tank Farm	Yes	Yes	Yes
7	Fire Department Training Area	Yes	Yes	Yes
8	Railroad Maintenance Site	Yes	Yes	Yes
9	East Loring Landfill	Yes	Yes	Yes
10	Flightline Drainage Ditch	Yes	Yes	Yes
11	Nose Dock Area	Yes	Yes	Yes
12	Flightline Area	Yes	Yes	Yes
13	BX Service Station	Yes	Yes	Yes
14	Fuel Drop Site	Yes	Yes	Yes
15	Radioactive Waste Disposal Tanks	No	--	No
16	East Gate Waste Storage Tanks	No	--	No
17	Underground Transformer Site	Yes	Yes	Yes
18	Flyash Disposal Area	Yes	Yes	Yes
19	Coal Storage Area	Yes	Yes	Yes

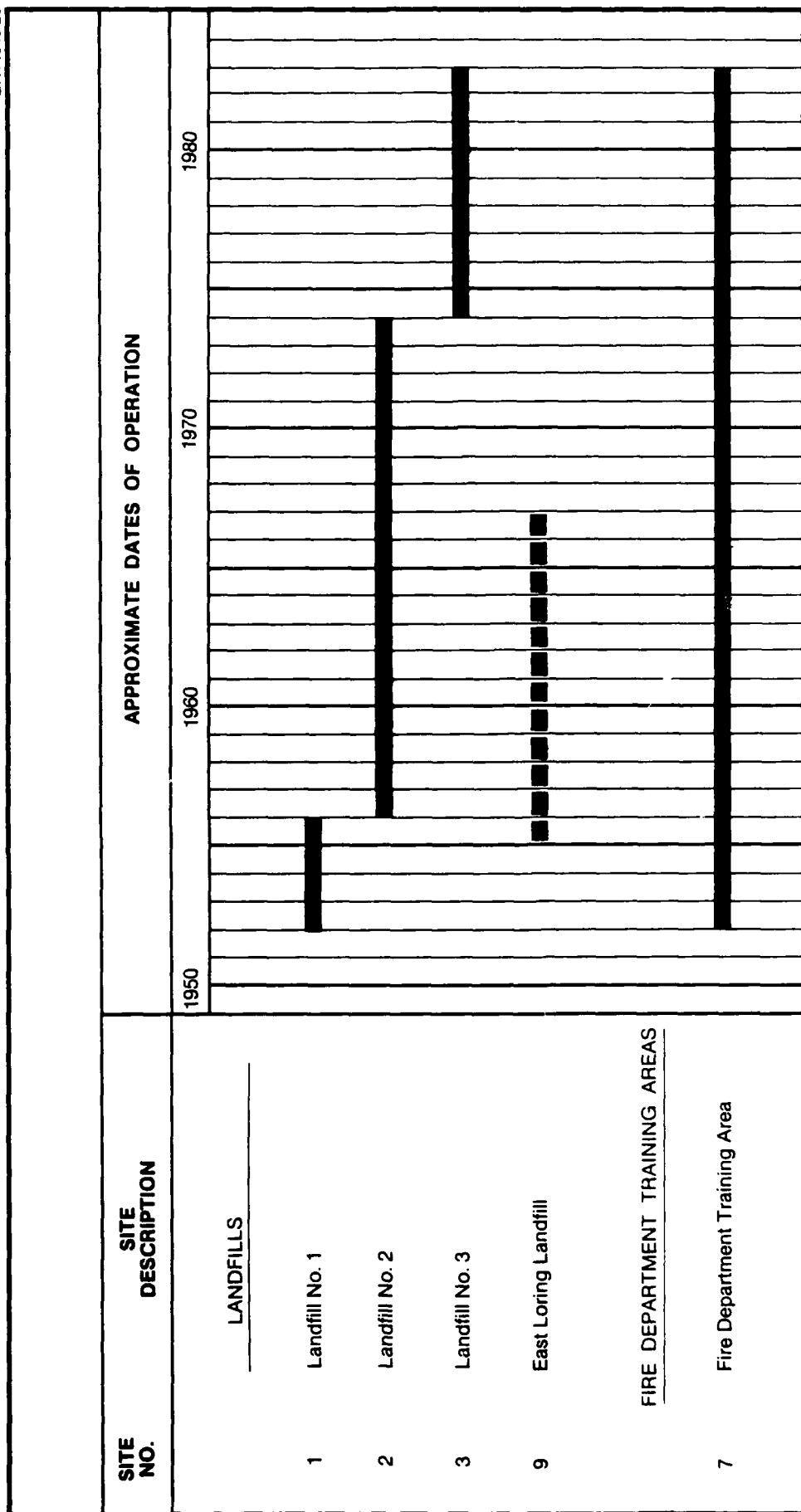
Table 10
SUMMARY OF DISPOSAL AND SPILL SITE RATINGS

Site No.	Site Description	Subscore (% of Maximum Possible Score in Each Category)				Factor for Waste Management Practices	Overall Score	Page Reference of Site Rating Form
		Receptors		Pathways				
1	Landfill No. 1	58	70	67	1.0	65	H-1	
2	Landfill No. 2	66	100	74	1.0	80	H-3	
3	Landfill No. 3 (Active)	62	40	74	1.0	59	H-5	
4	Receiver Site	61	40	80	1.0	60	H-7	
5	Quarry Site	56	50	100	1.0	69	H-9	
6	Fuels Tank Farm	63	64	100	.95	72	H-11	
7	Fire Department Training Area	51	80	61	1.0	64	H-13	
8	Railroad Maintenance Site	74	40	80	1.0	65	H-15	
9	East Loring Landfill	54	40	54	1.0	49	H-17	
10	Flightline Drainage Ditch	62	60	100	1.0	74	H-19	
11	Nose Dock Area	62	64	100	1.0	75	H-21	
12	Flightline Area	64	60	61	1.0	62	H-23	
13	BX Service Station	56	48	80	1.0	61	H-25	
14	Fuel Drop Site	56	40	46	1.0	47	H-27	
15	Radioactive Waste Disposal Tanks	-----Not Rated-----						
16	East Gate Waste Storage Tanks	-----Not Rated-----						
17	Underground Transformer Site	53	60	54	1.0	56	H-29	
18	Flyash Disposal Area	59	30	61	1.0	50	H-31	
19	Coal Storage Area	59	30	61	1.0	50	H-33	



FIGURE 10.
Location Map of Identified Disposal and Spill Sites at Loring AFB.





LEGEND


 Known Period of Activity Assumed Period of Activity

FIGURE 11.
Historical Summary of Activities at Landfills and Fire Department Training Areas
at Loring AFB.

AD A137 475

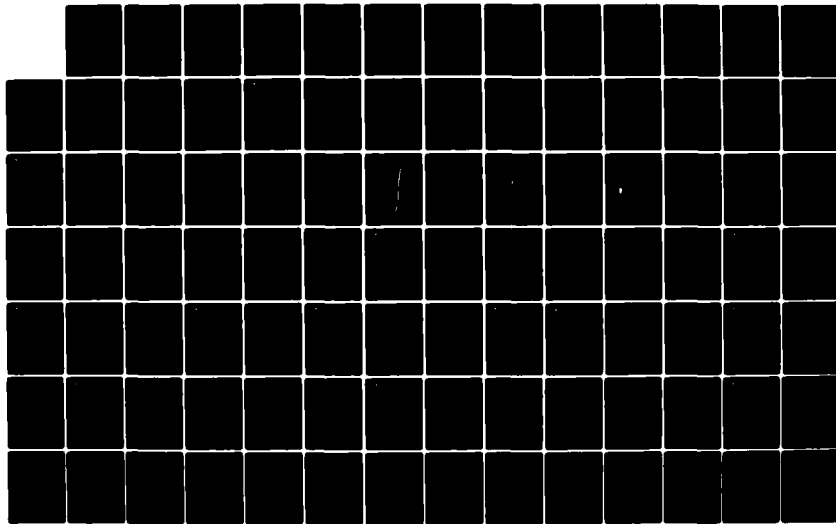
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AFB MAINE(U) CH2M HILL INC GAINESVILLE FL JAN 84
F08637-80-G-0010

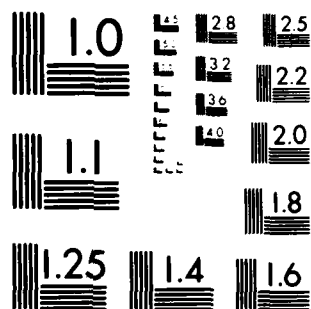
2/3

UNCLASSIFIED

F/G 13/2

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

a. Site No. 1--Landfill No. 1

This site is located off of West Virginia Road, just southwest of the Airmen's Wherry Housing. The site was formerly a gravel pit and was used for disposal of general base refuse from 1952 to about 1956. Eight to ten trenches were reportedly filled at this site during site operation and refuse was burned regularly. Large quantities of hazardous flightline wastes were probably burned or buried in these trenches.

Landfill No. 1 (Site No. 1) received an overall HARM rating score of 65, primarily due to: (1) the suspected disposal of large quantities of hazardous wastes, (2) its proximity to inactive on-base potable water wells (approximately 800 feet), (3) residential land use within one mile, and (4) a depth to the surficial ground water of less than 10 feet.

b. Site No. 2--Landfill No. 2

Landfill No. 2 is located west of Sawyer Road, adjacent to the base boundary in a large gravel pit. The area around this landfill is rural; however, five inactive water supply wells are located within a few hundred feet west of the site. This site is reported to have been used for waste disposal from 1956 to approximately 1974; during that 18-year period, the majority of the base refuse was apparently landfilled there. Wastes that were buried or burned at this site include: domestic garbage, construction rubble, flightline wastes, and sewage sludge. Flightline wastes disposed of at this site reportedly included large quantities of oil, hydraulic fluids, solvents, thinners, and paints. Oil-filled (suspect PCB) switches were also reportedly disposed of at this site with an estimated total

quantity of more than 3,000 gallons of oil. Some interviewees indicated that the disposal of significant quantities of hazardous liquids at this site was terminated by 1968. Because the gravel at this site, valuable as a non-renewable resource, was being depleted as a cover material, the landfill operation was relocated in 1974.

Landfill No. 2 (Site No. 2) received an overall HARM rating score of 80, primarily due to: (1) the presence of large confirmed quantities of hazardous wastes, (2) its proximity to several on-base inactive potable water supply wells (approximately 200 feet), (3) its proximity to the base boundary (approximately 500 feet), (4) the presence of residential areas within one mile of the site, (5) a depth to the surficial ground water of less than 10 feet, and (6) the existence of a high soil permeability.

This site is currently under preliminary investigation by the EPA as a possible hazardous waste site. An EPA contractor visited the site in September 1983 and collected one surface water sample, one sediment sample, and two soil samples. The surface water and sediment samples were collected in an area of standing water. The soil samples were collected at two other locations within the landfill area. The samples were sent to an EPA contract laboratory for priority pollutants analyses and as of the writing of this report, the analyses have not been completed. Recommendations for monitoring at this site have been made in Section VI of this report. The EPA contractor's site investigation report and analysis, when received, should be used to supplement this monitoring effort.

c. Site No. 3--Landfill No. 3

Landfill No. 3 is located immediately west of and adjacent to Sawyer Road, approximately one half mile south of the west base entrance. This landfill is located in an extensive gravel borrow pit contiguous with landfill No. 2. Wastes brought to this site include all base refuse including domestic garbage, dumpsters from the flightline shops, and mess hall wastes. Wastes are deposited in large piles, compacted, and covered with clean dirt. No burning was ever practiced at this site. During the period of operation of this landfill, hazardous wastes have been controlled at Loring AFB, and no large quantities of these materials were reported to have entered this fill. However, small suspected quantities, consisting of partially filled solvent cans, oily water wastes, and fuel-saturated soil are probably buried at this fill.

Landfill No. 3 (Site No. 3) received an overall HARM rating score of 59, primarily due to: (1) the suspected disposal of a small quantity of hazardous wastes, (2) the proximity of on-base inactive potable water wells (approximately 2,500 feet), (3) the distance to the base boundary (approximately 500 feet), (4) the presence of residential areas within one mile, and (5) a high potential for ground-water migration.

d. Site No. 9--East Loring Landfill

This landfill site was originally a gravel pit located southwest of the 9000 area, which was a conventional weapons storage area on East Loring. Most of the waste deposited at this site was reported to be construction rubble and trees; however, small quantities of shop wastes are expected to be present at this site.

The East Loring Landfill (Site No. 9) received an overall HARM rating score of 49, primarily due to: (1) the suspected disposal of small quantities of hazardous wastes, and (2) the proximity of an on-base active potable water well (approximately 1,500 feet).

2. Other Sites

a. Site No. 4--Receiver Site

The Receiver Site is located on an isolated parcel of Air Force property immediately south of Loring AFB, near State Highway 89. Facilities located at this site include the receiver building, a well, and a 1,000-gallon underground fuel oil tank. Sometime during the early 1970's, the fill spout to this tank was reportedly cut off by snow removal equipment, and snow melt water displaced fuel from the tank. Within the past few years, fuel odors have been detected in the well at this site. Oil and grease analyses from this site were not available. As a result, no indication on the level of contamination was available.

The Receiver Site (Site No. 4) received an overall HARM rating score of 60, primarily due to: (1) the confirmed presence of a small quantity of moderately hazardous wastes (fuel oil), (2) the contamination detected in an on-base well, and (3) the location of the site immediately adjacent to off-base property.

b. Site No. 5--Quarry Site

Site No. 5 is an abandoned limestone quarry located west of the nose dock area, adjacent to the base boundary. This quarry is approximately 30 feet deep and

covers an area of 1 to 2 acres. About one fourth of the site is flooded by a shallow pond, with a small stream draining from this pond, along the entrance road, and then off-base. Approximately 100 drums are present in the quarry with the majority of them in the ponded area. Whether these drums are empty or partially full, and the nature of their contents, has not been determined; however, since the records search base visit, samples of ponded water in the area of the drums have been collected and are currently being analyzed to determine if contamination is present. Samples are being analyzed for oil and grease, benzene, total organic chloride, EP toxicity, lead, and silver. Results were not available at the writing of this report.

No vegetative stress was observed at this site; however, a slight oil sheen was observed on the water leaving the area. In addition to the drums, a considerable quantity of other industrial garbage is present in the quarry including rolls of wire, paint cans, acid cans, broken concrete, and asphalt. The presence of some drums and debris protruding from the ground surface as well as a report by one interviewee indicated that additional waste may be buried at this site.

The Quarry Site (Site No. 5) received an overall HARM rating score of 69, primarily due to: (1) the suspected disposal of moderate quantities of hazardous wastes, (2) the proximity of the base boundary (approximately 800 feet), (3) the presence of residential areas within one mile, and (4) the presence of a direct pathway for contaminant migration via surface water runoff from the site.

c. Site No. 6--Fuels Tank Farm

The bulk fuels storage area is located on the south edge of Loring AFB, between South Carolina Road and the base boundary. During the 31-year period of operation of this facility, several major fuel spills have occurred at this site; however, no written records of fuel quantities lost to ground and surface waters were located during the base visit. Liquid POL's may have migrated from this site as evidenced by persistent fuel odors downstream from the site, and by the recent (1978) discovery of fuel floating on the groundwater under the fuel pump house. A recovery well has been installed adjacent to this building and has been successful in recovering some of this fuel. In 1980, an oil-water separator consisting of weirs and lagoons was completed at this area. POL is being trapped by this system as evidenced by oil-saturated areas on the inside banks of the ponds. Formerly, washdown of fuel spills and surface runoff would have carried these wasted POL's to a tributary of Greenlaw Brook.

The Fuels Tank Farm (Site No. 6) received an overall HARM rating score of 72, primarily due to: (1) the confirmed presence of a moderate quantity of hazardous waste (JP-4) in the ground, (2) its proximity to inactive, on-base, potable water wells (approximately 2,500 feet), (3) the proximity of the base boundary (approximately 600 feet), and (4) the distance to a Greenlaw Brook tributary (approximately 500 feet).

d. Site No. 7--Fire Department Training Area

Only one fire department training area was reported at Loring AFB. The area located east of the runway has been an active training site from approximately 1952

until the present. During the period from 1952 until 1974, all types of liquid wastes were burned at this site, including: contaminated fuels, oil, solvents and thinners. Most waste liquids were reported delivered to the site in 55-gallon drums and subsequently spilled in a shallow bermed area and burned. Most of the liquid wastes would have been consumed in the fire; however, small quantities of these wastes are expected to have infiltrated at the site.

Since 1974, only new or recovered JP-4 has been used at this site for training exercises. The great majority of this fuel would have been consumed through evaporation or incineration in the fire. In 1981, the fire department training area was modified by reconstruction of the pit, installation of underdrains, and operation of an oil-water separator at the site. Any fuels reaching the separator are stored in an underground tank and recycled through the training exercises. Effluent leaving the separator comes to the ground surface for discharge.

The Fire Department Training Area (Site No. 7) received an overall HARM rating score of 64, primarily due to: (1) the confirmed disposal of a moderate quantity of hazardous wastes, (2) the proximity of inactive on-base potable water wells (approximately 2,000 feet), and (3) a moderate potential for contaminant migration due to surface water runoff.

e. Site No. 8--Railroad Maintenance Site

This site is located at an abandoned railroad maintenance yard adjacent to the East Loring boundary. At least 19 drums were discovered at this site, several of which contained heavy oils and antifreeze and others which were empty. A large, oily area was present and several patches of weeds and grass had been killed by the former contents of

the drums. Based on verbal reports, these drums appeared at this site sometime in the early 1980's.

Since the time of the records search base visit, the drums and their unspilled contents have been removed from the site and temporarily stored at Building 9001. The base Civil Engineer is awaiting analytical results to determine the proper disposal method for the drum and their contents.

The Railroad Maintenance Site (Site No. 8) received an overall HARM rating score of 65, primarily due to: (1) the confirmed presence of a small quantity of hazardous wastes on the ground, (2) the proximity of an inactive on-base potable water well (approximately 3,000 feet), (3) the distance to the reservation boundary (approximately 800 feet), and (4) the indirect evidence of contaminant migration (wastes observed on the ground surface).

f. Site No. 10--Flightline Drainage Ditch

This site is located west and parallel to Pennsylvania Road and the flightline hangar area. The site is actually a 2,500-foot channelized portion of a tributary to Greenlaw Brook. At the head of the ditch, three underground culverts bring all of the major storm drain waters from the nose dock area, the runway area, and the flightline shops. Several additional culverts also bring additional flightline storm drain flows to this ditch. The ditch is rocky and had strong fuel/solvent odors during the base visit. An oil-water separator was installed on this ditch at the point where it crosses Rhode Island Road in 1976. Liquid wastes from the flightline area may have left Loring AFB via this channel prior to that installation. Dirt and sediments in and around the channel may still contain waste materials.

In addition, the channel may be a recharge point to the surficial groundwater aquifer, and contaminants may have also migrated via that route.

The Flightline Drainage Ditch (Site No. 10) received an overall HARM rating score of 74, primarily due to: (1) the confirmed presence of a small quantity of hazardous wastes, (2) the proximity to inactive on-base potable water wells (approximately 500 feet), (3) the presence of residential housing within one mile of the site, and (4) the location of the site in a continuously-flooded, surface water drainageway flowing into Greenlaw Brook and then off-base.

9. Site No. 11--Nose Dock Area

The Nose Dock area includes 15 nose docks, a number of hardstands and the engine test cell. Fuel lines and buried tanks are present throughout this area and have resulted in several fuel spills of over 1,000 gallons. In addition, regular practice apparently included emptying drums and bowzers on the ground in this area to dispose of waste oils, solvents, and contaminated fuels. During the base visit, observation at the engine test cell indicated oily liquids present under the broken pavement. A recent Air Force study by Fuss and O'Neill Engineers (Reference No. 3), has indicated that confirmed pockets of liquid wastes are floating on the surface of the groundwater under this site, although the exact composition of this material has not been identified.

The Nose Dock area (Site No. 11) received an overall HARM rating score of 75, primarily due to: (1) the confirmed presence of moderate quantities of hazardous wastes in the ground, (2) the proximity of the site to Greenlaw Brook

(approximately 1,000 feet) and (3) the confirmed migration of wastes to the top of the surficial groundwater.

h. Site No. 12--Flightline Area

The Flightline area at Loring AFB has been one of the major sources of generation of hazardous wastes during the lifetime of the base. Most of this waste material was disposed of away from the area; however, some liquid wastes were reportedly disposed of on the ground, on concrete, or in the storm or sewer drains. Also, several major fuel spills have occurred in this area. Existing facilities in this area are geared toward the Arch, DC, and ADC Hangars. Other facilities include the engine build-up shop, the general purpose aircraft shops, the snow removal hangar, and the ADC alert aircraft hangar. In addition, eight maintenance hangars also housed various shops on the flightline before being torn down during the 1970's.

The Flightline Area (Site No. 12) received an overall HARM rating score of 62, primarily due to: (1) the confirmed disposal of small quantities of hazardous wastes, (1) the proximity of inactive on-base potable water wells (approximately 2,000 feet), (3) the density of the working population in the area of the site, and (4) the proximity of the site to drainage ditches leading to Greenlaw Brook.

i. Site No. 13--BX Service Station

The BX service station is located at the intersection of Texas and Wisconsin Roads, west of the flightline area. This facility was completed in 1955 and has three underground fuel storage tanks. These tanks are filled behind the station via standpipes which are on the top edge of a steep embankment. Evidence of fuel spillage including odors,

stains, and saturated soil were noted below these fill pipes during the base visit. Also, a small group of dead trees is directly downgradient from the fill pipes, indicating vegetative response to the spill of fuels.

The BX Service Station (Site No. 13) received an overall HARM rating score of 61, primarily due to: (1) the presence of small quantities of hazardous wastes (fuels) in the ground, (2) the proximity of the site to Greenlaw Brook (approximately 800 feet), and (3) the indirect evidence of contaminant migration observed at the site.

j. Site No. 14--Fuel Drop Site

During a condition of "strip alert", 2,000 to 3,000 gallons of JP-4 may be dumped in a designated fuel drop site at the north end of the runway at Loring AFB. Interviewees indicated that this site has been used on at least one and possibly one or two more occasions.

The Fuel Drop Site (Site No. 14) received an overall HARM rating score of 47, primarily due to: (1) the suspected presence of moderate quantities of hazardous wastes (fuels) and (2) the proximity of the site to Butterfield Brook (approximately 3,500 feet).

k. Site No. 15--Radioactive Waste Disposal Tanks

This site is located in the Weapons Storage Area of East Loring and was originally constructed as part of Atomic Energy Commission's experimental weapons handling facility at that location. This site consists of five underground liquid waste tanks and one underground dry waste tank. At least one of the tanks was reportedly used for liquid

wastes from showers and laundry areas. Tests were conducted on the contents of these tanks in the early 1970's and were found to be essentially negative for radioactivity. Based on this analytical evidence documenting the absence of radioactive contamination, this site was not rated.

1. Site No. 16--East Gate Waste Storage Tanks

This site consists of two 5,000-gallon underground storage tanks originally used for MOGAS. By 1968, the facility originally associated with these tanks had been removed, and this site began to be used for storage of all types of liquid wastes prior to disposition off-base. The tank contents were reportedly removed by contractors 2 to 3 times per year until about 1980 when the tanks were no longer used. Types of liquid wastes stored in the tanks included: shop wastes such as waste fuels, crankcase oils, gear oils, brake fluid, hydraulic fluids, solvents, and strippers. Based on observations during the site visit, one tank is known to be open and partially filled with liquid. Since no evidence suggested that the tanks are leaking, the site was not rated; however, the status of these tanks should be determined, the contents removed, and the tanks secured.

m. Site No. 17--Underground Transformer Site

Site No. 17 consisted of three abandoned 500-750 kVA transformers located in underground vaults in the former U.S. Army barracks located on East Loring. Since the time of the base visit, these three transformers have been excavated and removed to storage at Building No. 9062. Two of the transformers had previously been drained and based on the age of the units and labeling it is believed that each had contained PCB oil. Contents of the third transformer were intact and confirmed to contain PCB contaminated oil.

The contents of the two empty transformers were probably drained at the site into floor drains which are thought to go to the ground in the immediate vicinity of the building site.

The Underground Transformer Site (Site No. 17) received an overall HARM rating score of 56, primarily due to: (1) a confirmed small quantity of hazardous wastes (PCB oil) released at the site, (2) the proximity of an active on-base potable water well (approximately 500 feet), and (3) the proximity of the Q Area Lake (approximately 800 feet).

n. Site No. 18--Flyash Disposal Area

This site is located next to the Coal Storage Area (Site No. 19) south of South Carolina Road. The current flyash pile is approximately 15 to 20 feet high and appears to cover several acres. Chemical analyses of the flyash, completed in 1982, confirmed the presence of low concentrations of heavy metals characteristic of coal ash. Subsequently, an EP Toxicity test was conducted to determine if the ash met the characteristics of a hazardous waste. Results of the test were negative (Reference No. 4).

The Flyash Disposal Area (Site No. 18) received an overall HARM rating score of 50, primarily due to: (1) a small confirmed quantity of hazardous wastes (heavy metals), (2) the proximity of an inactive on-base potable water well (approximately 1,800 feet), and (3) the proximity of a tributary to Greenlaw Brook (approximately 800 feet).

o. Site No. 19--Coal Storage Area

This site, located between South Carolina Road and the Flyash Disposal Area (Site No. 18), has been the coal storage area since construction of the central heating plant in 1953. Coal is stored on the ground and, at the present time, no facilities exist for collection and treatment of coal pile storm-water runoff. However, the storage area is being modified with the construction of a concrete pad for storage of the coal and a storm-water runoff collection system. Runoff will be diverted to a holding pond and then pumped to the Loring AFB wastewater treatment facility.

Attention was focused on the coal storage area in 1982 when the State of Maine advised Loring AFB that coal storage areas required surface water runoff collection and treatment to prevent potential ground or surface water contamination. To determine whether or not the existing coal pile was a potential threat to ground water in the area, Loring AFB installed two ground-water monitoring wells (one upgradient; one downgradient) around the coal storage area (see Figure 5). Each well was sampled on three occasions and analyzed for various contamination indications including heavy metals (Reference No. 2). Using the EPA Primary Drinking Water Standards for comparison, analyses were within acceptable limits with the exception of the initial analyses (10/28/82) in which lead and mercury both exceeded the drinking water standards. Subsequent analyses, however, indicated the concentrations to be less with the last analyses showing the lowest concentration of lead and mercury. The recorded lead and mercury values, compared with the EPA Primary Drinking Water Standards, (PDWS) are summarized in the following table:

	<u>10/28/82</u>		<u>11/15/82</u>		<u>12/1/82</u>		<u>Primary Drinking</u>
	<u>MW-1</u>	<u>MW-2</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-1</u>	<u>MW-2</u>	<u>Water Standards</u>
Lead,							
mg/L	0.062	0.050	0.035	0.048	<0.020	<0.020	0.050
Mercury,							
mg/L	0.001	0.002	0.002	0.002	0.001	<0.001	0.002

Two surface water samples were also collected in the vicinity of the coal storage area on December 1, 1982 (Reference No. 2). Both samples had concentrations of lead and mercury but well below the primary drinking water standards. The above analyses determined that the potential for contamination of ground or surface water via coal pile runoff did exist. Therefore, a decision was made by Loring AFB to provide a concrete pad and storm-water runoff collection system to rule out the potential for ground or surface water contamination. This system, described earlier, should be completed by the summer of 1985.

The Coal Storage Area (Site No. 19) received an overall HARM rating score of 50, primarily due to: (1) a small confirmed quantity of hazardous wastes (heavy metals), (2) the proximity of an inactive on-base potable water well (approximately 1,500 feet), and (3) the proximity of a tributary to Greenlaw Brook (approximately 1,500 feet).

C. ENVIRONMENTAL STRESS

During the base visit to Loring AFB in September 1983, former and present disposal areas were examined for signs of vegetative stress possibly related to the presence or migration of hazardous wastes. Most of the areas examined showed

no indications of recent toxicity to adjacent biological systems; however, vegetative stress provided clear evidence of contamination at two sites. At Site No. 8, the Railroad Maintenance Site, drums of oily liquids had been spilled on the ground within the past few years and all of the vegetation which had been contacted by the liquids was dead or severely stressed. No signs of stress were observed outside the immediate area of spillage. At Site No. 13, the BX Service Station, a number of cedar trees are directly downgradient from the MOGAS fill pipes. These trees are in an area of apparent fuel-saturated soil and appear to have been dead for several years. No other vegetation appears to be stressed in this area.

At least two fishkills have been reported at Malabean Lake on Loring AFB. The first of these, which occurred in 1974, was attributed to a parasitic infection and the other in 1979 was linked to spraying for weed control.

It has also been reported that high residual chlorine in Greenlaw Brook below the sewage treatment plant has resulted in greatly reduced fish populations in that area. No fish or wildlife kills have been linked to hazardous waste migration from any of the identified sites at Loring AFB.



V. CONCLUSIONS

V. CONCLUSIONS

A. No direct evidence was found to indicate that migration of hazardous contaminants exists beyond the Loring AFB boundary. Indirect evidence of contamination and/or contaminant migration within the installation boundary was found at six sites:

- o Nose Dock Area (Site No. 11):

During the base visit, oily liquid was observed on the ground at the Engine Test Cell located within the Nose Dock Area. In addition, a recent engineering study confirmed the presence of pockets of liquid wastes below the ground.

- o Flightline Drainage Ditch (Site No. 10):

Strong fuel/solvent type odors were detected at this site during the base visit.

- o Fuels Tank Farm (Site No. 6):

JP-4 fuel is known to be present in the ground in the vicinity of the main pump house located at this site.

- o Railroad Maintenance Site (Site No. 8):

A large oily area was noted on the ground during the base visit. Also, a patch of dead weeds and grass was observed adjacent to the oily area, suggesting environmental stress.

o BX Service Station (Site No. 13):

Fuel-saturated soil was observed at this site during the base visit. Signs of environmental stress (dead trees) were also observed.

o Receiver Site (Site No. 4):

Fuel odors have been detected in the water well located at this site.

B. Evidence of environmental stress due to past disposal/spills of hazardous wastes was observed at Loring AFB. At Site No. 8, the Railroad Maintenance Site, all of the vegetation that had been contacted by the spilled liquid wastes was either dead or severely stressed. At Site No. 13, the BX Service Station, a number of cedar trees in the area of the fuel-saturated soil appear to have been dead for several years. No recent evidence of environmental stress was noted at this site.

C. Information obtained through interviews with 25 past and present base personnel, base records, shop folders, and field observations indicates that hazardous wastes have been disposed of on Loring AFB in the past.

D. The potential for ground-water migration of hazardous contaminants is moderate to high, primarily due to: (1) shallow depth to ground water, (2) the lack of a confining bed, and (3) proximity to nearby wells. The lack of data on ground-water movement, the large number of abandoned or out-of-service wells, and the lack of ground-water quality data raise the priority for monitoring at Loring AFB.

E. Table 11 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other Loring AFB Sites) for environmental concerns.

1. Site No. 2--Landfill No. 2

This site was used for waste disposal from about 1956 to 1974. Wastes buried or burned at this site included flightline wastes (oil, solvents, thinners), sewage sludge, domestic garbage and construction rubble. PCB-contaminated oil is also suspected of being disposed of at this site. This site received an overall HARM rating score of 80 due to types and quantities of hazardous wastes disposed of, proximity to inactive water wells and the base boundary, presence of residential areas within one mile of the site, depth to the surficial groundwater, and a high soil permeability.

2. Site No. 11--Nose Dock Area

Fuel lines and tanks are buried throughout this area. Interviewees reported that regular waste disposal practices in the past included emptying of drums and bowers containing waste oils, solvents, and contaminated fuels onto the ground. During the base visit, oily liquids were observed on the ground at the engine test cell building. A recent study completed for the Air Force (Reference No. 2) confirmed that pockets of liquid wastes are present beneath this site. This site received an overall HARM rating score of 75 primarily due to confirmed presence of hazardous wastes in the ground; proximity to surface waters (Greenlaw Brook); and the confirmed migration of wastes to the top of the surficial ground waters.

Table 11
PRIORITY LISTING OF DISPOSAL AND SPILL SITES

<u>Ranking</u>	<u>Site No.</u>	<u>Site Description</u>	<u>Overall Score</u>
1	2	Landfill No. 2	80
2	11	Nose Dock Area	75
3	10	Flightline Drainage Ditch	74
4	6	Fuels Tank Farm	72
5	5	Quarry Site	69
6	1	Landfill No. 1	65
7	8	Railroad Maintenance Site	65
8	7	Fire Department Training Area	64
9	12	Flightline Area	62
10	13	BX Service Station	61
11	4	Receiver Site	60
12	3	Landfill No. 3 (Active)	59
13	17	Underground Transformer Site	56
14	18	Flyash Disposal Area	50
15	19	Coal Storage Area	50
16	9	East Loring Landfill	49
17	14	Fuel Drop Site	47

3. Site No. 10--Flightline Drainage Ditch

This ditch collects all the major storm drainage waters from the Nose Dock Area, the runway area, and the flightline shops. Strong fuel/solvent odors were detected at the ditch during the base visit. Dirt and sediments in and along the edge of the ditch may contain significant quantities of waste materials. This site received an overall HARM rating score of 74, primarily due to the nature of hazardous materials at the site; proximity to inactive water wells; presence of residential housing within one mile of the site; and the location of the site in a continuously flooded, surface water drainageway flowing into Greenlaw Brook and then off-base.

4. Site No. 6--Fuels Tank Farm

During the history of this fuel storage facility, several major fuel spills have occurred. Substantial quantities of liquid fuels have migrated from this site as evidenced by persistent fuel odors downstream and by a recent (1978) discovery of a large volume of JP-4 fuel present in the ground in the area of the main pump house. The Fuels Tank Farm received an overall HARM rating score of 72 primarily due to the confirmed presence of a moderate quantity of hazardous wastes (JP-4) in the ground and proximity to inactive water wells and the base boundary.

5. Site No.5--Quarry Site

This is an abandoned limestone quarry. About one-fourth of the site is flooded by a shallow pond with a small stream draining the pond. Approximately 100 drums are present at this site, with the majority in the ponded area. Quantity and nature of drum contents have not been determined. The base is currently analyzing samples of ponded water

collected in the area of the abandoned drums for signs of contamination. The base also has plans to remove the abandoned drums in the near future. The Quarry Site received an overall HARM rating score of 69 primarily due to the suspected disposal of hazardous wastes, proximity to base boundary, presence of residential areas within one mile of the site, and the presence of a direct pathway for contaminant migration via surface water runoff from the site.

6. Site No. 1--Landfill No. 1

Landfill No. 1 was a former gravel pit and was used for the disposal of general base refuse during the 1950's. Large quantities of hazardous flightline wastes were probably burned or buried at this site. The site received an overall HARM rating score of 65 primarily due to the suspected disposal of large quantities of hazardous wastes, proximity to inactive water wells, residential housing within one mile of the site, and the depth to the surficial groundwater.

7. Site No. 8--Railroad Maintenance Site

At least 19 drums suspected of containing oils and antifreeze (ethylene glycol) were discovered abandoned at this site. A large oily area was present and environmental stress was noted. Since the base visit, base personnel have removed the drums from the site and are awaiting results of chemical tests to determine the proper disposal of the drums and their contents. The site received an overall HARM rating score of 65 primarily due to the presence of a small quantity of hazardous wastes on the ground, proximity to inactive water wells, proximity to the base boundary, and the indirect evidence of contaminant migration (wastes observed on the ground).

8. Site No. 7--Fire Department Training Area

The existing fire department training area has been in use since 1952. Since that time, all types of wastes have been burned at the site, including oils, solvents, thinners, and recovered and new JP-4 fuels. Most of the liquid wastes would have been consumed in the fires; however, small quantities probably percolated into the ground beneath the site. The site received an overall HARM rating score of 64 primarily due to the confirmed disposal of a moderate quantity of hazardous wastes, proximity to inactive water wells, and a moderate potential for contaminant migration via surface water runoff.

9. Site No. 12--Flightline Area

The majority of wastes generated in the flightline area were disposed of away from the area; however, some liquid wastes were reportedly disposed of on the ground, on concrete, or into storm or sewer drains. In addition, several major fuel spills have occurred in the flightline area. The site received an overall HARM rating score of 62 primarily due to the confirmed disposal of small quantities of hazardous wastes, proximity to inactive water wells, density of working population in the area, and proximity to drainage ditches leading to Greenlaw Brook.

10. Site No. 13--BX Service Station

Considerable evidence of fuel spillage, including odors and saturated soil, was noted in a depression behind the BX Service Station. The depression is located downhill from the fill pipes for three underground MOGAS tanks. The site received an overall HARM rating score of 61 primarily due to the presence of small quantities of hazardous wastes (fuels) in the ground, proximity to Greenlaw Brook, and indirect evidence of contaminant migration observed at the site.

11. Site No. 4--Receiver Site

Sometime during the early 1970's, the fill spout to an underground fuel oil tank located at this site was ruptured; snow meltwater entered the tank and displaced fuel oil from the tank. Within the past few years, fuel odors have been detected in a water well located at this site. This site received an overall HARM rating score of 60, primarily due to the confirmed presence of a small quantity of moderately hazardous wastes (fuel oil); contamination detected in an on-base water well; and proximity to the reservation boundary.

12. Site No. 3--Landfill No. 3 (Active)

This landfill is located adjacent to landfill No. 2 and has been the active landfill at Loring AFB since 1974. Wastes brought to this site include all base refuse, including domestic garbage, dumpsters from the flightline shops, and mess hall wastes. Small quantities of hazardous wastes are suspected of being buried at this site (oily rags, partially full solvent cans, oil water, fuel-saturated soil). This site received an overall HARM rating score of 59 primarily due to the suspected disposal of a small quantity of hazardous wastes, proximity to inactive water wells, proximity to the reservation boundary, presence of residential areas within one mile of the site, and a high potential for groundwater migration.

13. Site No. 17--Underground Transformer Site

This site originally consisted of three abandoned transformers located in underground vaults at the former U.S. Army barracks on East Loring. Recent excavation and removal of these transformer confirmed that two had been

previously drained and were believed to have contained PCB oil. The contents of these two transformers were probably drained at the site into floor drains which are thought to go to the ground in the vicinity of the site. The site received an overall HARM rating score of 56 primarily due to a confirmed small quantity of hazardous wastes (PCB oil) released at the site, proximity to an active water well, and the proximity to surface waters (Q Area Lake).

F. The remaining sites (Sites No. 9, 14, 15, 16, 18, and 19) are not considered to present significant concern for adverse effects on health or the environment.



VI. RECOMMENDATIONS

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A. PHASE II PROGRAM

The priority for monitoring at Loring AFB is considered moderate to high, although no imminent hazard has been identified. Therefore, a Phase II program is recommended to confirm or rule out the presence and/or migration of hazardous substances. The recommended program requires the development of additional information prior to implementation of site-specific monitoring recommendations. The details of the program are given below.

1. General

During the base visit and records search, numerous (35 plus) abandoned or out-of-service wells were identified at the base. These wells are located at two out-of-service well fields and a number of abandoned anti-aircraft/missile sites. Although many wells have been installed on Loring AFB, little information exists on construction, depth, or precise locations. It has also become clear during this study that little is known of local ground-water flow conditions (i.e., direction, hydraulic gradient, etc.). This was especially true of the deeper limestone aquifer developed within the Carys Mills Formation. This aquifer is used as a potable water supply and agricultural irrigation by residents surrounding Loring AFB and to a limited extent as a potable water supply on base, primarily at the East Loring side.

To fill this substantial data gap, the following recommendations are made:

- a. Evaluate the feasibility of using existing wells as data collection points.

- b. Determine the adequacy of the data points in mapping ground-water flow.
- c. If adequate, level in the top of selected well casings, referenced to mean sea level. In each selected well, measure well diameter, well total depth, and depth to the water level.
- d. Construct a potentiometric map from data collected. Care should be taken to conduct the potentiometric survey using sound hydrogeological practice.
- e. Accessible wells near known waste disposal sites should be sampled for priority pollutants.
- f. All wells should be securely capped or adequately plugged to prevent aquifer contamination.

Once information on the regional ground-water flow conditions are known and potentiometric mapping completed, monitoring wells can be placed upgradient and downgradient from the suspected sites of ground-water contamination.

2. Site-Specific

a. Tables 12 and 13 present a summary of recommended monitoring sites, parameters to be measured, and the rationale for the analyses. Specifically, monitoring is recommended for: (1) a zone consisting of Landfill No. 2 (Site No. 2) and the active Landfill No. 3 (Site No. 3), (2) the Nose Dock Area (Site No. 11), (3) the Flightline Drainage Ditch (Site No. 10), (4) the Fuels Tank Farm (Site No. 6), (5) the Quarry Site (Site No. 5), (6) Landfill No. 1 (Site No. 1), (7) the Railroad Maintenance Site (Site No. 8), (8) the Fire Department Training Area (Site No. 7),

Table 12
RECOMMENDED PHASE II ANALYSES

Sample Location	Sample Type			Analyses					
	Ground Water	Soil	Surface Water	VOC ^a	Heavy Metals	Phenols	Pesticides	COD ^b TOC ^c	Oil & Grease PCB ^d
1. Landfill Zone Monitoring (Site No. 2 and No. 3)	X			X	X	X	X	X	X
2. Nose Dock Area (Site No. 11)	X			X					
3. Flightline Drainage Ditch (Site No. 10)		X	X	X	X	X		X ^e	X
4. Fuels Tank Farm (Site No. 6)	X		X	X				X ^e	X
5. Landfill No. 1 (Site No. 1)	X			X	X	X	X	X	X
6. Railroad Maintenance Site (Site No. 8)			X	X		X		X ^e	X
7. Fire Department Training Area (Site No. 7)		X		X	X			X ^e	X
8. Flightline Area (Site No. 12)		X		X	X		X ^f	X ^e	X
9. BX Service Station (Site No. 13)	X			X	X			X ^e	X
10. Receiver Site (Site No. 4)	X			X					X
11. Underground Transformer Site (Site No. 17)	X								X

^aVOC = Volatile Organic Compounds

^bCOD = Chemical Oxygen Demand

^cTOC = Total Organic Carbon

^dPCB = Polychlorinated Biphenyls

^eTOC Only

^fPesticide analyses to be completed only on the two samples collected nearest Building 8390 (Snow Barn).

R156

Table 13
RATIONALE FOR RECOMMENDED ANALYSES

Parameter	Rationale
Volatile Organic Compounds (VOC)	Organic solvents used on-base (past and present); persistent components of fuels and other POL products, e.g., benzene and toluene.
Heavy Metals (lead, nickel chromium, cadmium, and silver)	Potential sources identified (leaded fuel, battery acid and other electrolytes, paint wastes, photographic chemicals).
Phenols	Phenolic cleaners and paint strippers used in the past.
Pesticides	Known or suspected use at Loring AFB ^a .
COD, TOC, and Oil and Grease	Fuel spill indicators and indicators of non-specific contamination.

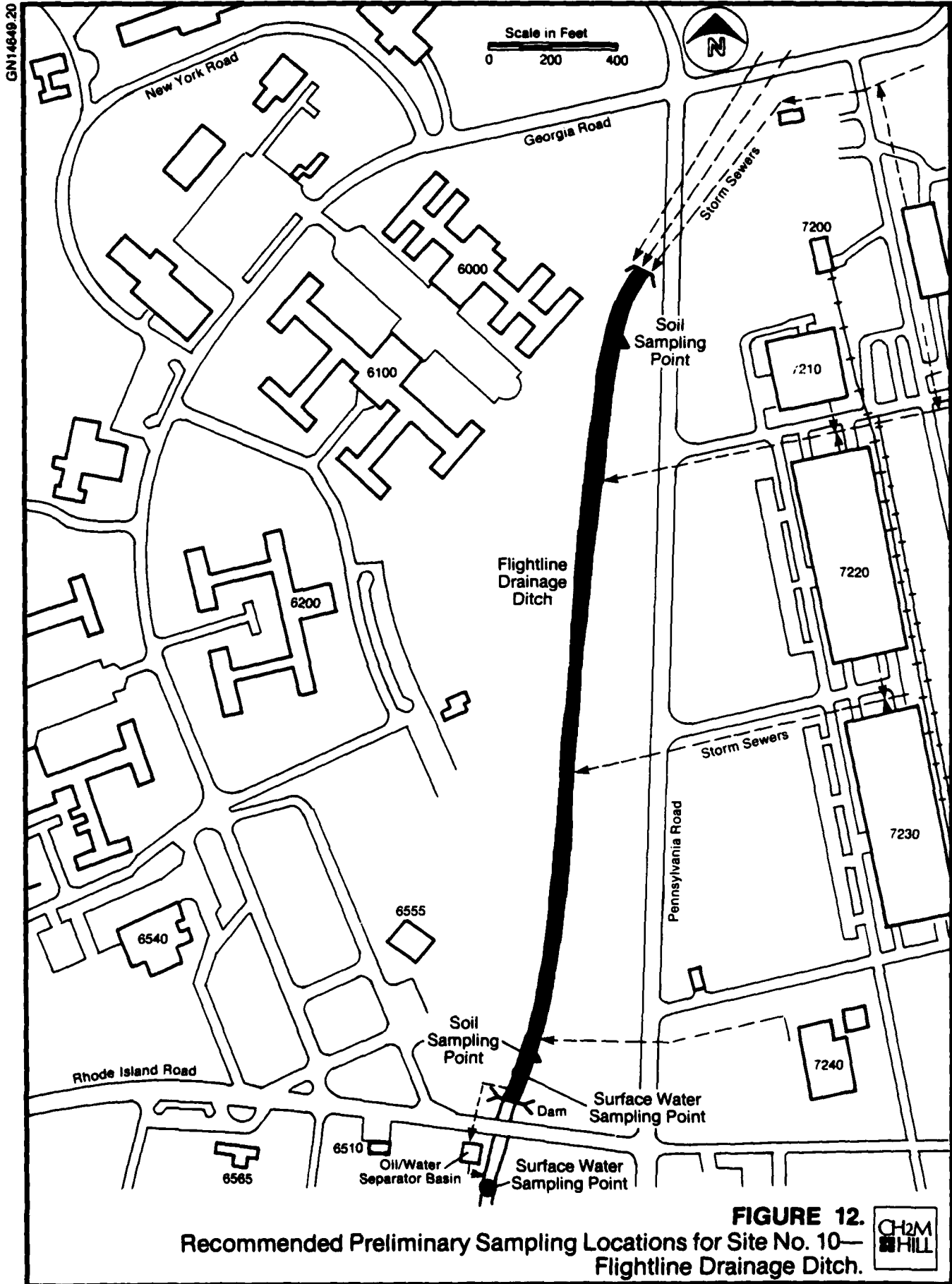
^aPesticide analysis should include Chlordane, 2,4-D, DDT, Diazinon, Dursban, Endrin, Lindane, Malathion, Methoxychlor, Sevin, Toxaphene, and Warfarin.

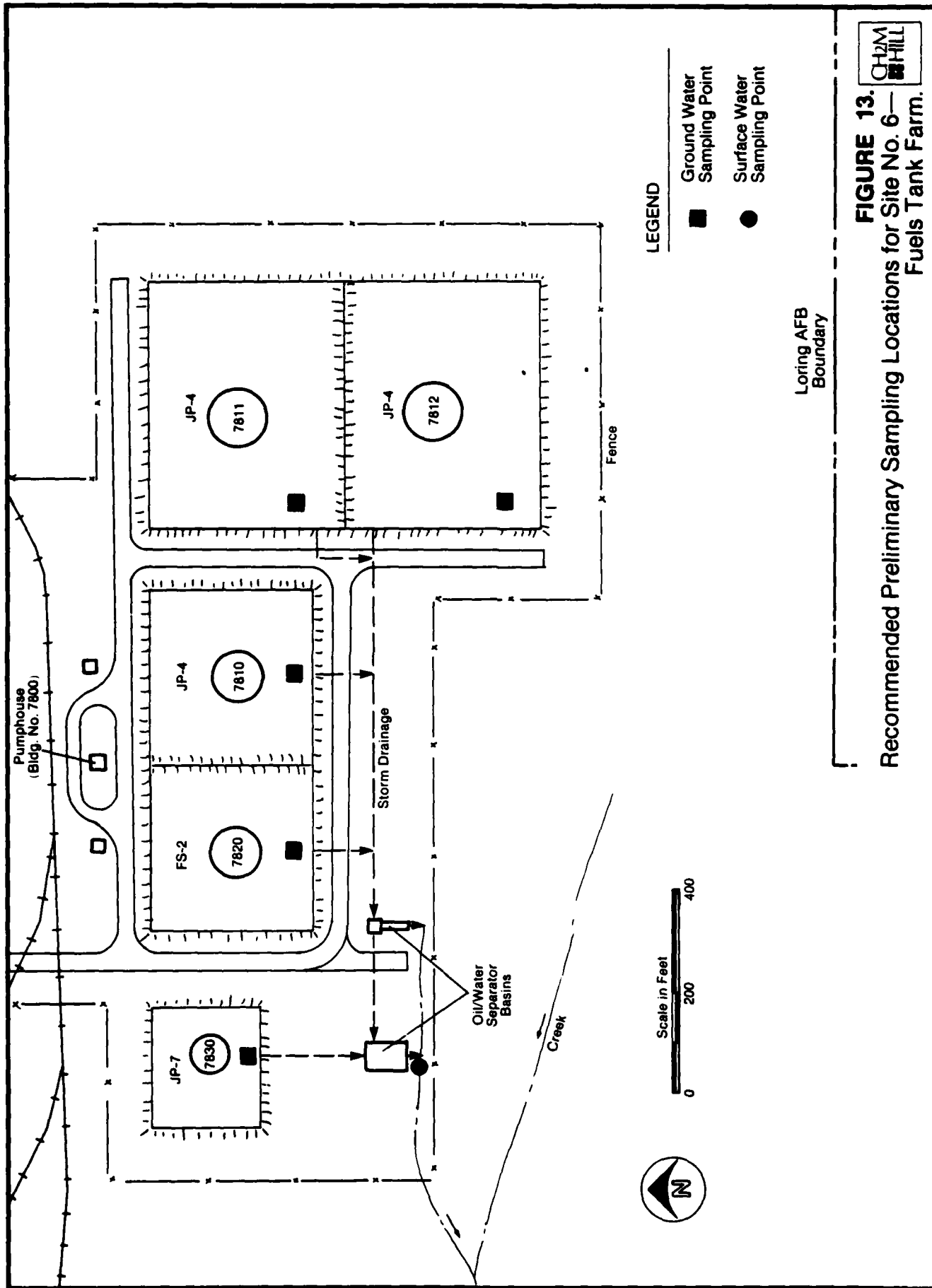
(9) the Flightline Area (Site No. 12), and (10) the BX Service Station (Site No. 13). Approximate monitoring locations for selected sites are shown in Figures 12 to 16. Recommended construction for bedrock monitoring wells is shown in Figure 17; however, recommended locations for monitoring wells are not provided, since data on groundwater movement in the Carys Mills Aquifer are not available to delineate upgradient and downgradient directions. Recommendations for the East Gate Waste Storage Tanks (Site No. 16) and the Radioactive Waste Disposal Tanks (Site No. 15) are presented in Section VI.B, "Other IRP Recommendations."

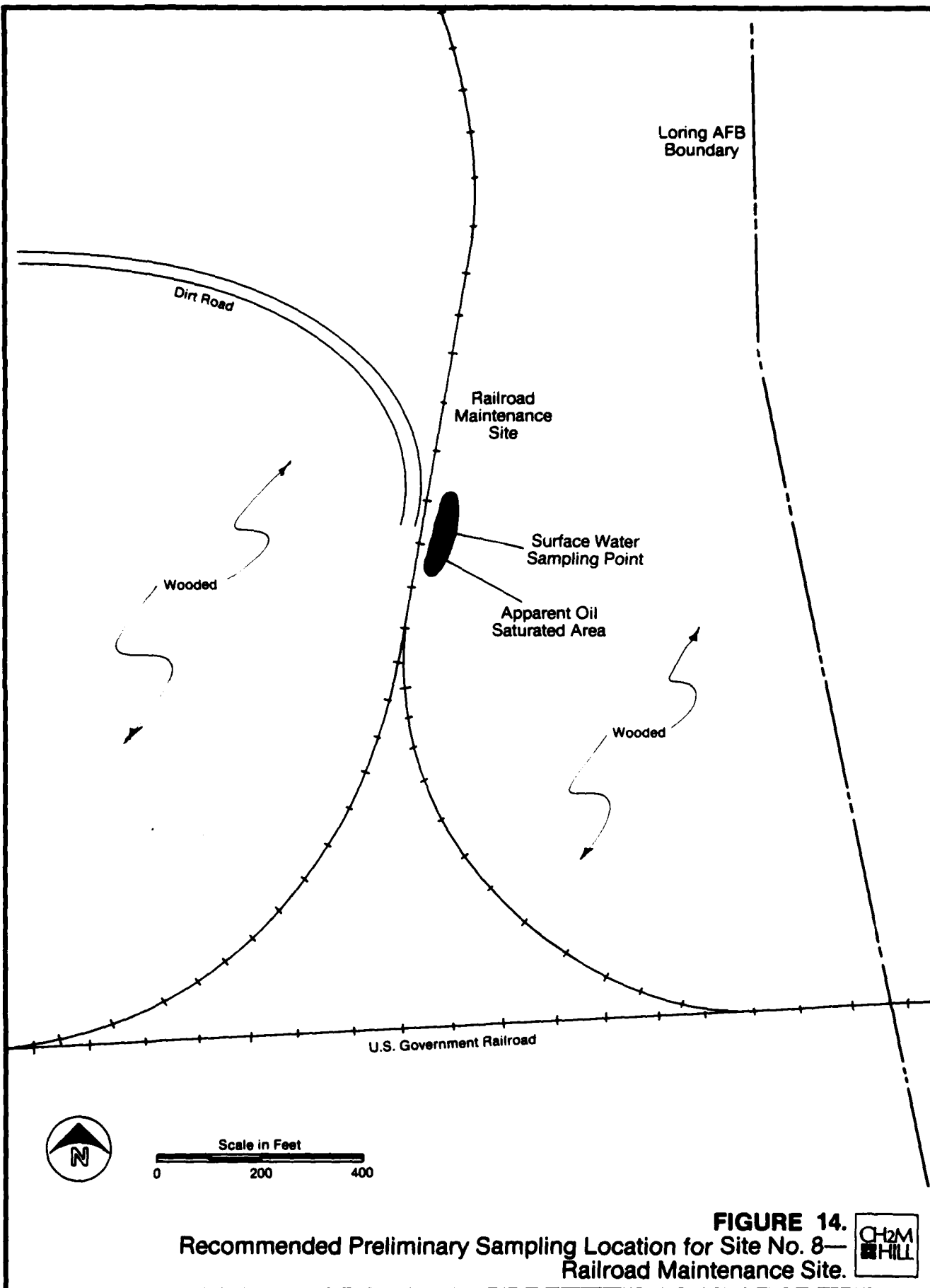
b. Landfill Zone Monitoring (Site No. 2 and No. 3)

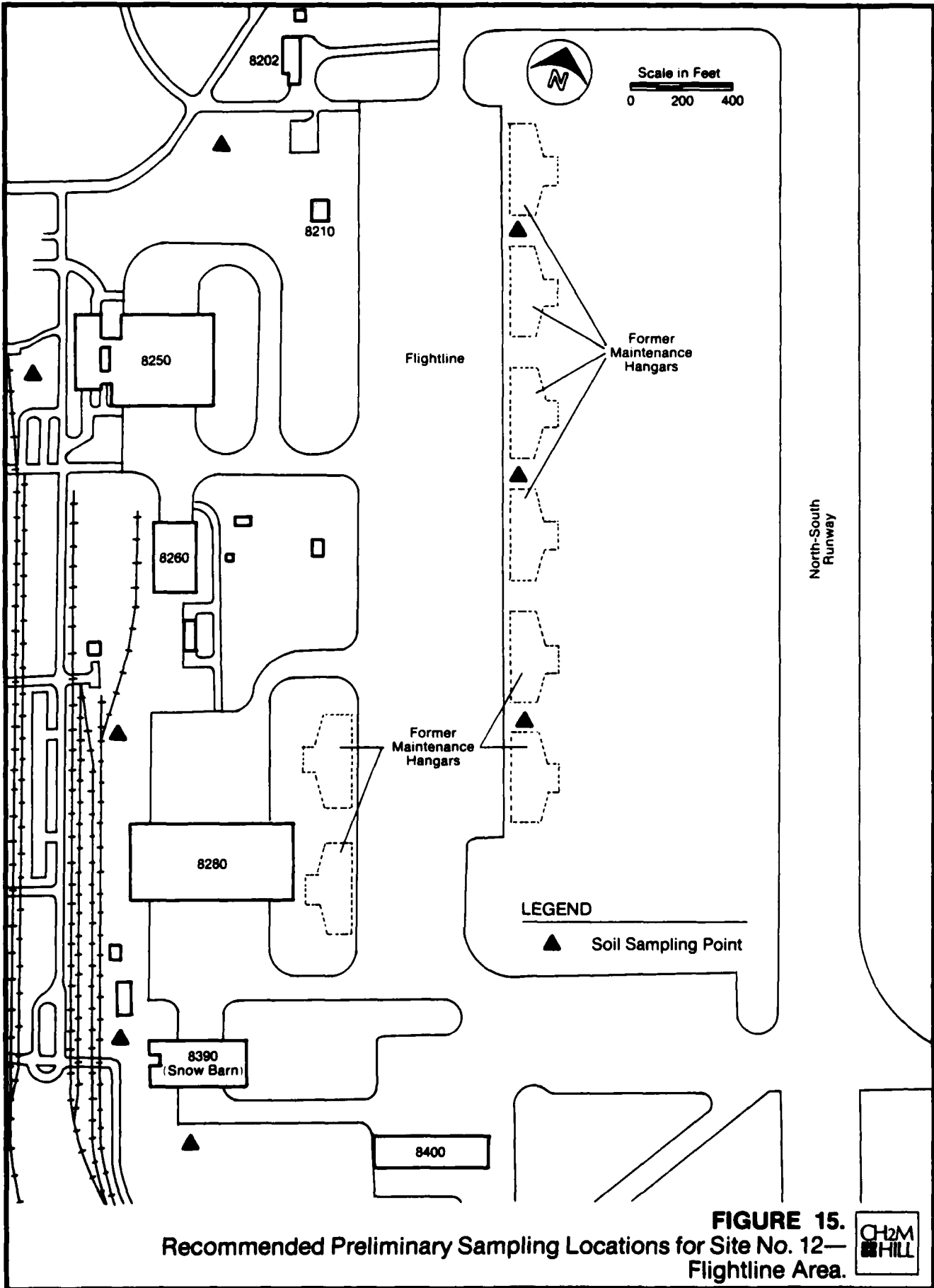
Monitoring wells should be installed to determine if hazardous contaminants are present in the groundwater in the vicinity of Landfill No. 2 and the active Landfill No. 3. Upgradient and downgradient wells should be installed. The wells should be drilled into the top of the Carys Mills Aquifer to a depth of at least 25 feet below the top of the aquifer. The total depth of the wells should be 100 to 200 feet. The precise number of wells and appropriate locations should be determined by the Phase II contractor based upon the potentiometric mapping recommended earlier and consistent with structural geologic conditions. Each well should be analyzed for the parameters given in Table 12 and should be sampled on two occasions, at least 30 days apart.

Section IV.B, Disposal Sites Identification and Evaluation, stated that Site No. 2 is currently under preliminary investigation by EPA and that water, sediment, and soil samples have been collected for priority pollutants analyses. Because the analyses were not available











Scale in Feet
0 50 100

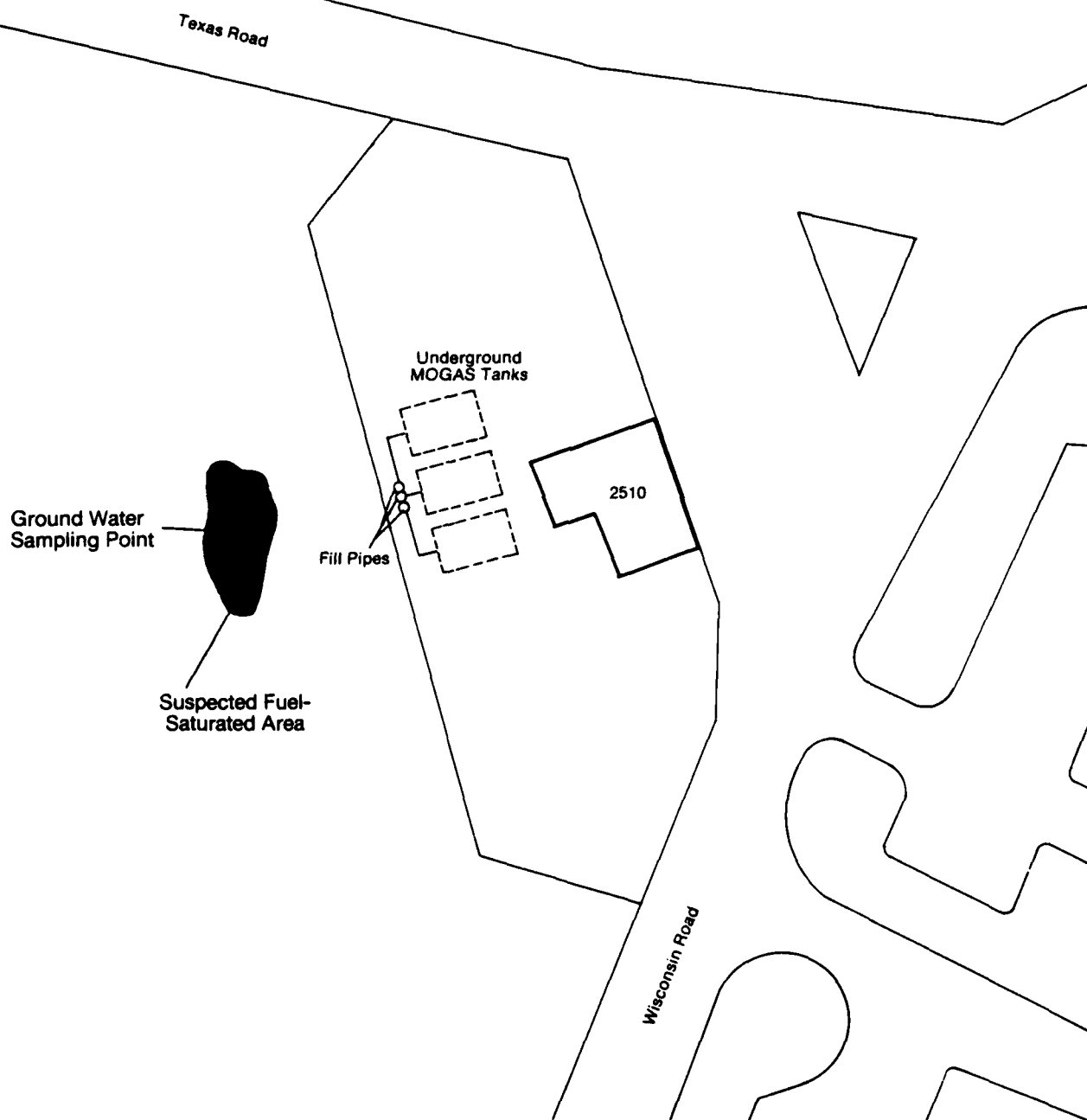
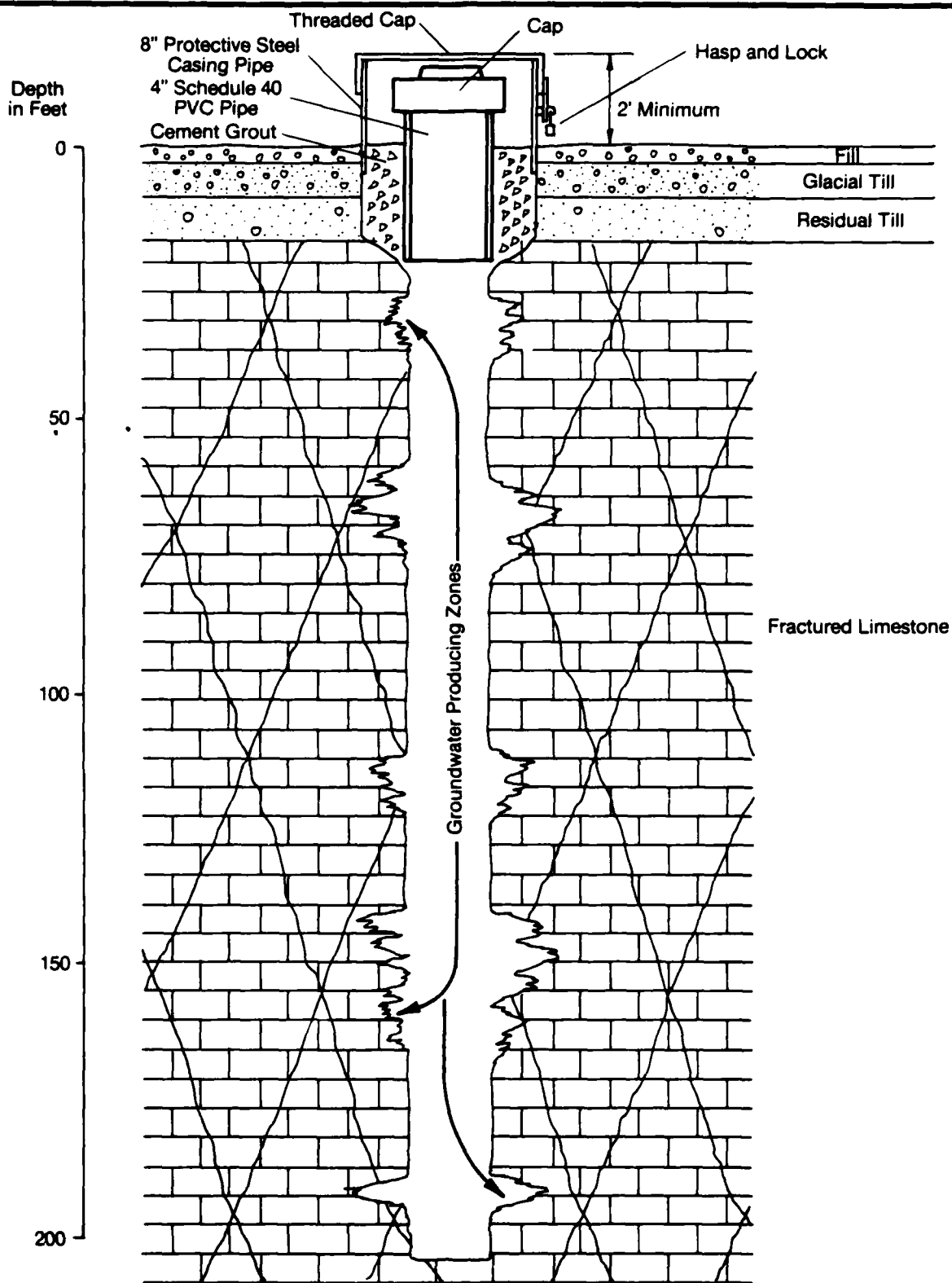


FIGURE 16.
Recommended Preliminary Sampling Location for Site No. 13—
BX Service Station.





Maximum Depth 100 to 200 Feet.
 Note: Drawing not to Scale.

FIGURE 17.
 Typical Bedrock Monitoring Well Installation.



at the writing of this report, the EPA findings could not be considered in formulating monitoring recommendations for Site No. 2. However, when the results become available, they should be used to supplement the monitoring efforts.

c. Nose Dock Area (Site No. 11)

Upgradient and downgradient monitoring wells should be installed to determine if hazardous contaminants exist in the groundwater in the vicinity of the Nose Dock Area. Each well should be drilled into the Carys Mills Aquifer to a depth of 25 feet below the top of the aquifer (total depth 100 to 200 feet). The precise number of wells and the most appropriate locations should be determined by the Phase II contractor based upon the potentiometric mapping recommended earlier and consistent with structural geologic conditions. Each well should be analyzed for the parameters given in Table 12 and should be sampled on two occasions, at least 30 days apart.

In addition, several of the shallow wells installed in 1981 as part of the Loring AFB flightline area ground-water contamination study (Reference No. 2) should be located and analyzed for the parameters listed in Table 12. Each well should be checked for the existence and thickness of a hydrocarbon layer. Based on the Fuss and O'Neill report (Reference No. 3), soil borings made in the vicinity of buildings 8510, 8634, and 8511 were converted to wells by installing 1-1/4 inch PCV pipes.

d. Flightline Drainage Ditch (Site No. 10)

Two soil borings should be completed at this site and be located as shown in Figure 12. Each boring should be completed to the top of the Carys Mills Aquifer.

A certified geologist should be present to examine the soil profile and characteristics and to inspect for signs of fuel or VOC contamination. Soil samples should be collected and analyzed in accordance with Table 12. The number of samples collected should be at the discretion of the geologist. After sampling has been completed, the soil borings should be properly sealed to prevent a pathway for contaminant migration.

Surface water samples should also be collected and analyzed for the parameters shown in Table 12 to define the contaminants present in the ditch. Samples should be collected upstream and downstream of the oil/water separator and diversion dam. Although the downstream sample point is not within the limits of the identified site, downstream analyses when compared to upstream analyses will provide an indicator of oil/water separator performance. One set of upstream and downstream samples should be collected during a low flow period and a second set should be collected during a high flow period.

If the soil samples indicate the presence of VOC's, phenols or heavy metals, consideration should be given to the installation of monitoring wells to define the presence and/or extent of contaminant migration from the ditch area. Location of these wells would be dependent upon the potentiometric mapping recommended earlier.

e. Fuels Tank Farm (Site No. 6)

Completing bore holes, using a hollow stem auger, at the locations shown in Figure 13 is recommended. The holes should be completed to a depth of 3 feet below the groundwater level. Samples of water taken from each boring

should be analyzed for the parameters shown in Table 12. The existence and thickness of a hydrocarbon lens in each bore hole should be determined. After sampling, the bore holes should be properly sealed to prevent a pathway for contaminant migration.

A surface water sample should be collected and analyzed for the parameters shown in Table 12. The sample should be collected at the discharge from the oil/water separator (Figure 13).

f. Quarry Site (Site No. 5)

A survey should be made of the number and condition of drums disposed of in the quarry area. Drums with contents should be sampled, using proper precautions, and analyzed for the hazardous waste characteristics (EP toxicity, ignitability, reactivity, corrosivity). Drums should also be sampled for the suspected contents based on the drum labeling. All drums should be removed and disposed of in accordance with approved practice and RCRA regulations.

Based on the findings from pending surface water analyses and recommended drum sampling, ultimate consideration should be given to performing a magnetometer survey of the quarry area to detect, locate, and remove any buried drums.

g. Landfill No. 1 (Site No. 1)

Upgradient and downgradient monitoring wells should be installed in the vicinity of the site to determine if hazardous contaminants are present in the groundwater. The wells should be drilled into the top of the Carys Mills

Aquifer to a depth of at least 25 feet below the top of the aquifer (total depth 100 to 200 feet). The number of wells and appropriate locations should be determined by the Phase II contractor based upon the potentiometric mapping recommended earlier. Each well should be analyzed for the parameters shown in Table 12 and should be sampled on two occasions, at least 30 days apart.

h. Railroad Maintenance Site (Site No. 8)

The oily substances observed on the ground at this site should be sampled (Figure 14) for the parameters shown in Table 12 and removed. If the sample results are positive for one or more of the analyzed parameters, then consideration should be given to the completion of a soil boring at the site to determine if the contamination has entered the ground to any appreciable extent. Location and depth of boring should be determined by the Phase II contractor based on the results of the analyses.

i. Fire Department Training Area (Site No. 7)

One bore hole should be completed to the top of the Cary Mills Aquifer and located near the center of the fire department training area. A certified geologist should be present to examine the soil profile and characteristics and to inspect for signs of fuel or VOC contamination. Soil samples should be collected and analyzed in accordance with Table 12. The number of samples collected should be at the discretion of the geologist. If groundwater is encountered in the bore hole, analyses should also be completed on a water sample. After sampling has been completed, the bore hole should be properly sealed to prevent a pathway for contaminant migration. If the results of the analyses confirm the presence of contamination below the site,

then based upon the type and concentration of contaminants, consideration should be given to installing upgradient and downgradient monitoring wells to better define the presence and/or extent of contaminant migration. The precise number and location of the monitoring wells should be determined by the Phase II contractor based upon the potentiometric mapping recommended earlier.

j. Flightline Area (Site No. 12)

Eight bore holes should be completed at this site to the top of the Carys Mills Aquifer and located as shown in Figure 15. A certified geologist should be present to examine the soil profile and characteristics and to inspect for signs of fuel or VOC contamination. Soil samples should be collected and analyzed in accordance with Table 12. The number of samples collected should be at the discretion of the geologist. Analyses should also be completed on a water sample from any bore hole in which water is encountered. After completion of sampling, the bore holes should be properly sealed to prevent a pathway for contaminant migration. If the results of analyses confirm the presence of contamination below the site, then based upon the type and concentration of contaminants, consideration should be given to installing upgradient and downgradient monitoring wells to better define the presence and/or extent of contaminant migration. The precise number and location of the monitoring wells should be determined by the Phase II contractor based upon the potentiometric mapping recommended earlier.

k. BX Service Station (Site No. 13)

One shallow (2 feet to 3 feet) bore hole should be completed at this site (Figure 16) and water collected from the hole be analyzed for the parameters

shown in Table 12. After sampling has been completed, the bore hole should be properly sealed to prevent a pathway for contamination migration. If analyses are positive for VOC, heavy metals, or oil and grease, consideration should be given to installing a monitoring well into the most permeable zone above the Carys Mills Aquifer to define the depth of contamination. If analyses from this monitoring well are positive, consideration should then be given to installing upgradient and downgradient monitoring wells drilled into the Carys Mills Aquifer. Number, location, and depth of the wells would be dependent upon the results of the potentiometric mapping recommended earlier.

1. Receiver Site (Site No. 4)

The water well located at the Receiver Site should be sampled and analyzed for oil and grease and VOC's to confirm or rule out the presence of contamination from No. 2 fuel oil. If the tests are positive, the well should be plugged and consideration should be given to removal of the contaminated soil and disposal of the soil in an acceptable manner and in compliance with RCRA regulations.

m. Underground Transformer Site (Site No. 17)

Water should be collected from Wells No. 9 and 20 located near the site and analyzed for PCB's to confirm or rule out the presence of contamination in nearby ground water.

B. OTHER IRP RECOMMENDATIONS

Other recommendations that have resulted from the base visit and records search are presented below:

1. The East Gate Waste Storage Tanks (Site No. 16) should be pumped out and contents analyzed for the hazardous waste characteristics (EP toxicity, reactivity, corrosivity, and ignitability), VOC's, phenols, and oil and grease. Based upon the results of these analyses, the liquid should be disposed of in an acceptable manner and, if required, in compliance with RCRA regulation. The tanks should be secured in an acceptable manner.

2. The six tanks located at the Radioactive Waste Disposal Tanks Site (Site No. 15) should be resampled and analyzed for radioactivity. If tests are still negative, the tanks should be secured. If tests are positive for radioactivity, then based upon the level of radioactivity, consideration should be given to removal and disposal of the contents in an acceptable manner, in compliance with RCRA and other applicable regulations.

3. Inactive fuel tanks located by base personnel during the October 1983 tank survey should be properly secured. If any of these tanks show evidence of leaking, consideration should be given to sampling soil and/or ground water beneath the respective site for signs of fuel contamination. Tanks previously preserved with a chromate substance should be emptied. If inspection of any of the tanks shows evidence of leaking, consideration should be given to sampling soil and ground water beneath the respective site for signs of fuel and/or chromium contamination.

4. Approximately 2,500 gallons/year of B&B 2020 NV aircraft cleaning compound is discharged to the storm-water collection system which discharges to the Flightline Drainage Ditch (Site No. 10) and eventually to Greenlaw Brook. Due to the components (hexylene glycol, pine oil,

surfactants) and the biodegradeable nature of this material, this discharge should be treated at the wastewater treatment plant as opposed to continued discharge into the storm-water collection system.

C. LAND USE RESTRICTIONS FOR IDENTIFIED SITES

Land use restrictions at the identified disposal and spill sites at Loring AFB should be considered. Such land use restrictions would (1) provide for the continued protection of human health, welfare, and the environment; (2) ensure that the migration of potential contaminants is not promoted through improper land uses; (3) facilitate the compatible development of future USAF facilities; and (4) allow for identification of property which may be proposed for excess or outlease.

Before any land use activity is planned at suspected contamination sites, potential hazards and environmental impacts must be considered. As more site information becomes available (Phase II) and/or cleanup actions occur (Phase IV) land use restrictions should be re-evaluated.



VII. OFF-BASE FACILITIES

VII. OFF-BASE FACILITIES

A. INTRODUCTION

Off-base facilities include housing areas in the towns of Caribou, Caswell, Connor, Limestone, and Presque Isle; the Blotner Radar Site; the Ashland RBS Site; the Scope Control Site near Caribou; the Madawaska Dam and Water Treatment Plant; and the Dow Pines Recreation Area near Bangor, Maine. Locations of these facilities, except for the Dow Pines Recreation Area, are shown in Figure 3, Section II.

B. OFF-BASE FACILITIES

1. Housing Areas

The Caribou Housing facility is located on Route 89 just east of the town of Caribou. This facility built in 1958 consists of 16 family housing units.

The Caswell Housing facility is located near the northeast corner of the Loring AFB boundary in the town of Caswell. This facility, built in 1958, consists of 16 family housing units.

The Connor Housing facility is located west of the base in the town of Connor. Like the Caribou and Caswell facilities, the Connor Housing Facility was also built in 1958 and consists of 16 family housing units.

The Limestone Housing facility is located southeast of the base in the town of Limestone. Like the other three facilities, Limestone Housing was built in 1958 and consists of 16 family housing units.

The Presque Isle Housing facility is located at the site of the former Presque Isle Air Force Base near the town of Presque Isle. This facility, built in 1957, consists of 82 duplex and 27 single units.

The Caribou, Caswell, Connor, and Limestone facilities were originally U.S. Army housing complexes. Loring AFB accepted jurisdiction for each facility in 1966 and they were permanently assigned to the Air Force in 1976.

The Caribou, Limestone, and Presque Isle facilities are each served by local water and sewage utilities. Household refuse is collected by a local contractor and disposed of in local municipal landfills.

The Caswell and Connor facilities each have their own potable water well supply and wastewater treatment system with leach field discharge. Household refuse is collected by a contractor and disposed of in the Loring AFB landfill (Site No. 3).

Numerous underground tanks (550-gallon capacity) store heating fuel at each of the housing facilities. Most of these tanks were installed about 1958. Due to the age of these tanks, there is concern for the potential of ground-water contamination from leaking tanks. An inspection/maintenance program should be developed for these tanks. In addition, periodic sampling and analysis of the water supply wells at the Caswell and Connor Housing Facilities should be made. Analyses should include oil and grease and a volatile organic carbon (VOC) scan to detect the presence of fuel components.

No industrial operations or generation of hazardous wastes are known to exist at any of the 5 housing facilities.

2. Blotner Radar Site

The Blotner Radar Site is located about one mile north of the town of Connor. This is a radar installation covering approximately 25-30 acres. Main facilities consist of the radar installation and an administration building.

Water is supplied by a potable water well and wastewater treatment is provided by a septic tank system. Refuse collection is by contract with disposal at the Loring AFB landfill (Site No. 3).

No industrial operations or generation of hazardous wastes are known to exist at this facility.

3. Ashland RBS Site

The Ashland RBS Site is a radar bomb scoring (RBS) range located north of the town of Ashland. The facility, built in 1980, covers approximately 6 to 7 acres.

Practice bombing is accomplished electronically. Neither real nor practice bombs are dropped at this site during practice exercises.

No industrial operations or generation of hazardous wastes are known to exist at this site.

4. Caribou Scope Control Site

The Caribou Scope Control Site is a radio receiving facility located north of Route 89, southwest of Loring AFB

and northeast of Caribou. The facility, built in 1957, covers approximately 71 acres (30 acres owned by Air Force; 41 acres of easement).

Water is supplied by a potable water well and wastewater treatment is by septic tank. Refuse collection is by contractor with disposal at the Loring AFB landfill (Site No. 3).

No industrial operation or generation of hazardous wastes are known to exist at the site.

5. Madawaska Dam and Water Treatment Plant

This facility is a dam and water treatment facility located on the Little Madawaska River. Both were constructed in 1960 to provide a source of potable water for Loring AFB. Additional discussion of this facility is presented in Section IV.A.8, Available Water Quality Data.

The facility provides its own water supply. Wastewater treatment is by septic tank. Refuse collection is by contractor with disposal at the Loring AFB landfill (Site No. 3).

6. Dow Pines Recreation Area

The Dow Pines Recreation Area is located approximately 150 miles south of Loring AFB and about 30 miles east of Bangor, Maine. Locally, the recreation site is located on Great Pond, a lake 8 to 10 miles north of the Township of Aurora, Maine. The facility is strictly a campsite, consisting of year-round camping on Great Pond.

Water is supplied by a potable well and wastewater treatment is by septic tank. Collection of refuse is handled locally with disposal at the Township of Aurora's Landfill.

C. CONCLUSIONS/RECOMMENDATIONS

The records search did not identify any past disposal or spill sites at any of the off-base facilities. Therefore, Phase II monitoring is not recommended for any of the off-base facilities.

An inspection/maintenance program should be developed for the underground fuel oil tanks located at the five housing facilities. In addition, the potable water wells located at the Caswell and Conner Housing facilities should be periodically sampled and analyzed. Analyses should include oil and grease and volatile organic carbon (VOC) scans to detect the presence of fuel components in the ground water.



APPENDIX CONTENTS

APPENDIX A	RESUMES OF TEAM MEMBERS
APPENDIX B	OUTSIDE AGENCY CONTACT LIST
APPENDIX C	LORING AFB RECORDS SEARCH INTERVIEW LIST
APPENDIX D	INSTALLATION HISTORY
APPENDIX E	MASTER LIST OF INDUSTRIAL OPERATIONS
APPENDIX F	INVENTORY OF EXISTING, POL STORAGE TANKS
APPENDIX G	HAZARDOUS ASSESSMENT RATING METHODOLOGY
APPENDIX H	SITE RATING FORMS
APPENDIX I	GLOSSARY OF TERMS
APPENDIX J	LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT
APPENDIX K	REFERENCES



Appendix A
RESUMES OF TEAM MEMBERS



DAVID M. MOCCIA
Industrial Reclamation
Department Manager

Education

B.S., Chemical Engineering, University of Florida

Experience

Since joining CH2M HILL, Mr. Moccia has developed expertise in water and wastewater treatment and hazardous waste management. Projects for municipal clients include the design of a reverse osmosis water treatment plant and several preliminary designs for activated sludge wastewater treatment facilities. He has also completed wastewater investigations, pilot studies, and engineering designs for clients in the food, chemicals, and metal treating industries. In hazardous waste projects, Mr. Moccia has been involved with the identification of possible hazardous waste contaminated sites, assessments of potential for contaminant migration, and the preparation of master plans for the management of uncontrolled hazardous waste sites.

In his present position as Manager of the Industrial Reclamation Department, Mr. Moccia is responsible for project execution, fiscal management, business development, and staffing for the department.

In the area of water treatment, Mr. Moccia completed the process design and managed the engineering design of a 3.0-mgd reverse osmosis water treatment plant for the Englewood Water District in south Florida. The facility was designed to provide potable water from brackish well water having a total dissolved solids concentration of 4,700 ppm. The design included chemical addition to prevent precipitation of minerals, micron filtration to remove fine particles in the raw water, spiral-wound membranes to reduce the total dissolved solids concentration, degassification to remove hydrogen sulfide and carbon dioxide, chemical addition to adjust pH, chlorination to provide disinfection, and potable water storage. Prior to distribution, the treated water is combined with treated water from three lime softening water treatment plants.

Mr. Moccia participated in the design of a 9.5-mgd wastewater treatment plant for Alexander City, Alabama. He was responsible for the process design of an activated sludge process, including sludge thickening and dewatering. Components of the system included aeration basins, clarifiers, chlorination facilities, a dissolved air flotation system for thickening sludge, a thickened sludge holding basin, and

DAVID M. MOCCIA

belt filter presses for sludge dewatering prior to off-site disposal. Although the plant was a municipal facility, the raw wastewater was comprised largely of wastewaters from a large textile plant in Alexander City.

Mr. Moccia's experience in industrial wastewater treatment includes a study and process design completed for a south Georgia organic chemicals plant. He was responsible for the wastewater characterization, pretreatment, laboratory and pilot plant studies, and process design of a facility to treat up to 39,000 pounds per day of BOD₅. Studies showed that the wastewater was very amenable to biological treatment but was nutrient-deficient and would require addition of nitrogen and phosphorus. The wastewater temperature was found to be excessively high, requiring cooling prior to biological treatment. Various toxic shock loading tests determined the potential impact of uncontrolled spills. The process design included modification to existing pretreatment equipment, in-line equalization basins, a pH neutralization basin, aeration basins, clarifiers, belt filter press sludge dewatering facilities and chemical addition facilities for nutrient addition and pH adjustment.

In the food processing industry, Mr. Moccia has been involved in various wastewater studies and designs for Perdue, Inc., a poultry processor. Projects were completed for plants located in North Carolina, Virginia, Maryland, and Delaware. Poultry processing wastewater is generally high in oil and grease, solids, BOD₅ and blood and requires pretreatment prior to effective biological treatment. At the Virginia location wastewater characterization and pretreatment studies were completed followed by process and engineering designs for a 2.0 mgd activated sludge treatment system. Due to water quality limitations on the receiving creek, Mr. Moccia was involved in various stages of negotiations with the regulatory agencies concerning discharge criteria and discharge permit requirements. Similar services provided to the other plants included an effluent spray irrigation feasibility study, design of a complete pretreatment system utilizing a dissolved air flotation tank, and evaluation and recommendations for improvements to two activated sludge treatment systems.

Examples of Mr. Moccia's involvement in hazardous waste projects include several studies completed for the U.S. Air Force in accordance with the Department of Defense's (DoD) Installation Restoration Program (IRP). The IRP represents DoD's policy to identify and fully evaluate suspected problems associated with past hazardous materials disposal

DAVID M. MOCCIA

sites on DoD facilities (e.g., Air Force bases), to control the migration of hazardous contamination, and to control hazards to health and welfare that may have resulted from these past operations. Phase I of this program, the Records Search, included a search and review of installation records to identify possible hazardous waste-contaminated sites and to assess the potential for contaminant migration from the installation. Mr. Moccia participated in and managed Phase I Records Searches at MacDill AFB, Florida; Dobbins AFB, Georgia; Richards-Gebaur AFB, Missouri; Bergstrom AFB, Texas; and Cannon AFB, New Mexico.

Mr. Moccia has directed the preparation of Remedial Action Master Plans (RAMP) for several uncontrolled hazardous waste sites including a landfill and refinery/petrochemical waste disposal sites. The documents served to identify the scope and sequence of remedial investigations, feasibility studies, and other onsite or offsite remedial actions applicable to the uncontrolled site. The plans included work statement and order-of-magnitude cost estimates for recommended remedial projects, preliminary health and safety requirements, and community relations strategies.

Professional Registration

Professional Engineer, Florida, Georgia, North Carolina

Membership in Professional Organizations

Florida Engineering Society
Florida Pollution Control Association
National Society of Professional Engineers
Water Pollution Control Federation
Tau Beta Pi

GNRE2



GARY E. EICHLER
Hydrogeologist

Education

M.S., Geology with Minor in Civil Engineering, University of Florida

B.S., Cum Laude, Construction and Geology, Utica College of Syracuse University

Experience

Mr. Eichler has been responsible for groundwater projects for both water supply and effluent disposal. Studies have included site selection, well design, construction services, monitoring and testing programs, determination of aquifer characteristics, and well field design. In addition, he has conducted numerous studies to determine pollution potential of toxic and hazardous wastes. Prior to joining CH2M HILL, Mr. Eichler was an engineering geologist with an environmental consulting firm. His responsibilities included project management, soils investigations, siting studies, groundwater and surface-water reports, and federal and state environmental impact studies.

Mr. Eichler has been responsible for exploration drilling, testing and design of well fields having a combined total installed capacity of over 75 mgd. Many of these well fields for potable water supply are located in the coastal aquifer in close proximity to saltwater.

His experience includes responsibility for the design and installation of shallow aquifer well fields in unconsolidated formations. Mr. Eichler has designed and installed screened wells, both natural and gravel packed, as well as open hole wells using both cable tool and rotary drilling methods.

Project responsibilities have included management and team participation on more than 20 hazardous waste disposal projects. The studies included initial site investigations, determination of pollutant travel time and direction, and evaluation of the potential for contaminant migration.

Mr. Eichler has been involved in geophysical logging and performance testing of deep disposal wells for both municipal effluent and hazardous waste.

He has conducted projects to determine saltwater intrusion potential and has been responsible for the design of monitoring programs to warn against intrusion.

GARY E. EICHLER

Mr. Eichler has conducted hydrogeological projects using aquifer computer modeling techniques to predict the effects of future large scale groundwater withdrawals.

Professional Registration

Certified Professional Geologist, Certificate No. 4544

Membership in Professional Organizations

American Institute of Professional Geologists
American Water Resources Association
Association of Engineering Geologists
Geological Society of America
Southeastern Geological Society
National Water Well Association
Florida Well Drillers Association

Publications

With U. P. Singh, C. R. Sproul, and J. I. Garcia-Bengochea.
"Aquifer Testing of the Boulder Zone of South Florida."
ASCE Publication Preprint 82-030. 1982.

Engineering Properties and Lime Stabilization of Tropically
Weathered Soils. Master's Thesis. Department of Geology,
University of Florida. August 1974.

GNRE3



ROBERT L. KNIGHT
Ecologist

Education

Ph.D., Systems Ecology, University of Florida
M.S.P.H., Environmental Chemistry and Biology, University of
North Carolina
B.A., Zoology, University of North Carolina

Experience

Dr. Knight's responsibilities at CH2M HILL involve all aspects of environmental study, including design and implementation of field studies, data analysis and interpretation, project management, environmental systems overview analysis, impact analysis, prediction, and assessment. His experience has covered a wide range of applied research problems in aquatic and terrestrial environments, including computer simulation analyses.

Dr. Knight has managed several marine ecology field studies in Florida including: a 4-year study of estuarine metabolism at the Crystal River Nuclear Power Plant; a baseline conditions assessment of seagrass and oyster reef ecology in the Withlacoochee and Crystal Bays; and a 1-year productivity study and preparation of a simulation model of the Indian River estuary.

Dr. Knight participated in the design and implementation of long-term studies of fate and effects of toxic metals in stream mesocosms. He had direct responsibility for the chemical and biological monitoring of algal and insect populations, prepared a toxicity simulation model for cadmium, and developed general techniques for quantification of toxicity in biological systems.

Dr. Knight performed extensive field work at Silver Springs, Florida, to investigate the relationship between plant productivity and consumer organizations. As one part of that study, he developed a new microcosm design for the study of flowing aquatic systems.

Dr. Knight has conducted several studies on the feasibility of using natural and artificial wetlands for the assimilation of domestic wastewaters. Wetland systems include Spartina salt marshes and pocosins in North and South Carolina, hardwood swamp and prairie wetlands in Florida, and a marsh wetland in Mississippi. He has played a major role in site investigations and in developing management criteria for wetland and land treatment systems.

ROBERT L. KNIGHT

Dr. Knight has participated in a number of hazardous waste studies, including three Superfund sites, a hazardous waste landfill, and six Air Force bases, nationwide. He has prepared ecological assessments of susceptible environments and has participated in water quality sampling in groundwater studies.

Dr. Knight has considerable expertise in the study of phytoplankton and other algae in aquatic systems. He has conducted field verification studies of the Algal Assay Procedure, studied the effects of power plant entrainment on phytoplankton, and provided taxonomy and enumeration of phytoplankton and periphyton from rivers and streams.

Publications

Dr. Knight has authored several technical papers on ecosystem metabolism, phytoplankton ecology, and heavy metal dynamics in aquatic systems. Representative papers include:

Energy Model of a Cadmium Stream with Correlation of Embodied Energy and Toxicity Effect. EPA-600/53-048. U.S. EPA, Athens, Georgia. 1982.

"In Defense of Ecosystems," co-authored with D. Swaney. American Naturalist, 117:991-992, 1981.

"A Control Hypothesis for Ecosystems--Energetics and Quantification with the Toxic Metal Cadmium," in W. Mitsch, R. W. Bosserman, and J.M. Klopatek (eds.) Energy and Ecological Modelling. Elsevier Publishing Co., pp. 601-615, 1981.

Record of Estuarine and Salt March Metabolism at Crystal River, Florida, 1977-1981, co-authored with W. F. Coggins. Final Summary Report to Florida Power Corporation, Dept. of Environmental and Engineering Sciences, University of Florida, Gainesville. 1982.

"Large-Scale Microcosms for Assessing Fates and Effects of Trace Contaminants," co-authored with J. W. Bowling, J. P. Giesy, and H. J. Kania. In: J. P. Giesy (ed.) Microcosms in Ecological Research, USDE pp. 224-247, 1980.

"Fates of Cadmium Introduced into Channel Microcosms," co-authored J. P. Giesy, J. W. Bowling, H. J. Kania, and S. Mashburn. Environment International, 5:159-175, 1981.

Energy Basis of Control in Aquatic Ecosystems. Ph.D. Dissertation, University of Florida. 1980.

ROBERT L. KNIGHT

Fate and Biological Effects of Mercury Introduced into Artificial Streams, co-authored with H. J. Kania and R. J. Beyers. PEA-600/3-76-060. U.S. EPA, Athens, Georgia. 1976.

Effects of Entrainment and Thermal Shock on Phytoplankton Numbers and Diversity. Department of Environmental Sciences and Engineering, Publication 336, University of North Carolina, Chapel Hill. 1973.

RE2



Appendix B
OUTSIDE AGENCY CONTACT LIST



Appendix B
OUTSIDE AGENCY CONTACT LIST

1. Maine Inland Fisheries and Wildlife Department
Assistant Director of Fisheries
Augusta, Maine
Mr. Peter Bourque
207/289-3651
2. United States Fish and Wildlife Service
Fisheries Management Biologist
Laconia, New Hampshire
Mr. Alan Knight
603/524-6809
3. United States Fish and Wildlife Service
Endangered Species Biologist
Newton, Massachusetts
Mr. Paul Nickerson
617/965-5100
4. United States Fish and Wildlife Service
Fisheries Biologist
Newton, Massachusetts
Mr. David Goldthwaite
617/965-5100
5. United States Fish and Wildlife Service
Ecological Services
Concord, New Hampshire
Mr. Gordon Russell
603/224-2585
6. U.S. Environmental Protection Agency, Region I
Federal Facilities Coordinator (pending)
Boston, Massachusetts
Ms. Elizabeth Higgins
617/223-1740

7. Maine Department of Environmental Protection
Bureau of Hazardous Substances
Superfund Coordinator
Augusta, Maine
207/289-2651
Mr. Hank Aho
8. Maine Department of Environmental Protection
Bureau of Oil and Hazardous Materials Control
Environmental Services Specialist
Augusta, Maine
207/289-2651
Mr. Richard Baker
9. Maine Department of Environmental Protection
Management and Planning Division
Augusta, Maine
Mr. George Kaplan
207/289-2437
10. Maine Department of Environmental Protection
Bureau of Water Quality Control
Augusta, Maine
Ms. Bonnie Hadians
207/289-3355
11. Maine Inland Fisheries and Wildlife Department
Endangered Wildlife
Augusta, Maine
Mr. Lee Perry
207/289-3651

12. Maine Department of Environmental Protection
Bureau of Water Quality Control
Presque Isle, Maine
Mr. Carl Allen
207/764-3737
13. State Planning Department
Manager of Critical Areas
Augusta, Maine
Mr. Hank Tyler
207/289-3261
14. State of Maine Geological Survey
State House Station 22
Augusta, Maine
Andrews L. Tolman
207/289-2801
15. U.S. Geological Survey
Water Resources Division
Maine Subdistrict Office
26 Ganneston Drive
Augusta, Maine
Daniel J. Morrissey
207/623-4797



Appendix C
LORING AFB RECORDS SEARCH INTERVIEW LIST



Appendix C
LORING AFB RECORDS SEARCH INTERVIEW LIST

<u>Interviewee</u>	<u>Area of Knowledge</u>	<u>Years at Installation</u>
1	Bioenvironmental Engineering	1
2	Interior Electric	31
3	Landfill Operation	16
4	Corrosion Control	15
5	Fuels Supply	9
6	Construction Management	30
7	Civil Engineering	26
8	Supply	33
9	Explosive Ordnance Disposal	1
10	Defense Property Disposal Office	31
11	Fire Department	17
12	Fire Department	4
13	Entomology	12
14	Aerospace Ground Equipment	14
15	Aerospace Ground Equipment	16
16	Paint Shop	14
17	Paint Shop	9
18	Pavement and Grounds	10
18	Aerospace Ground Equipment	16
19	BX Service Station	7
20	Transportation Squadron	29
21	Environmental Planning	3
22	Water and Wastewater	28
23	Wastewater Treatment	10
24	Liquids Fuels Distribution	15
25	Liquids Fuels Distribution	2



Appendix D
INSTALLATION HISTORY



Appendix D INSTALLATION HISTORY

Loring AFB is located on a 10,000 acre tract of land in Maine's northeast corner, approximately 400 miles north of Boston and 3 miles from the Canadian border. Initial work was started on the base in June 1946 by the Corps of Engineers, New England Division, U.S. Army, on a tract of virgin land which was 80 percent forest and 20 percent farmland. This is one of the first bases designed as an Air Force Installation and not converted from an old Army field. During the initial construction period, extending from 1946 until 1953, Loring was garrisoned by a small force of Air Force personnel designated only as a base detachment. Later the detachment was redesignated the 4215th Base Service Squadron and as Loring grew in importance, the squadron became the 4215th Air Base Squadron.

On February 25, 1953, the 42nd Bombardment Wing (H) was activated as the first tactical unit to be assigned to Loring. The smaller air base squadron was deactivated and its personnel and equipment merged with the 42nd Bombardment Wing. The 42nd BMW has been at Loring since that date.

On October 1, 1954, in keeping with the Air Force policy of honoring its heroes, the name of this base officially was changed from Limestone Air Force Base to Loring Air Force Base.

Major Charles J. Loring, Jr., enlisted in the Air Force in 1942 and served as a fighter pilot in the European Theatre and was shot down over Belgium. He spent five months in a German prisoner of war camp and emerged from the Second World War having won the Distinguished Flying Cross and the Air Medal. Major Loring died on November 22, 1952 while leading a jet dive-bombing mission over Korea against

Red gun emplacements that were harassing friendly United Nations troops. According to an Air Force citation, he deliberately dived his damaged aircraft into an enemy artillery installation, thereby destroying it. It was his 51st combat mission.

In late 1953, the Weapons Storage Area operated by 3080th Aviation Depot Group was renamed Caribou Air Force Station. The next year in September 1954, the U.S. Army activated the 548th Anti-Aircraft Artillery Battalion at Loring AFB.

In early 1956 twelve B-36s departed Loring for reassignment and by June 1956 the first B-52 assigned to the 42nd BWB arrived at Loring AFB, making this the first 8AF unit to receive the heavy bomber. By September 1956, the last B-36 had departed Loring for Biggs AFB, Texas. During the next year the 42nd ARS received the first KC-135 stratotanker, christened the "Aroostook Queen", and by December 1957, the last KC-97 had departed Loring.

By the end of 1961 the former Presque Isle Air Force Base had been closed and its personnel were reassigned to Loring AFB. On July 1, 1962, the 3080th Aviation Depot Group was inactivated at Caribou Air Force Station and control of this land was transferred to SAC. The former Caribou Air Force Station was renamed East Loring.

The 83rd Fighter Interceptor Squadron ended almost 13 years of duty at Loring when ADC inactivated the unit on June 30, 1972. The change reflected an extensive realignment and reorganization of the Air Force defense system that placed greater reliance on Air National Guard units. The move by ADC included the inactivation of the 83rd detachment located

at Bangor International Airport, Maine. A total of 450 personnel and 20 F-106s were reassigned to either the 95th FIS, Dover AFB, Delaware, or the 102d Fighter Group, Otis AFB, Massachusetts.

Loring remained void of the sleek Delta wing jet fighters until February 18, 1976, when ADC activated Detachment 1, 49th FIS. This brought in several F-106s and 30 to 40 people to pull rotational alert at Loring AFB.

The 45th Air Division, a longtime resident at Loring AFB, was transferred administratively to Pease AFB, New Hampshire, effective July 1, 1971. The existing 817th Air Division, at Pease since 1956, was redesignated as the 45th Air Division. Former air division personnel at Loring were either absorbed into wing agencies or reassigned to other units. The composition of the new 45th included the 42d BMW, 380th BMW at Plattsburg, 509th BMW at Pease, 99th BMW at Westover and the 95th Strategic Wing at Goose AB.

On November 1, 1979, the Department of Defense reversed its decision to reduce Loring AFB after three years and seven months of political and legal battling with communities in the surrounding area. Headquarters SAC had announced its intention to inactivate the 42d Bomb Wing on March 11, 1976. Since that initial announcement, the Air Force had conducted detailed studies, held public hearings, filed several Environmental Impact Statements, reviewed and revised these studies and finally filed the Final Environmental Impact Statement on November 1, 1977. In February 1978, it appeared that the final announcement was near; then President Carter requested the Secretary of Defense to reassess the decision. The Air Force reexamined all previous studies as well as related military decisions, events and trends occurring after the 1976 studies. In December 1978, Headquarters USAF instructed SAC to conduct

an on-site survey of Loring facilities. In another effort to update and validate their data base, the Directorate of Engineering and Services, Headquarters USAF, commissioned the Stanford Research Institute (SRI) International of California and the Air Force Engineering and Services Center, Tyndall AFB, Florida, to accomplish one more socio-economic analysis of the potential impact of the proposed Loring reduction. This new study analyzed current data plus information from earlier studies using a different methodology.

With three and one-half years of frustration and confusion behind them, Loringites faced a new decade secure in the belief that the 42d Bomb Wing would continue as an integral part of the national defense system. They could look forward to new construction and improvements in living and working conditions. The command also recognized the importance of accomplishing projects to improve the quality of life at Loring. General Ellis, CINCSAC, requested Senator Muskie to support a five year plan costing \$147.3 million, plus an immediate supplemental budget request of \$16.7 million, to breathe new life into the base. As 1980 began, it appeared that the 33-year old base could look to the future with a new lease on life.

A. PRIMARY MISSION

Loring AFB operates as a single mission facility. Its primary mission is the support of the 42d Bomb Wing with its B-52 and KC-135 aircraft.

B. TENANT MISSION

Loring AFB depends on support from its tenant units - those organizations which are not a part of the Strategic Air Command but are assigned to Loring by the Air Force to assist the Wing.

The Office of Special Investigations, for example, assists in the area of crime investigation and security matters; Detachment 4, 26th Weather Squadron, compiles weather forecasts and briefs commanders on weather conditions and the 2192nd Communications Squadron (AFCS) operates the radar approach control, control tower, and other communications facilities.

Other tenant units are Detachment 2, 4000th Aerospace Applications Group, SAC Manpower Evaluation Team and the USAF Resident Auditor.

A detachment of the 49th Fighter Interceptor Squadron maintains two F-106 interceptors on satellite alert at Loring.

There are no Air National Guard or Air Force Reserve units assigned to this base. It operates only as a SAC facility with no major sharing of function with any other service or civilian activity.



Appendix E
MASTER LIST OF INDUSTRIAL OPERATIONS

Appendix E
MASTER LIST OF INDUSTRIAL OPERATIONS

Shop Name	Present Location and Dates (Building No.)	Past Location and Dates (Building No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
42nd Avionics Maintenance Squadron					
Bomb Navigation Shop	(1954-Pres.)		X	--	Consumed in use
Communication (Radio)	(1954-Pres.)		X	--	Consumed in use
Defensive Fire Control	(1954-Pres.)		X	X	DFO
Explosive Shop (Inertial Navigation)	(1954-Pres.)		--	--	
ECM Shop	(1954-Pres.)		X	--	Consumed in use
Navigation (Radar)	(1954-Pres.)		X	--	Consumed in use
PMEL	(1954-Pres.)		X	X	Recycled
42nd Civil Engineering Squadron					
Carpenter Shop	(1953-Pres.)		X	--	Consumed in use
Emergency Power	(1954-Pres.)		X	X	HS
Entomology	(1957-Pres.)		X	--	Consumed in use
Exterior Electric	(1953-Pres.)		X	--	Consumed in use, DFO
Fire Extinguisher Maintenance	(1952-Pres.)		X	--	Consumed in use
Fire Station (Crash)	(1952-Pres.)		X	--	Consumed in use
Fuels Shop	(1953-Pres.)		X	--	Consumed in use, DFO
Ground Power	(1952-Pres.)		X	X	Consumed in use, DFO
Heating Plant	(1953-Pres.)		X	--	Consumed in use
Housing Maintenance	(1952-Pres.)		X	--	Consumed in use
Paint Shop	(1981-1983)		X	--	Consumed in use
Pavement and Grounds	(1960-Pres.)		X	--	Consumed in use
Plumbing Shop	(1953-Pres.)		X	--	Consumed in use
Refrigeration Shop	(1953-Pres.)		X	--	Consumed in use
Sewage Treatment Plant	(1952-Pres.)		X	--	Consumed in use
Water Treatment Plant	(1954-Pres.)		X	--	Consumed in use
Welding Shop	(1953-Pres.)		X	--	Consumed in use
Sheet Metal Shop	(1953-Pres.)		X	--	Consumed in use

Legend

DFO = Defense Property Disposal Office (Hazardous wastes sent to DFO for proper disposition).
 FRT = Fire Department Training Exercises (Recovered fuels burned in fire department training exercises).
 HS = Heavy Shop (Auto) Oil Storage Tank (Waste oils stored here prior to contractor removal through DFO).
 S1 = Shop Tanks (2) located at Fuels Tank Farm (Storage of recovered fuels prior to contractor removal through DFO).

Notes:

1. Metallic mercury recycled to McClellan AFB, California.
2. Battery electrolyte neutralized and drained to sanitary sewer.
3. Transformer and developer drained to sanitary sewer.
4. A/C cleaning compound, BAP 2020 RV drains to storm sewer.

Appendix E--continued

Shop Name	Present Location and Dates (Building No.)	Past Location and Dates (Building No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
42nd Combat Support Group					
Auto Hobby	6560 (1964-Pres.)		X	X	HS
Laundry (Base)	7330 (1961-Pres.)		X	X	DPDO
Photo Lab 1	5055 (1954-Pres.)		X	--	Consumed in use
42nd Field Maintenance Squadron					
Battery Shop	8262 (1956-Pres.)		X	X	Sanitary Sewer ²
Electric Shop	8280 (1955-Pres.)		X	--	Consumed in use
Corrosion Control	8250 (1952-Pres.)		X	X	DPDO
Engine Test Cell	8720 (1980-Pres.)	8250 (1952-1980)	X	X	DPDO, ST, FDT, HS
Environmental Systems	8280 (1980-Pres.)	8250 (1952-1980)	X	--	Consumed in use
Egress	8280 (1955-Pres.)		X	--	ST, FDT
Fuels Systems	8744 (1956-Pres.)		X	X	DPDO, FDT, ST
Jet Engine Shop	8260 (1952-Pres.)		X	X	DPDO, ST
Jet Engine Bearing Room	8260 (1952-Pres.)		X	X	DPDO
Machine Shop	8251 (1952-Pres.)		X	X	DPDO, Sanitary Sewer ³
ND1	8250 (1952-Pres.)		X	X	DPDO, HS
Pneumatics	8280 (1955-Pres.)		X	X	DPDO, HS
AGE Repair/Inspection	8510 (1976-Pres.)	8366 (1952-1976)	X	X	DPDO, HS
Reclamation & Repair	8280 (1955-Pres.)		X	X	DPDO, HS
Small Gas Shop	8264 (1955-Pres.)		X	X	DPDO, FDT, ST
Structural Repair	8250 (1952-Pres.)		X	--	Consumed in use
Survival Equipment	8810 (1956-Pres.)		X	--	Consumed in use
Welding Shop	8251 (1952-Pres.)		--	--	
Wheel and Tire Shop	8280 (1955-Pres.)		X	X	DPDO, HS

Legend

DPDO = Defense Property Disposal Office (Hazardous wastes sent to DPDO for proper disposition).
 FDT = Fire Department Training Exercises (Recovered fuels burned in fire department training exercises).
 HS = Hobby Shop (Auto) Oil Storage Tank (Waste oils stored here prior to contractor removal through DPDO).
 ST = Slop Tanks (2) located at Fuels Tank Farm (Storage of recovered fuels prior to contractor removal through DPDO).

Notes:

- ¹ Metallic mercury recycled to McClellan AFB, California.
- ² Battery electrolyte neutralized and drained to sanitary sewer.
- ³ Emulsifier and developer drained to sanitary sewer.
- ⁴ A/C cleaning compound, B&B 2040 NV drains to storm sewer.

Appendix E--continued

Shop Name	Present Location and Dates (Building No.)	Past Location and Dates (Building No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
<u>42nd Munitions Maintenance Squadron</u>					
Bomber Weapon Maintenance	232	(1960-Pres.)	X	X	DPDO, Consumed in use
Conventional Weapon Maintenance	109	(1960-Pres.)	X	X	DPDO, Consumed in use
Equipment Maintenance	8710	(1960-Pres.)	X	X	DPDO, Consumed in use
SRM Missile Maintenance	232	(1960-Pres.)	X	--	Consumed in use
Weapons Loading	8710	(1960-Pres.)	X	--	Consumed in use
Weapons Release	8710	(1960-Pres.)	X	--	Consumed in use
<u>42nd Organizational Maintenance Squadron</u>					
Bomber Phase	8250	(1952-Pres.)	X	X	DPDO, Storm Sewer ⁴
Non-Powered AGE	8621	(1952-Pres.)	X	X	DPDO
Tanker Phase	8250	(1955-Pres.)	X	X	DPDO, Storm Sewer ⁴
<u>42nd Services Squadron</u>					
Laundry and Dry Cleaning	7330	(1961-Pres.)	X	X	DPDO
<u>42nd Supply Squadron</u>					
Fuels Lab	8721	(1960-Pres.)	X	X	DPDO

Legend

DPDO = Defense Property Disposal Office (Hazardous wastes sent to DPDO for proper disposition).
 FDT = Fire Department Training Exercises (Recovered fuels burned in fire department training exercises).
 HS = Hobby Shop (Auto) Oil Storage Tank (Waste oils stored here prior to contractor removal through DPDO).
 ST = Shop Tanks (2) located at Fuels Tank Farm (Storage of recovered fuels prior to contractor removal through DPDO).

Notes:

- ¹ Metallic mercury recycled to McClellan AFB, California.
- ² Battery electrolyte neutralized and drained to sanitary sewer.
- ³ Emulsifier and developer drained to sanitary sewer.
- ⁴ A/C cleaning compound, B&B 2020 NW drains to storm sewer.

Appendix E--continued

Shop Name	Present Location and Dates (Building No.)	Past Location and Dates (Building No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
<u>42nd Transportation Squadron</u>					
Battery Shop	7500	(1952-Pres.)	X	X	Sanitary Sewer ²
Dynamometer Shop	7501	(1952-Pres.)	X	--	Consumed in use
General Purpose Maintenance	7500	(1952-Pres.)	X	X	HS, DPDO
Machine Shop	7500	(1952-Pres.)	X	--	Consumed in use
Paint/Body Shop	7500	(1952-Pres.)	X	X	DPDO
Packing & Crating	7210	(1956-Pres.)	--	--	
Refueling Maintenance	7600	(1955-Pres.)	X	X	HS, DPDO
Special Purpose Maintenance	7500	(1952-Pres.)	X	X	DPDO
<u>2192nd Communication Squadron</u>					
Antenna Maintenance	5001	(1952-Pres.)	--	--	
Crypto Maintenance	5001	(1952-Pres.)	--	--	
Nav Aids Maintenance	8200	(1952-Pres.)	--	--	
Telephone Switching	5001	(1952-Pres.)	--	--	
Teletype Maintenance	8200	(1952-Pres.)	--	--	
Tower Radar Maintenance	8705	(1964-Pres.)	--	--	
<u>USAF Hospital</u>					
Dental Clinic (Main)	6565	(1953-Pres.)	X	--	Consumed in use
Dental Clinic Laboratory	6565	(1953-Pres.)	X	X	Consumed in use, sanitary sewer
Medical Laboratory	3500	(1953-Pres.)	X	--	Consumed in use
Medical X-Ray	3500	(1953-Pres.)	X	X	Silver recovery to sanitary sewer

Legend

DPDO = Defense Property Disposal Office (Hazardous wastes sent to DPDO for proper disposition).
 FDT = Fire Department Training Exercises (Recovered fuels burned in fire department training exercises).
 HS = Hobby Shop (Auto) Oil Storage Tank (Waste oils stored here prior to contractor removal through DPDO).
 ST = Slop Tanks (2) located at Fuels Tank Farm (Storage of recovered fuels prior to contractor removal through DPDO).

Notes:

- 1 Metallic mercury recycled to McClellan AFB, California.
- 2 Battery electrolyte neutralized and drained to sanitary sewer.
- 3 Embolifier and developer drained to sanitary sewer.
- 4 A/C cleaning compound, R&B 2020 RV drains to storm sewer.

Appendix E--continued

Shop Name	Present Location and Dates (Building No.)	Past Location and Dates (Building No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
Det 1, 49th Fighter Interceptor Squadron	8410 (1976-Pres.)		X	X	ST
Det 2, 4000th Satellite Operations Group	302/303		--	--	
Det 4, 26th Weather Squadron	8200		--	--	

Legend

DPDO = Defense Property Disposal Office (Hazardous wastes sent to DPDO for proper disposition).
 FDT = Fire Department Training Exercises (Recovered fuels burned in fire department training exercises).
 HS = Hobby Shop (Auto) Oil Storage Tank (Waste oils stored here prior to contractor removal through DPDO).
 ST = Slop Tanks (2) located at Fuels Tank Farm (Storage of recovered fuels prior to contractor removal through DPDO).

Notes:

1. Metallic mercury recycled to McClellan AFB, California.
2. Battery electrolyte neutralized and drained to sanitary sewer.
3. Emulsifier and developer drained to sanitary sewer.
4. A/C cleaning compound, B&B 2020 MV drains to storm sewer.



Appendix F
INVENTORY OF EXISTING POL STORAGE TANKS

Source: Loring AFB

Page 9 of 11

* 104	TRUCK LOCATION	USING AGENCY	ABOVE GRADE STORAGE	Type of Sdg.	CAPACITY	MATERIAL STORED	CONTAINERS		CYCLOCK	
							EXT	INT	AGE	PROTECTON COND.
	Bldg 8342 - LAB	SNOW CONTROL - CE	UNDERGROUND		12,500 GAL	DF-1	-	-	1952	F
	Bldg 8340 - LAB	SNOW CONTROL - CE	UNDERGROUND		17,000	MAGAS	-	-	1948	G
	Bldg 8006 - LAB	GOLF COURSE	UNDERGROUND		1,000	MAGAS	-	-	1954	F
	Bldg 8512 - LAB	AGE - FMS	UNDERGROUND		5,000	MAGAS	-	-	1966	G
	Bldg 8512 - LAB	AGE - FMS	UNDERGROUND		2,000	MAGAS	-	-	1966	G
	Bldg 8512 - LAB	AGE - FMS	UNDERGROUND		10,000	MAGAS	-	-	1966	G
	Bldg 8520 - LAB	AGE - FMS PL	UNDERGROUND		1,000	JP-4	-	-	1960	F E
	Bldg 8720 - LAB	AGE - FMS PL	UNDERGROUND		2,500	JP-4	-	-	1960	F E
	Bldg 704 PI	CE	UNDERGROUND		275	MAGAS	-	-	1961	F
	Bldg 8283 - LAB	CE - FIRE DEPT	UNDERGROUND		400	MAGAS	-	-	1955	F
	Bldg 102 - LAB	SFS / NIMS	UNDERGROUND		5,000	MAGAS	-	-	1952	F
	Bldg 19 - DOWEL	TWO RAILS	UNDERGROUND		1,000	MAGAS	-	-	1951	G
	Bldg 4040 - DP	DOW PINES	UNDERGROUND		1,000	MAGAS	-	-	1957	F
	Bldg 4033 - DP	DOW PINES	UNDERGROUND		275	FS-2	-	-	1956	F
	Bldg 4032 - DP	DOW PINES	UNDERGROUND		1,000	FS-2	-	-	1956	F

PUNCH CARD TRANSCRIPT

①

LOCATION	USING AGENCY	ADN/BELOW	CAPACITY	MATERIAL STORED	COOPINES EXT INT	AGE	CATHODE PROTECTION CONDITION
BUDG 4031 - DP	DOU PINES	ADN/BELOW	550 GAL	FS-2	-	1956	F
BUDG 4041 - DP	DOU PINES	ADN/BELOW	875	FS-2	-	1957	F
BUDG 4045 - DP	DOU PINES	ADN/BELOW	875	FS-2	-	1964	F
BUDG 4071 - DP	DOU PINES	ADN/BELOW	875	FS-2	-	1957	F
BUDG 4072 - DP	DOU PINES	ADN/BELOW	875	FS-2	-	1957	F
BUDG 4073 - DP	DOU PINES	ADN/BELOW	875	FS-2	-	1957	F
BUDG 4074 - DP	DOU PINES	ADN/BELOW	875	FS-2	-	1957	F
BUDG 4075 - DP	DOU PINES	ADN/BELOW	875	FS-2	-	1957	F
BUDG 4080 - DP	DOU PINES	UNDERGROUND	1,000	FS-2	-	1957	F
BUDG 4080 - DP	DOU PINES	ADN/BELOW	110	K5N	-	1964	G
BUDG DATE - 1 ³⁰⁰⁰	A/22 DRAIN	UNDERGROUND	8,000	FS-2	-	1957	F
BUDG DATE - 3 ³⁰⁰⁰	A/22 DRAIN	UNDERGROUND	8,500	FS-2	-	1957	F
BUDG 5 - CHSHELL	700 RAMP	UNDERGROUND	875	FS-2	-	1957	F
FACTORY BLDG - CAFE	RM 3 - LIQUID PILES	UNDERGROUND	(1) 50,000	JP-4	-	1953	G
REL BLDG - CAFE	RM 3 - LIQUID PILES	UNDERGROUND	(2) 50,000	JP-4	-	1953	G

PUNCH CARD TRANSCRIPT

LOCATION	USING	AGENCY	ABOVE/BELOW	CAPACITY	MATERIAL STORED	EXT	INT	AGE	CATHODE	ANODE
FAC B10 - LAFB	P13	LIQUID FUELS	UNDERGROUND	(3) 50,000 GAL	JP-4	-	-	1953	-	-
FAC B10 - LAFB	P13	LIQUID FUELS	UNDERGROUND	(4) 50,000	JP-4	-	-	1953	-	-
FAC B10 - LAFB	P13	LIQUID FUELS	UNDERGROUND	(3) 50,000	JP-4	-	-	1953	-	-
FAC B10 - LAFB	P13	LIQUID FUELS	UNDERGROUND	(6) 50,000	JP-4	-	-	1953	-	-
FAC B11 - LAFB	P14	LIQUID FUELS	UNDERGROUND	(1) 50,000	JP-4	-	-	1953	-	-
FAC B11 - LAFB	P14	LIQUID FUELS	UNDERGROUND	(2) 50,000	JP-4	-	-	1953	-	-
FAC B11 - LAFB	P14	LIQUID FUELS	UNDERGROUND	(3) 50,000	JP-4	-	-	1953	-	-
FAC B11 - LAFB	P14	LIQUID FUELS	UNDERGROUND	(4) 50,000	JP-4	-	-	1953	-	-
FAC B11 - LAFB	P14	LIQUID FUELS	UNDERGROUND	(5) 50,000	JP-4	-	-	1953	-	-
FAC B11 - LAFB	P14	LIQUID FUELS	UNDERGROUND	(6) 50,000	JP-4	-	-	1953	-	-
FAC B12 - LAFB	P15	LIQUID FUELS	UNDERGROUND	(1) 50,000	JP-4	-	-	1953	-	-
FAC B12 - LAFB	P15	LIQUID FUELS	UNDERGROUND	(2) 50,000	JP-4	-	-	1953	-	-
FAC B12 - LAFB	P15	LIQUID FUELS	UNDERGROUND	(3) 50,000	JP-4	-	-	1953	-	-
FAC B12 - LAFB	P15	LIQUID FUELS	UNDERGROUND	(4) 50,000	JP-4	-	-	1953	-	-
FAC B12 - LAFB	P15	LIQUID FUELS	UNDERGROUND	(5) 50,000	JP-4	-	-	1953	-	-

PUNCH CARD TRANSCRIPT

LOCATION	USING AGENCY	AGENCY/BELOW	CAPACITY	MATERIALS STORED	Capacities		CYCLES PER YEAR	AMOUNT
					EXT	INT	AGE	
FAC 8113 - LAFB	PA6	LIQUID FUELS	(1) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(2) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(3) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(4) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(5) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(6) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(7) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(8) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(9) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(10) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(11) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(12) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(13) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(14) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(15) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(16) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(17) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(18) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(19) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(20) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(21) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(22) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(23) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(24) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(25) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(26) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(27) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(28) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(29) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(30) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(31) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(32) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(33) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(34) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(35) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(36) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(37) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(38) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(39) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(40) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(41) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(42) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(43) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(44) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(45) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(46) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(47) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(48) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(49) 50,000	JP-4	-	-	1958	5
FAC 8113 - LAFB	PA6	LIQUID FUELS	(50) 50,000	JP-4	-	-	1958	5

PUNCH CARD TRANSCRIPT

LOCATION	USING AGENCY	ABOVE/BELOW	CAPACITY	INTERVALS STORED	ENT	INT	AGE	PROTECTION	CONDITION
FAC 8115 - LAFB	LIQUID FUELS	UNDERGROUND (A)	50,000 GAL	JP-4	-	-	1959	-	G
FAC 8114 - LAFB	PH-4 LIQUID FUELS	UNDERGROUND (1)	50,000	JP-4	-	-	1959	-	G
FAC 8114 - LAFB	PH-4 LIQUID FUELS	UNDERGROUND (2)	50,000	JP-4	-	-	1959	-	G
FAC 8114 - LAFB	PH-4 LIQUID FUELS	UNDERGROUND (3)	50,000	JP-4	-	-	1959	-	G
FAC 8114 - LAFB	PH-4 LIQUID FUELS	UNDERGROUND (4)	50,000	JP-4	-	-	1959	-	G
FAC 8270 - LAFB	PH-1 LIQUID FUELS	UNDERGROUND (1)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-1 LIQUID FUELS	UNDERGROUND (2)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-1 LIQUID FUELS	UNDERGROUND (3)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-1 LIQUID FUELS	UNDERGROUND (4)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-1 LIQUID FUELS	UNDERGROUND (5)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-1 LIQUID FUELS	UNDERGROUND (6)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-1 LIQUID FUELS	UNDERGROUND (7)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (1)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (2)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (3)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (4)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (5)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (6)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (7)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (8)	25,000	PICKLED	-	-	1952	-	F
FAC 8270 - LAFB	PH-2 LIQUID FUELS	UNDERGROUND (9)	25,000	PICKLED	-	-	1952	-	F

PUNCH CARD TRANSCRIPT

5

LOCATION	USING	AGENCY	AGENCY/BELOW	CAPACITY	MATERIAL	SPEED	EXT	W/	AGE	CHARGE	SECTION	DATE
FAC 8210 - LAFB	ALZ	LIQUID FUEL	UNDERGROUND	(4)	15,000 GAL	PICKLED	-	-	1952	-	-	F
FAC 8210 - LAFB	ALZ	LIQUID FUEL	UNDERGROUND	(5)	25,000	PICKLED	-	-	1952	-	-	F
FAC 8210 - LAFB	ALZ	LIQUID FUEL	UNDERGROUND	(10)	25,000	PICKLED	-	-	1952	-	-	F
FAC 8210 - LAFB	ALZ	LIQUID FUEL	UNDERGROUND	(7)	25,000	PICKLED	-	-	1952	-	-	F
FAC 7820 - LAFB	TH1	BULK SIG - POL	AGNE GROUND	55,000 GAL	F.D. #2	-	PAINTED	PAINTED	1953	465	-	F
FAC 7820 - LAFB	TH2	BULK SIG - POL	AGNE GROUND	55,000 GAL	JP-4	-	PAINTED	PAINTED	1952	1145	-	E
FAC 7830 - LAFB	TH3	BULK SIG - POL	AGNE GROUND	25,000 GAL	115/145	PIG 605	-	PAINTED	1957	-	-	F
FAC 7811 - LAFB	TH6	BULK SIG - POL	AGNE GROUND	80,000 GAL	JP-4	-	PAINTED	PAINTED	1959	465	-	E
FAC 7812 - LAFB	TH7	BULK SIG - POL	AGNE GROUND	80,000 GAL	JP-4	-	PAINTED	PAINTED	1959	-	-	E
FAC 7803 - LAFB	TANK	FREY - POL	UNDERGROUND	50,000 GAL	110-625	-	-	-	1957	-	-	G
FAC 7825 - LAFB	TANK	FREY - POL	AGNE GROUND	1,000 GAL	SUP TANK	-	-	-	1961	-	-	G
FAC 7826 - LAFB	TANK	FREY - POL	AGNE GROUND	1,000 GAL	SUP TANK	-	-	-	1961	-	-	G
FAC 7317 - LAFB	CNP - HANSON	-	AGNE GROUND	15,000 GAL	F.D. #2	-	-	-	1965	-	-	G
FAC 7508 - LAFB	SAFE ALCTHE POL	-	UNDERGROUND	(1)	119 GAL	MOGAS (100)	-	-	1953	-	-	F
FAC 7505 - LAFB	SAFE MOORE POL	-	UNDERGROUND	(2)	119 GAL	MOGAS (100)	-	-	1953	-	-	E

PUNCH CARD TRANSCRIPT

(6)

LOCATION	USING AGENCY	ABOVE/BELOW	CAPACITY	MATERIAL STORED	CONTAINERS	EXT	INT	REE	CAPACIT	PROTECTION	CONSTRUCTION
FAC 7240 - LABS	DEFENSE REPLY (PDI)	UNDERGROUND	(5) 595 GAL	DEFENSE	-	-	-	1954	-	-	G
BUDG 7300 - LABS	DE-CHP (DAY TRAIL)	ABOVE GROUND	17,500 GAL	FOA 42	-	-	-	1948	-	-	G
BUDG 7310 - LABS	DE-CHP	UNDERGROUND	(1) 5,000 GAL	SLOP TANK	-	-	-	1971	-	-	E
BUDG 7310 - LABS	DE-CHP	UNDERGROUND	(1) 5,000 GAL	SLOP TANK	-	-	-	1971	-	-	E
FAC 8511 - LABS	AGE	UNDERGROUND	10,000 GAL	JP-4	-	-	-	1954	-	-	G
FAC 8511 - LABS	AGE	UNDERGROUND	5,000 GAL	MOSPS	-	-	-	1954	-	-	G
FAC 8511 - LABS	AGE	UNDERGROUND	2,000 GAL	MOSPS (UL)	-	-	-	1954	-	-	G
FAC 21 - EAST	FOI	ABOVE GROUND	7,000 GAL	ACKLED	-	-	-	1953	-	-	F
FAC 8719 - LABS	PDI	UNDERGROUND	4,000 GAL	ANNIVERSARY	-	-	-	1961	-	-	G
FAC 102 - EAST	MM's / FDI/SOS	UNDERGROUND	(1) 5,000 GAL	MOSPS	-	-	-	1952	-	-	F
FAC 102 - EAST	MM's	UNDERGROUND	(2) 3,000 GAL	MOSPS - (W/14)	-	-	-	1952	-	-	F
FAC 102 - EAST	MM's	UNDERGROUND	(1) 25,000 GAL	RECOVERED	-	-	-	1952	-	-	P
FAC 102 - EAST	MM's	UNDERGROUND	(2) 45,000 GAL	RECOVERED	-	-	-	1952	-	-	P
FAC 102 - EAST	MM's	UNDERGROUND	475 GAL	MOSPS	-	-	-	1948	-	-	F
FAC 102 - EAST	MM's	UNDERGROUND	1,000 GAL	MOSPS	-	-	-	1954	-	-	F

LOCATION	USNG AGENCY	ABOVE/BELOW	CAPACITY	MATERIAL STORED	COATPLUGS	AGE	CATHODE PROTECTION
CONRAD	CE	ABOVE GROUND	275 GAL	FS-2	-	1969	-
BLDG 19 -	700 EXPOSE	UNDERGROUND	200 GAL	MUSOS	-	1957	-
BLDG 24 -	WATER TOWER/RET	ABOVE GROUND	1,000 GAL	FS-2	-	1954	-
BLDG 109 -	FIRE DEPT - CE	UNDERGROUND	1,500 GAL	FS-2	-	1956	-
BLDG 216 -	MMS STORAGE	UNDERGROUND	2,000 GAL	FS-2	-	1952	-
BLDG 216 -	42 MMS	UNDERGROUND	(1) 10,000 GAL	FS-2	-	1952	-
BLDG 216 -	42 MMS	UNDERGROUND	(1) 10,000 GAL	FS-2	-	1952	-
BLDG 232 -	42 MMS	UNDERGROUND	2,000 GAL	FS-2	-	1954	-
BLDG 232 -	42 MMS	UNDERGROUND	2,000 GAL	FS-2	-	1955	-
BLDG 241 -	42 MMS / 5 FS	UNDERGROUND	1,500 GAL	FS-2	-	1956	-
BLDG 385 -	CE	UNDERGROUND	1,000 GAL	PICKLED	-	1958	-
BLDG 1200 -	WATER EXPOSE - CE	ABOVE GROUND	275 GAL	MUSOS	-	1952	-
BLDG 1350 -	ARMORON SCHOOL -	UNDERGROUND	10,000 GAL	#4 FO	-	1935	-
BLDG 1870 -	REVENUE SITE	UNDERGROUND	500 GAL	FS-2	-	1953	-
BLDG 2004 -	BLF CLUB HOUSE	ABOVE GROUND	275 GAL	FS-2 RESERVE USED IN WARE	-	1961	-

PUNCH CARD TRANSCRIPT

LOCATION	USING	AGENCY	DATE/BELW	CAPACITY	INTERIAL	STORED	COPYINGS	EXT	INT	AGE	CATHOLIC	PROJECTION	ON-DEMAND
Bldg 2100 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2101 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2102 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2103 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2104 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2105 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2106 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2107 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2108 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2109 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2110 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2111 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2112 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2113 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F
Bldg 2114 - LAFB	OFFICE	HAWKINS	UNDER 4 RND	550 GRL		FS-2				1960	-	-	F

PUNCH CARD TRANSCRIPT

LOCATION	USING AGENCY	ABOVE/BELOW	CAPACITY	MATERIAL STORED	DATE	BY	DATE	INITIALS	DATE
Bldg 210 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1960	-	-	-	F
Bldg 218 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1960	-	-	-	F
Bldg 2120 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1960	-	-	-	F
Bldg 2121 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1961	-	-	-	F
Bldg 2201 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1953	-	-	-	F
Bldg 2202 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1953	-	-	-	F
Bldg 2203 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1953	-	-	-	F
Bldg 2204 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1953	-	-	-	F
Bldg 2301 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1957	-	-	-	F
Bldg 2303 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1957	-	-	-	F
Bldg 2305 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1957	-	-	-	F
Bldg 2307 - LAB	OFFICE HALLWAY	UNDERGROUND	550 GAL	FS-2	1957	-	-	-	F
Bldg 2500 - LAB	BOQ	UNDERGROUND	7,500 GAL	FS-2	1953	-	-	-	F
Bldg 2501 - LAB	VOO	UNDERGROUND	8,000 GAL	FS-2	1953	-	-	-	F
Bldg 2500 - LAB	AN FILING STATION	UNDERGROUND	8,000 GAL	FS-2	1955	-	-	-	F

PUNCH CARD TRANSCRIPT

LOCATION	USING AGENCY	ADDITIONAL	CAPACITY	MATERIAL	COATINGS	CATHODIC PROTECTION
BUDG 2700 - LATH	15 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	20 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	22 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	24 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	19 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	21 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	23 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	25 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	27 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	29 WELLS DE (6)	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	OFFICE UNDERGROUND	UNDERGROUND	6,000 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	OFFICE UNDERGROUND	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	OFFICE UNDERGROUND	UNDERGROUND	6,000 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	OFFICE UNDERGROUND	UNDERGROUND	500 GAL	FS-2	EXT	1973
BUDG 2700 - LATH	OFFICE UNDERGROUND	UNDERGROUND	6,000 GAL	FS-2	EXT	1973

PUNCH CARD TRANSCRIPT

LOCATION	USING AGENCY	ABOVE/BELOW	CAPACITY	MATERIAL STORED	EXT	INT	AGE	CHARACTER PROTECTION
BUD 2910 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2911 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2912 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2913 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2914 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2915 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2916 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2917 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2918 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2919 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2920 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2921 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2922 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2923 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F
BUD 2924 - LAFB	CAPITOL HILL	UNDERGROUND	550 GAL	FS-2	-	-	1961	F

PUNCH CARD TRANSCRIPT

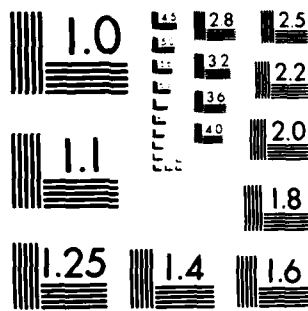
INSTALLATION RESTORATION PROGRAM PHASE I RECORDS LORING
AFB MAINE(U) CH2M HILL INC GAINESVILLE FL JAN 84
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LOCATION	USING AGENCY	AGE/BELOW	CAPACITY	MATERIAL STAINED	CONTAMINANTS	EXT	INT	AGE	CONCISE ADDITION	REMARKS
ALDS 4401- LADS	ANN WILDER BR #1	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4401- LADS	ANN WILDER BR #1	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4401- LADS	ANN WILDER BR #2	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #3	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #3	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #4	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #4	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #5	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #5	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #6	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #6	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #7	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #7	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #8	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #8	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #9	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #9	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #10	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #10	UNDERGROUND	500	PS-2	-	-	-	1984	-	F
ALDS 4402- LADS	ANN WILDER BR #11	UNDERGROUND	600	PS-2	-	-	-	1984	-	G
ALDS 4402- LADS	ANN WILDER BR #11	UNDERGROUND	500	PS-2	-	-	-	1984	-	F

LOCATION	USING AGENCY	ABOVE/BELOW	CAPACITY	MATERIAL STOCKED	COASTS	EXT	INT	AGE	CONDTN
BUDG 6300 - LABS	ARMED FORCES	ABOVE	375 GAL	FS-2				1969	B
BUDG 6400 - LABS	ARMED FORCES	ABOVE	600 GAL	FS-2				1969	B
BUDG 6500 - LABS	ARMED FORCES	ABOVE	600 GAL	FS-2				1969	B
BUDG 6575 - LABS	ARMED FORCES	ABOVE	500 GAL	FS-2				1969	B
BUDG 6590 - LABS	ARMED FORCES	ABOVE	575 GAL	FS-2				1969	B
BUDG 6590 - LABS	ARMED FORCES	ABOVE	500 GAL	FS-2				1969	B
BUDG 6700 - LABS	ARMED FORCES	ABOVE	275 GAL	FS-2				1969	B
BUDG 7206 - LABS	ARMED FORCES	ABOVE	1000 GAL	FS-2				1969	B
BUDG 7302 - LABS	ARMED FORCES	ABOVE	275 GAL	FS-2				1969	B
BUDG 7600 - LABS	ARMED FORCES	ABOVE	500 GAL	FS-2				1969	B
BUDG 7610 - LABS	ARMED FORCES	ABOVE	500 GAL	FS-2				1969	B
BUDG 7641 - LABS	ARMED FORCES	ABOVE	275 GAL	FS-2				1969	B
BUDG 8005 - LABS	ARMED FORCES	ABOVE	275 GAL	FS-2				1969	B
BUDG 8011 - LABS	ARMED FORCES	ABOVE	1000 GAL	FS-2				1969	B
BUDG 8100 - LABS	ARMED FORCES	ABOVE	1000 GAL	FS-2				1969	B

LOCATION	USING AGENCY	ADVICE/REMARK	CAPACITY	MATERIAL SPEC	COATINGS	EST	INT	AGE	CORRECTION
BLDG 8955- LOTS	SAVINGS	UNDERGROUND	500 GAL	FS-2				1901	F
BLDG 1- OVERHEAD		UNDERGROUND	2,000 GAL	FS-2				1957	F
BLDG 1800- TRUCK	SAVINGS PLANT-CE	UNDERGROUND	1,000 GAL	FS-2				1952	F
BLDG 1802- TRUCK	SAVINGS PLANT-CE	UNDERGROUND	500 GAL	FS-2				1952	F
BLDG 1850- TRUCK	RETENET SITE	UNDERGROUND	1,000 GAL	FS-2				1953	F
BLDG 291- COM	UNDERGROUND	UNDERGROUND	5,000 GAL	FS-2				1960	F
BLDG 302- TRUCK	UNDERGROUND	UNDERGROUND	2,000 GAL	FS-2				1957	F
BLDG 303- TRUCK	UNDERGROUND	UNDERGROUND	2,000 GAL	FS-2				1957	F
BLDG 800- LOTS	TRANSMITTER SITE	UNDERGROUND	1,000 GAL	FS-2				1953	F
BLDG 1301- COMTEL	HOUSING	UNDERGROUND	500 GAL	FS-2				1958	P
BLDG 1302- COMTEL	HOUSING	UNDERGROUND	500 GAL	FS-2				1958	P
BLDG 1303- COMTEL	HOUSING	UNDERGROUND	500 GAL	FS-2				1958	P
BLDG 1304- COMTEL	HOUSING	UNDERGROUND	500 GAL	FS-2				1958	P
BLDG 1305- COMTEL	HOUSING	UNDERGROUND	500 GAL	FS-2				1958	P
BLDG 1306- COMTEL	HOUSING	UNDERGROUND	500 GAL	FS-2				1958	P

PUNCH CARD TRANSCRIPT

133

LOCATION	USING AGENCY	ABOVE/BELOW	CAPACITY	MATERIAL STORED	COATINGS	ENT	INT	AGE	CONCRETE PROTECTION	CONDITION
BLDG 1307 - PROSHEL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1308 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1309 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1310 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1311 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1312 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1313 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1314 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1315 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 1316 - CASWELL	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 3101 - UNESPAC	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 3102 - UNESPAC	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 3103 - UNESPAC	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 3104 - UNESPAC	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P
BLDG 3105 - UNESPAC	HOUSING	UNDERGROUND	550	GRK	FS-2			1958	—	P

PUNCH CARD TRANSCRIPT

LOCATION	USING AGENCY	DATE/BELOW	CAPACITY	MATERIAL STORED	COATINGS EXT	INT	AGE	OUTBACK PROTECTION
BLDG 3106-UNRESTAUR	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3107-UNRESTAUR	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3108-UNRESTAUR	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3109-UNRESTAUR	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3110-UNRESTAUR	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3501-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3502-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3503-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3504-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3505-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3506-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3507-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3508-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3509-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P
BLDG 3510-COMMER	HAWKINS	UNDER REPAIR	550	FS-2			1958	P

PUNCH CARD TRANSCRIPT

LOCATION	USING AGENCY	AGENCY/BEAN	CAPACITY	MATERIAL STORED	ENT IN 1	AGE	CAPABLE	ADDITION
BUD 3811 - DINNER	HAWKING	UNDERGROUND	550	FS-2	1	1958	-	P
BUD 3812 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3813 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3814 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3815 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3816 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3817 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3818 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3819 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3820 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3821 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3822 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3823 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3824 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3825 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3826 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3827 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3828 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P
BUD 3829 - DINNER	HAWKING	UNDERGROUND	550	FS-2		1958	-	P

PUNCH CARD TRANSCRIPT

LOCATION	USING ASBELY	ABOVE/BELOW	CAPACITY	MATERIAL STORED	EXT	INT	AGE	CARBON PROTECTION
BLDG 3800 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3811 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3812 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3813 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3814 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3815 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3816 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3817 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3818 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3819 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3820 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3821 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3822 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3823 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3824 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3825 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3826 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3827 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3828 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3829 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3830 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3831 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3832 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3833 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3834 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3835 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3836 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3837 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3838 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3839 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3840 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3841 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3842 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3843 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3844 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3845 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3846 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3847 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3848 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3849 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3850 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3851 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3852 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3853 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3854 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3855 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P
BLDG 3856 - CARPENT	HOUSING	UNDERGROUND	550	FS-2			1958	P

Location	Using agency	Amount (date)	Capacity	Material stored at int	Casing	Age	Cardiac protection	Condition
Bldg 3400 - LAMP	HOSPITAL	UNID	10,000 GAL	DUEZ	-	1953	-	F
Bldg 0220 - LAMP	CSC	UNID	60	"	-	1956	-	E
Bldg 0235 - LAMP	EMERGENCY POWER SUP	UNID	110	"	-	1955	-	G
Bldg 8410 - LAMP	49TH	UNID	275	"	-	1970	-	G
Bldg 8422 - LAMP	POL UNITS	UNID	420	"	-	1954	-	F
Bldg 1050 - LAMP	RECEIVER	UNID	1000	"	-	1952	-	F
Bldg 0208 - LAMP	RBS SITE	UNID	1000	"	-	1957	-	F
Bldg 0203 - LAMP	AIRWAY LAMP	UNID	1000	"	-	1963	-	G
Bldg 0224 - LAMP	LOCAL FEEL	UNID	275	NOSAS	-	1970	-	E
Bldg 0224 - LAMP	STROSCOPIC	UNID	275	NOSAS	-		-	
Bldg 0109 - LAMP	TOR	UNID	275	NOSAS	-	1961	-	F
Bldg 8420 - LAMP	CSC MAIN	UNID	275	NOSAS	-	1960	-	F
Bldg 8830 - LAMP	DEM	UNID	20	NOSAS	-	1954	-	G
Bldg 8455 - LAMP	EMERGENCY POWER	UNID	100	NOSAS	-	1955	-	F

PUNCH CARD TRANSCRIPT

(12)

TANKS

Location	Worm Agency	Shape/Notes	Capacity	Material stored	Casting and Int	all	Cathodic protection
BUD 2510-LAFB	BASE SERVICE STATION	UNDERGROUND	10,000 (500)	liquid sp	---	17.13	---
BUD 2510-LAFB	BASE SERVICE STATION	UNDERGROUND	10,000 (50)	water - liquid sp	---	19.53	---
BUD 2510-LAFB	BASE SERVICE STATION	UNDERGROUND	10,000 (50)	petroleum gas	---	19.53	---
BUD 2510-LAFB	BASE SERVICE STATION	UNDERGROUND	500 GAL	URATE CR	---	---	---
BUD 8280-LAFB	BASE SERVICE STATION	UNDERGROUND	175 GAL	water - 6000-00-285 8011	---	---	---
BUD 8280-LAFB	BASE SERVICE STATION	UNDERGROUND	200 GAL	water - 6000-00-285 8011	---	---	---
BUD 8280-LAFB	BASE SERVICE STATION	UNDERGROUND	210 GAL	PD 0 80	---	---	---

PUNCH CARD TRANSCRIPT



Appendix G
HAZARD ASSESSMENT RATING METHODOLOGY

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 representatives from the 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 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 Record 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.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1). The site rating form is provided on Figure 2 and the rating factor guidelines are provided in Table 1.

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, the potential pathways for waste contaminant migration, and any efforts to contain the contamination. 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. Scores for sites at which there is no containment are not reduced. 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.

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FIGURE 1

HAZARD ASSESSMENT RATING METHODOLOGY FLOW CHART

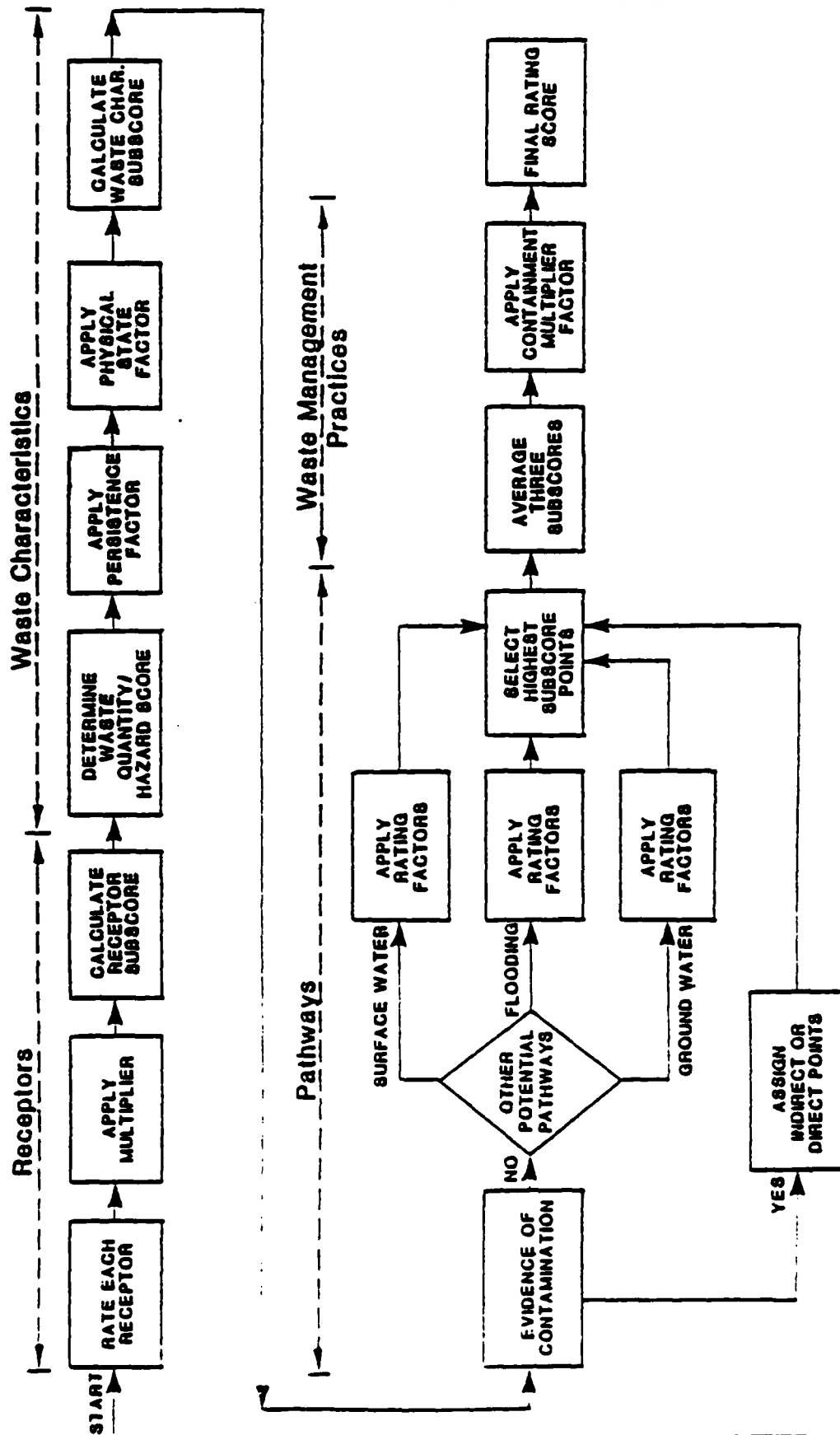


FIGURE 2

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

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 1 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 _____ = _____

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 subcore 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

Distance to nearest surface water		3		
Net precipitation		6		
Surface erosion		3		
Surface permeability		6		
Rainfall intensity		3		

Subtotals _____

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

2. Flooding

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water		3		
Net precipitation		6		
Soil permeability		3		
Subsurface flow		3		
Direct access to ground water		3		

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
HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels			Multiplier
	0	1	2	3
A. Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100
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
C. Land Use/Zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet
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
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
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
H. Population served by surface water supplies within 3 miles downstream of site	0	1-15	51-1,000	Greater than 1,000
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000

Table 1--Continued

11. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

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

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records

- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

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

- 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

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

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
70	M	C	H
	L	S	H
60	S	C	H
	H	C	H
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	C	M
	M	S	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:

Confirmed confidence levels (C) can be added.

Suspected confidence levels (S) can be added.

Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating

Wastes with the same hazard rating can be added.

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

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

B. Persistence Multiplier for Point Rating

Multiply Point Rating Persistence Criteria

Metals, polycyclic compounds, and halogenated hydrocarbons substituted and other ring compounds
Straight chain hydrocarbons
Easily biodegradable compounds

From Part A by the Following

1.0
0.9
0.8
0.4

C. Physical State Multiplier

Physical State

Liquid
Sludge
Solid

Multiply Point Total From Parts A and B by the Following

1.0
0.75
0.50

Table 1--Continued

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 Factors	Rating Scale Levels			Multiplier
	0	1	2	3
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
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches
Surface erosion	None	Slight	Moderate	Severe
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)
Rainfall intensity based on 1-year 24-hour rainfall	<1.0 inch	1.0 to 2.0 inches	2.1 to 3.0 inches	>3.0 inches

B-2 Potential for Flooding

Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually
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B-3 Potential for Ground-Water Contamination

Depth to ground water	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches
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)

Table 1--Continued

B-3 Potential for Ground-Water Contamination--Continued

Rating Factors	Rating Scale Levels			Multiplier
	0	1	2	3
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 located below mean ground-water level
Direct access to ground water (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk

IV. WASTE MANAGEMENT PRACTICES CATEGORY

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

B. Waste Management Practices Factor

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

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

Guidelines for fully contained:

Landfills:

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

Spills:

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

Surface Impoundments:

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

Fire Protection Training Areas:

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

General Note: If data are not available or known to be complete the factor ratings under items 1-A through 1, 111-B-1, or 111-6-3, then leave blank for calculation of factor score and maximum possible score.

CNR68A



Appendix H
SITE RATING FORMS

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 1 - Landfill No. 1

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1952 - 1956

OWNER/OPERATOR: Loring AFB, Maine

COMMENTS/DESCRIPTION: General base refuse including flightline waste.

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	2	9	18	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			105	180
Receptors subscore (100 x factor score subtotal/maximum 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.
- Waste quantity (S = small, M = medium, L = large) L
 - Confidence level (C = confirmed, S = suspected) S
 - Hazard rating (H = high, M = medium, L = low) H
- Factor Subscore A (from 20 to 100 based on factor score matrix) 70
- B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B
 $70 \times 1.0 = 70$
- C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore
 $70 \times 1.0 = 70$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	24
		Subtotals	66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61
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	1	8	8	24
Direct access to ground water	2	8	16	24
		Subtotals	76	114
Subscore (100 x factor score subtotal/maximum score subtotal)				67
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		67

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.				
	Receptors			58
	Waste Characteristics			70
	Pathways			67
	Total 195 divided by 3 =			65
			Gross Total Score	
B. Apply factor for waste containment from waste management practices				
Gross Total Score x Waste Management Practices Factor = Final Score				
	65 x 1.0 =			65

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 2 - Landfill No. 2

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1956 - 1974

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: General base refuse including flightline wastes, sewage sludge

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	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 boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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			119	180

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

66

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

L

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

H

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

$$100 \times 1.0 = 100$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$100 \times 1.0 = 100$$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
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	3	8	24	24
Subsurface flows	1	8	8	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		74

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	66
Waste Characteristics	100
Pathways	74
Total 240 divided by 3 =	80
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$80 \times 1.0 = 80$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 3 - Landfill No. 3 (Active)
 LOCATION: Loring AFB, Maine
 DATE OF OPERATION OR OCCURRENCE: 1974 - Present
 OWNER/OPERATOR: Loring AFB
 COMMENTS/DESCRIPTION: General base refuse (including flightline dumpster wastes)
 SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	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 boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	2	9	18	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			111	180
Receptors subscore (100 x factor score subtotal/maximum 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 (S = small, M = medium, L = large) S
 2. Confidence level (C = confirmed, S = suspected) S
 3. Hazard rating (H = high, M = medium, L = low) H
- 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
 $40 \times 1.0 = 40$
- C. Apply physical state multiplier
 Subscore B x Physical State Multiplier = Waste Characteristics Subscore
 $40 \times 1.0 = 40$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
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	3	8	24	24
Subsurface flows	1	8	8	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				74

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	62
Waste Characteristics	40
Pathways	74
Total 176 divided by 3 =	59
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$59 \times 1.0 = 59$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 4 - Receiver Site

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: Early 1970's

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Buried fuel tank overflow (No. 2 fuel)

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	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	2	3	6	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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 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 (S = small, M = medium, L = large)

S

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

M

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

$$50 \times 0.8 = 40$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$40 \times 1.0 = 40$$

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				80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	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	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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

$$60 \times 1.0 = 60$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 5 - Quarry Site

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: Late 1950's to present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Abandoned quarry site, approximately 100 drums sited - some partially full of unknown contents

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	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 boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	2	9	18	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			101	180

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

56

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) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

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

$$50 \times 1.0 = 50$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$50 \times 1.0 = 50$$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	0	6	0	18
Rainfall intensity	3	8	24	24
Subtotals			68	108
Subscore (100 x factor score subtotal/maximum score subtotal)				63
2. Flooding				
	3	1	3	3
Subscore (100 x factor score/3)				100
3. Ground-water migration				
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	3	8	24	24
Direct access to ground water	2	8	16	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				100

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	56
Waste Characteristics	50
Pathways	100
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

$$69 \times 1.0 = 69$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 6 - Fuels Tank Farm

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1952 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Fuel in ground below pump house

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	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 boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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			113	180

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

63

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)

M

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

H

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

$$80 \times 0.8 = 64$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$64 \times 1.0 = \underline{64}$$

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				100
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	24
Subtotals			74	108
Subscore (100 x factor score subtotal/maximum score subtotal)				69
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	1	8	8	24
Subtotals			60	114
Subscore (100 x factor score subtotal/maximum score subtotal)				53
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
Pathways Subscore				100

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	63
Waste Characteristics	64
Pathways	100
Total 227 divided by 3 =	76
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$76 \times .95 = 72$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 7 - Fire Department Training Area

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1952 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Cleared area, has underdrain and o/w separator; separator effluent to ground

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	1	6	6	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	2	9	18	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			92	180

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

51

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)

M

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

H

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

$$80 \times 1.0 = 80$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$80 \times 1.0 = 80$$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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				61

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.			
	Receptors		51
	Waste Characteristics		80
	Pathways		61
	Total 192 divided by 3 =		64
	Gross Total Score		
B. Apply factor for waste containment from waste management practices			
Gross Total Score x Waste Management Practices Factor = Final Score			
	64 x 1.0 =		64

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 8 - Railroad Maintenance Site

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: Early 1980's

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Abandoned drums (oil, ethylene glycol); evidence of oil on ground

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	27
H. Population served by surface-water supply within 3 miles downstream of site	3	6	18	18
I. Population served by ground-water supply within 3 miles of site	1	6	6	18
Subtotals			134	180

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

74

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

S

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

M

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

$$50 \times 0.8 = 40$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$40 \times 1.0 = 40$$

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	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	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	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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			74
	Waste Characteristics			40
	Pathways			80
	Total 194 divided by 3 =			65
			Gross Total Score	
B. Apply factor for waste containment from waste management practices				
Gross Total Score x Waste Management Practices Factor = Final Score				
	65 x 1.0 =			65

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 9 - East Loring Landfill
 LOCATION: Loring AFB, Maine
 DATE OF OPERATION OR OCCURRENCE: 1954 - 1967
 OWNER/OPERATOR: Loring AFB
 COMMENTS/DESCRIPTION: Construction rubble, suspected shop wastes
 SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	2	9	18	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			98	180

Receptors subscore (100 x factor score subtotal/maximum 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 (S = small, M = medium, L = large)

S

2. Confidence level (C = confirmed, S = suspected)

S

3. Hazard rating (H = high, M = medium, L = low)

H

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

$$40 \times 1.0 = 40$$

- C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$40 \times 1.0 = 40$$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	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	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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	54
Waste Characteristics	40
Pathways	54
Total 148 divided by 3 =	49
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$49 \times 1.0 = 49$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 10 - Flightline Drainage Ditch

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1952 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Receives stormwater and waste liquids from flightline area

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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			111	180

Receptors subscore (100 x factor score subtotal/maximum 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 (S = small, M = medium, L = large)

S

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

H

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

 $60 \times 1.0 = 60$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

 $60 \times 1.0 = 60$

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	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	24
		Subtotals	74	108
Subscore (100 x factor score subtotal/maximum score subtotal)				69
2. Flooding				
	3	1	3	3
		Subscore (100 x factor score/3)		100
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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		100

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.				
	Receptors			62
	Waste Characteristics			60
	Pathways			100
	Total 222 divided by 3 =			74
			Gross Total Score	
B. Apply factor for waste containment from waste management practices				
Gross Total Score x Waste Management Practices Factor = Final Score				
	74 x 1.0 =			74

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 11 - Nosedock Area

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1954 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Spills in area; disposal of solvents, etc. onto ground

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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			111	180

Receptors subscore (100 x factor score subtotal/maximum 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 (S = small, M = medium, L = large)

M

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

H

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

$$80 \times 0.8 = 64$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$64 \times 1.0 = 64$$

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				100
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	24
Subtotals			66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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				100

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	62
Waste Characteristics	64
Pathways	100
Total 226 divided by 3 =	75
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$75 \times 1.0 = 75$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 12 - Flightline Area
 LOCATION: Loring AFB, Maine
 DATE OF OPERATION OR OCCURRENCE: 1952 - Present
 OWNER/OPERATOR: Loring AFB
 COMMENTS/DESCRIPTION: Solvent, fuels, etc., onto ground
 SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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			115	180
Receptors subscore (100 x factor score subtotal/maximum subtotal)				64

II. WASTE CHARACTERISTICS

- A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.
1. Waste quantity (S = small, M = medium, L = large) S
 2. Confidence level (C = confirmed, S = suspected) C
 3. Hazard rating (H = high, M = medium, L = low) H
- 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
 $60 \times 1.0 = 60$
- C. Apply physical state multiplier
 Subscore B x Physical State Multiplier = Waste Characteristics Subscore
 $60 \times 1.0 = 60$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	24
Subtotals			66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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				61

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	64
Waste Characteristics	60
Pathways	61
Total 185 divided by 3 =	62
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$62 \times 1.0 = \underline{62}$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 13 - BX Service Station

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1955 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Ravine behind service station, evidence of fuel spills

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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			101	180

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

56

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

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

$$60 \times 0.8 = 48$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$48 \times 1.0 = 48$$

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	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
		Subtotals	66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61
2. Flooding				
	0	1	0	3
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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			56
	Waste Characteristics			48
	Pathways			80
	Total 184 divided by 3 =			61
			Gross Total Score	
B. Apply factor for waste containment from waste management practices				
Gross Total Score x Waste Management Practices Factor = Final Score				
	61 x 1.0 =			61

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 14 - Fuel Drop Site

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1952 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Designated area for dumping excess fuel

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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			100	180

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

56

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)

M

2. Confidence level (C = confirmed, S = suspected)

S

3. Hazard rating (H = high, M = medium, L = low)

H

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

 $50 \times 0.8 = 40$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

 $40 \times 1.0 = 40$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	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	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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		56
	Waste Characteristics		40
	Pathways		46
	Total 142 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 1.0 =		47

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 17 - Underground Transformer Site

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1972 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Two abandoned transformers - suspected of containing PCB

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	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	2	3	6	9
D. Distance to reservation boundary	1	6	6	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	2	9	18	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			96	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 53

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

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 1.0 = 60

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 60

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
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	3	8	24	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	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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	53
			Waste Characteristics	60
			Pathways	54
			Total 167 divided by 3 =	56
				Gross Total Score
B. Apply factor for waste containment from waste management practices				
Gross Total Score x Waste Management Practices Factor = Final Score				
56 x 1.0 =				56

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 18 - Flyash Disposal Area

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1953 - Present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Flyash disposal area (approximately 2-3 acres, 15-20 feet high)

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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 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 (S = small, M = medium, L = large)

S

2. Confidence level (C = confirmed, S = suspected)

C

3. Hazard rating (H = high, M = medium, L = low)

H

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

$$60 \times 1.0 = 60$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$60 \times 0.5 = 30$$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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				61

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	59
Waste Characteristics	30
Pathways	61
Total 150 divided by 3 =	50
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$50 \times 1.0 = 50$$

HAZARDOUS ASSESSMENT RATING FORM

Page 1 of 2

NAME OF SITE: Site No. 19 - Coal Storage Area

LOCATION: Loring AFB, Maine

DATE OF OPERATION OR OCCURRENCE: 1953-present

OWNER/OPERATOR: Loring AFB

COMMENTS/DESCRIPTION: Coal Storage Area, unlined, modifications underway

SITE RATED BY: David Moccia, Bob Knight, Gary Eichler

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	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 boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	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 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 (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

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

$$60 \times 1.0 = 60$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$60 \times 0.5 = 30$$

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 three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	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				61

IV. WASTE MANAGEMENT PRACTICES

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

Receptors	59
Waste Characteristics	30
Pathways	61
Total 150 divided by 3 =	50
Gross Total Score	

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

Gross Total Score x Waste Management Practices Factor = Final Score

$$50 \times 1.0 = 50$$



Appendix I
GLOSSARY OF TERMS



Appendix I
GLOSSARY OF TERMS

ALLUVIUM - A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semisorted sediment in the bed of the stream or on its flood plain or delta, or as a cone or fan at the base of a mountain slope; especially such a deposit of fine-grained texture deposited during time of flood.

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

BOWSER - A small mobile tank used to recover and transport POL products.

CONFINING STRATA - A strata of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.

CONTAMINANT - As defined by section 104(a)(2) of CERCLA, shall include, but not be limited to, any element, substance, compound, or mixture, including disease causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformation, in such organisms or their offspring.

DOWNGRAIENT - A direction that is hydraulically down slope. The downgradient direction can be determined through a potentiometric survey or through the evaluation of existing water level elevations referenced to a common datum (mean sea level).

EP TOXICITY - A laboratory test designed to identify if solid waste is hazardous. A liquid extract from the solid waste is analyzed for selected metals and pesticides. If one or more of the parameters tested for is present in concentration greater than a maximum value then the solid waste is considered a hazardous waste in accordance with RCRA definition.

ESKER - A widening ridge of stratified glacial drift, steep-sided, 3 to 15 m in height, and from a fraction of a mile to over 160 km in length.

EVAPOTRANSPIRATION - Evaporation from the ground surface and transpiration through vegetation.

FRACTURES - As a mineral characteristic, the way in which a mineral breaks when it does not have cleavage. May be conchoidal (shell-shaped), fibrous, hackly, or uneven.

GLACIAL TILL - Unsorted and unstratified drift, generally unconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier, and consisting of a heterogeneous mixture of clay, sand, gravel, and boulders varying widely in size and shape.

GROUND MORaine - Till deposited from a glacier as a veneer over the landscape and forming a gently rolling surface.

GROUND WATER - All subsurface water, especially that part that is in the zone of saturation.

HAZARDOUS WASTE (expanded version of the RCRA definition) -
A solid waste which because of its quantity, concentration,
or physical, chemical or infectious characteristics may -

- (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible, illness; or
- (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.

ICE-CONTACT DEPOSITS - Stratified drift deposited in contact with melting glacier ice, such as an esker, kame, kame terrace, or a feature marked by numerous kettles.

JOINTS - A break in a rock mass where there has been no relative movement of rock on opposite sides of the break.

LACUSTRINE - Pertaining to, produced by, or formed in a lake or lakes; e.g., "lacustrine sands" deposited on the bottom of a lake or formed along the margin of a lake.

LEACHING - The separation or dissolving out of soluble constituents from a rock or ore body by percolation of water.

LOAM - A rich, permeable soil composed of a friable mixture of relatively equal and moderate proportions of clay, silt, and sand particles, and usually containing organic matter (humus) with a minor amount of gravelly material.

METAMORPHOSED (METAMORPHIC) - Pertaining to the process of mineralogical and structural adjustment of solid rocks to physical and chemical conditions which have been imposed at depth below the surface zones of weathering and cementation,

and which differ from the conditions under which the rocks in question originated.

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

NET PRECIPITATION - Mean annual precipitation minus mean annual evapotranspiration. Evapotranspiration is sometimes estimated by pan evaporation measurements.

PD-680 (Type I and Type II) - A military specification for petroleum distillate (aliphatic) used as a safety cleaning solvent. The primary difference between PD-680 Type I and Type II is the flash point of the material. The flash points are 100°F and 140°F for PD-680 Types I and II, respectively. Currently, only Type II is authorized for use at Air Force installations.

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

POTENTIOMETRIC SURFACE - An imaginary surface that represents the static head of ground water and is defined by the level to which water will rise in a cased well.

SOIL HORIZONS -

- (A) A-Horizon - The uppermost mineral horizon of a soil; zone of leaching.
- (B) B-Horizon - Occurs below the A-Horizon; the mineral horizon of a soil or the zone of accumulation.
- (C) C-Horizon - Occurs below the B-Horizon; a mineral horizon of a soil consisting of unconsolidated

rock material that is transitional in nature between the parent material below and the more developed horizons above.

SOLUM - Upper part of a soil profile, in which soil-forming processes occur; A and B horizons.

SPOTTING CHARGE - A small explosive charge, the size of a shotgun shell, which is contained in training ordnance to score the impact of training ordnance.

STRATA - Plural of stratum.

STRATUM - A single and distinct layer, of homogeneous or gradational sedimentary material (consolidated rock or unconsolidated earth) of any thickness, visually separable from other layers above and below by a discrete change in the character of the material deposited or by a sharp physical break in deposition, or by both.

UNSATURATED ZONE (Vadose Zone or Zone of Aeration) - A subsurface zone containing water under pressure less than that of the atmosphere, including water held by capillarity; and containing air or gases generally under atmospheric pressure. This zone is limited above by the land surface and below by the surface of the zone of saturation.

UPGRADIENT - A direction that is hydraulically up slope. The upgradient direction can be determined through a potentiometric survey or through the evaluation of existing water level elevations referenced to a common datum (mean sea level).

WATER TABLE - The upper limit of the portion of the ground completely saturated with water.

WINNOWER - The selective sorting, or removal, of fine particles by water action, leaving the coarser grains behind.



Appendix J
LIST OF ARCONYMS, ABBREVIATIONS, AND
SYMBOLS USED IN THE TEXT



Appendix J
LIST OF ACRONYMS, ABBREVIATIONS,
AND SYMBOLS USED IN THE TEXT

A/C	Aircraft
AFB	Air Force Base
AFESC	Air Force Engineering and Services Center
AFFF	Aqueous Film-Forming Foam
AG	Aboveground
AGE	Aerospace Ground Equipment
AVGAS	Aviation Gasoline
Bldg.	Building .
bls	Below Land Surface
BOD ₅	Biochemical Oxygen Demand (5-day)
BX	Base Exchange
°C	Degrees Celsius (Centigrade)
CE	Civil Engineering
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
cm/sec	Centimeters per Second
COD	Chemical Oxygen Demand
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DoD	Department of Defense
DPDO	Defense Property Disposal Office
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
ft/min	Feet per Minute
gal/yr	Gallons per Year
gm/kg	Grams per Kilogram
gpd	Gallons per Day
gpm	Gallons per Minute
HARM	Hazard Assessment Rating Methodology
IRP	Installation Restoration Program
JP	Jet Petroleum
lb	Pounds

lb/yr	Pounds per Year
MAJCOM	Major Command
mg/L	Milligrams per Liter
mgd	Million Gallons per Day
mo.	Month
MOGAS	Motor Gasoline
mph	Miles per Hour
msl	Mean Sea Level
NDI	Non-Destructive Inspection
No.	Number
NPDES	National Pollutant Discharge Elimination System
OEHL	Occupational and Environmental Health Laboratory
PCB	Polychlorinated Biphenyls
POL	Petroleum, Oil, and Lubricants
ppm	Parts per Million
RBS	Radar Bomb Scoring
RCRA	Resource Conservation and Recovery Act
SAC	Strategic Air Command
SCS	Soil Conservation Service
TOC	Total Organic Carbon
TSS	Total Suspended Solids
UG	Underground
USAF	United States Air Force
USDA	United States Department of Agriculture
VOC	Volatile Organic Compound
ug/l	Micrograms per Liter



Appendix K
REFERENCES



Appendix K REFERENCES

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