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INSTALLATION RESTORATION PROGRAM
LF-022 RECORD OF DECISION

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

DRAFT FINAL

510003

Prepared by:

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SEPTEMBER 1992

LF-022 RECORD OF DECISION
PLATTSBURGH AFB

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Plattsburgh Air Force Base (AFB), Landfill LF-022
Plattsburgh, New York

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents a selected remedial action that will provide containment of landfill wastes at LF-022 on Plattsburgh AFB in Plattsburgh, New York. This document was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Through this document, Plattsburgh AFB plans to remedy the threat to human health, welfare, or the environment posed by surface soil at LF-022. This decision is based on the Administrative Record for the site, a copy of which is located at Plattsburgh AFB.

The New York State Department of Environmental Conservation (NYSDEC) on behalf of the State of New York and the U.S. Environmental Protection Agency (USEPA) concur with the selected remedy. The State's concurrence with this selected remedy is presented in Appendix B.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from LF-022, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to human health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This action addresses the principal threat posed by LF-022 by preventing endangerment to human health, welfare, or the environment through containment of the landfill to minimize exposure to pesticides present in the surface soils.

The selected source control remedy includes establishing institutional controls, constructing a soil and vegetative cover system over the landfill to minimize exposure to pesticides in the surface soils. The remedy also includes development of a post-

closure plan specifying inspection, maintenance, and monitoring programs to be conducted over 30 years. In addition, institutional controls for this site will be incorporated into the Plattsburgh AFB Comprehensive Plan. This will ensure that future owners will be made aware of the landfill location, and will be informed that the integrity of the final cover or any other component of the containment or monitoring system must not be compromised.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state Applicable or Relevant and Appropriate Requirements to the source control remedial action, and is cost-effective. The selected remedy uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable for this site. However, because treatment of the principal threats at the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. Treatment technologies were considered during the identification of remedial technologies and the development and initial screening of alternatives, but were not considered feasible for the LF-022 site. The size of the landfill and the fact that there are no on-site "hot spots" that represent the major sources of contamination preclude a remedy in which contaminants could be excavated and treated effectively.

Because this remedy could result in hazardous substances remaining on site, a review will be conducted by Plattsburgh AFB, USEPA, and NYSDEC within five years after closure to ensure that the source control remedy continues to provide adequate protection of human health and the environment. This review will be conducted at least every five years thereafter as long as hazardous substances remain on site at levels that could pose a risk to human health and the environment.

CONSTANTINE SIDAMON-ERISTOFF Date
Regional Administrator, USEPA Region II

DAVID C. LIAS Date
Colonel, USAF
Chairman, Environmental Protection Committee

1.0 SITE NAME, LOCATION, AND DESCRIPTION

Plattsburgh Air Force Base (AFB) is located in Clinton County in northeastern New York State, bordered on the north by the City of Plattsburgh, on the south and west by the Town of Plattsburgh, and on the east by Lake Champlain (Figure 1). The base is approximately 26 miles south of the Canadian border and 167 miles north of Albany. Landfill LF-022 is located west of the runway approximately 500 feet from the western Plattsburgh AFB boundary (Figure 2).

Access to the landfill from the east and north is restricted because the site is bordered on two sides by controlled access areas, the active runway to the east and the small arms range to the northwest (Figure 3). Access from the south and west is somewhat less restricted, but is limited by an intact 4-foot-high, three-wire fence posted with "No Trespassing" signs. This area is patrolled regularly by Plattsburgh AFB security personnel. Vehicles can access the landfill using a road leading from the western Perimeter Road, which is within the controlled access flightline area.

Plattsburgh AFB controls access to the Perimeter Road because it is next to the runway. Only military personnel who need to work within the area are allowed access to Perimeter Road. Occasionally, civilian law enforcement agencies (e.g., state police) are permitted to use the nearby small arms range on the northwestern edge of the landfill. Other military and civilian personnel are not likely to come in contact with the landfill.

LF-022 is approximately 1,350 feet north of a small mobile home development on NY Route 22, near the interchange with Interstate 87. The nearest on-base housing is more than 6,000 feet east of the site. A light industrial area is located approximately 700 feet west of the site along Route 22. Interstate 87 is approximately 200 feet further west of NY Route 22.

Site topography slopes gradually toward the east and southeast with a surface gradient between 0 and 3 percent. The site's northern boundary has a steep descending slope into a natural depression area. There are no surface water features within the LF-022 site. However, groundwater may collect in a natural depression approximately 600 feet north of the site during high water conditions (i.e., spring runoff).

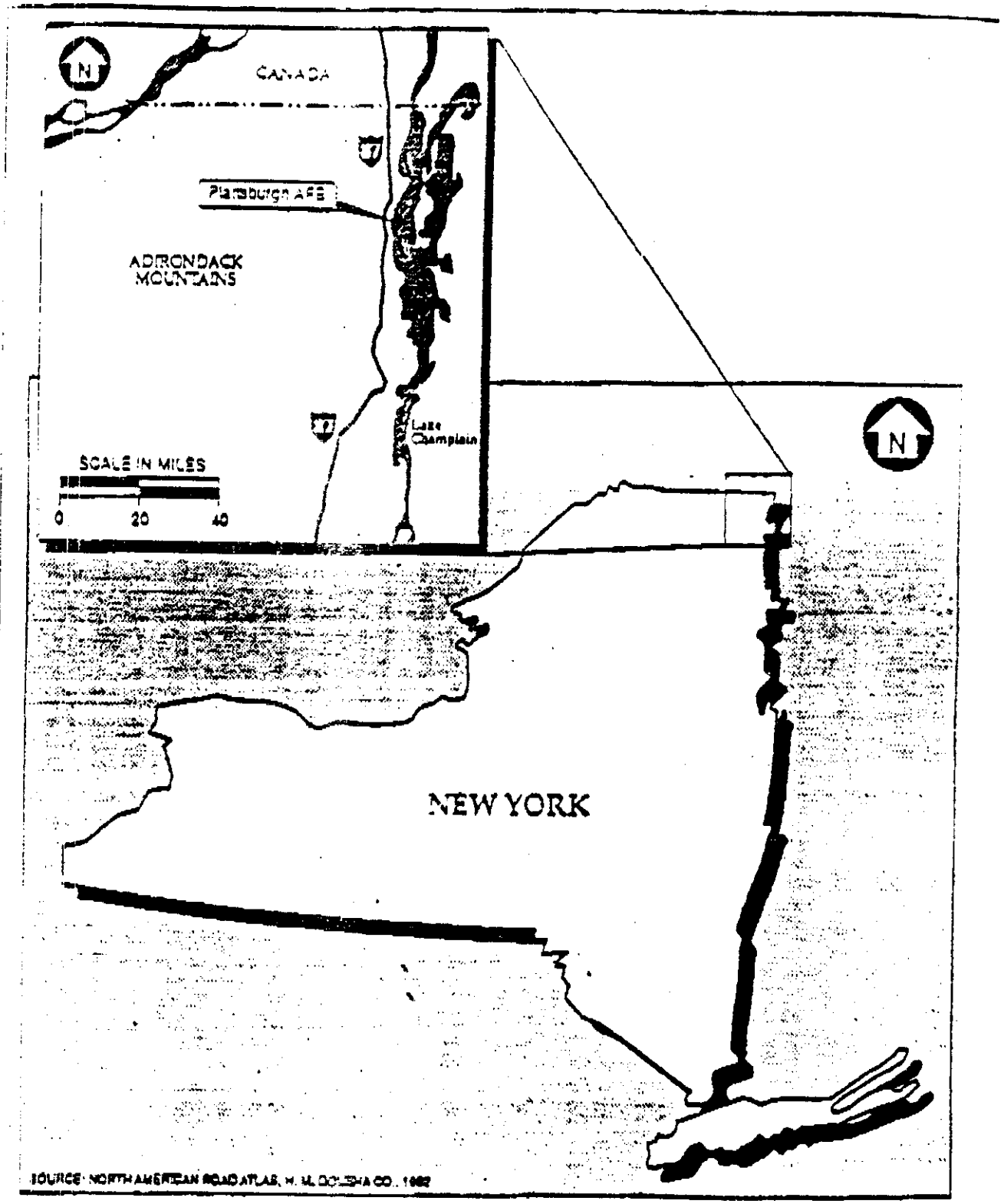

FIGURE 1
VICINITY LOCATION MAP

PLATTSBURGH AFB
ABB Environmental Services, Inc.

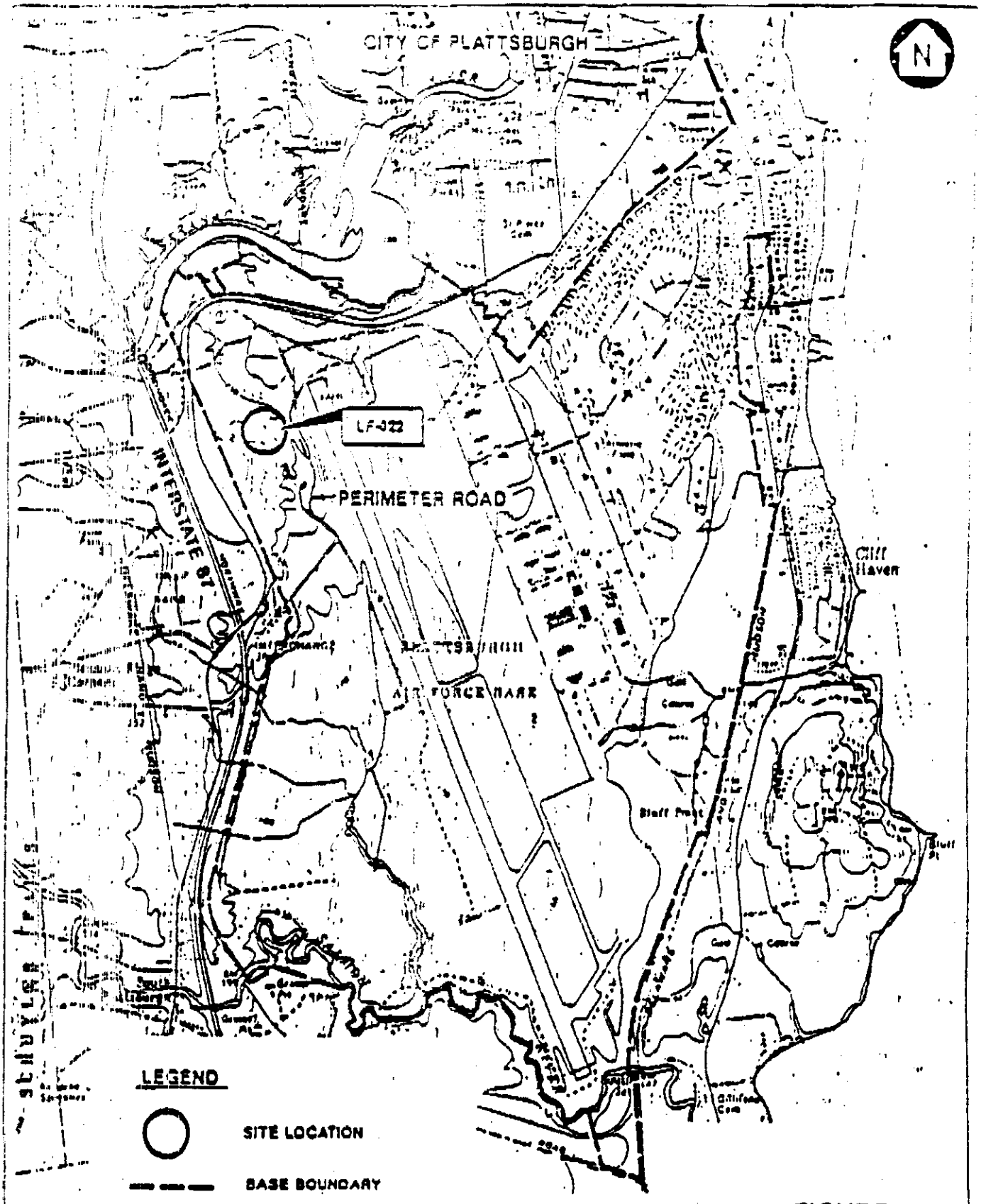

FIGURE 2
LF-022 LOCATION MAP

PLATTSBURGH AFB
ABB Environmental Services, Inc.

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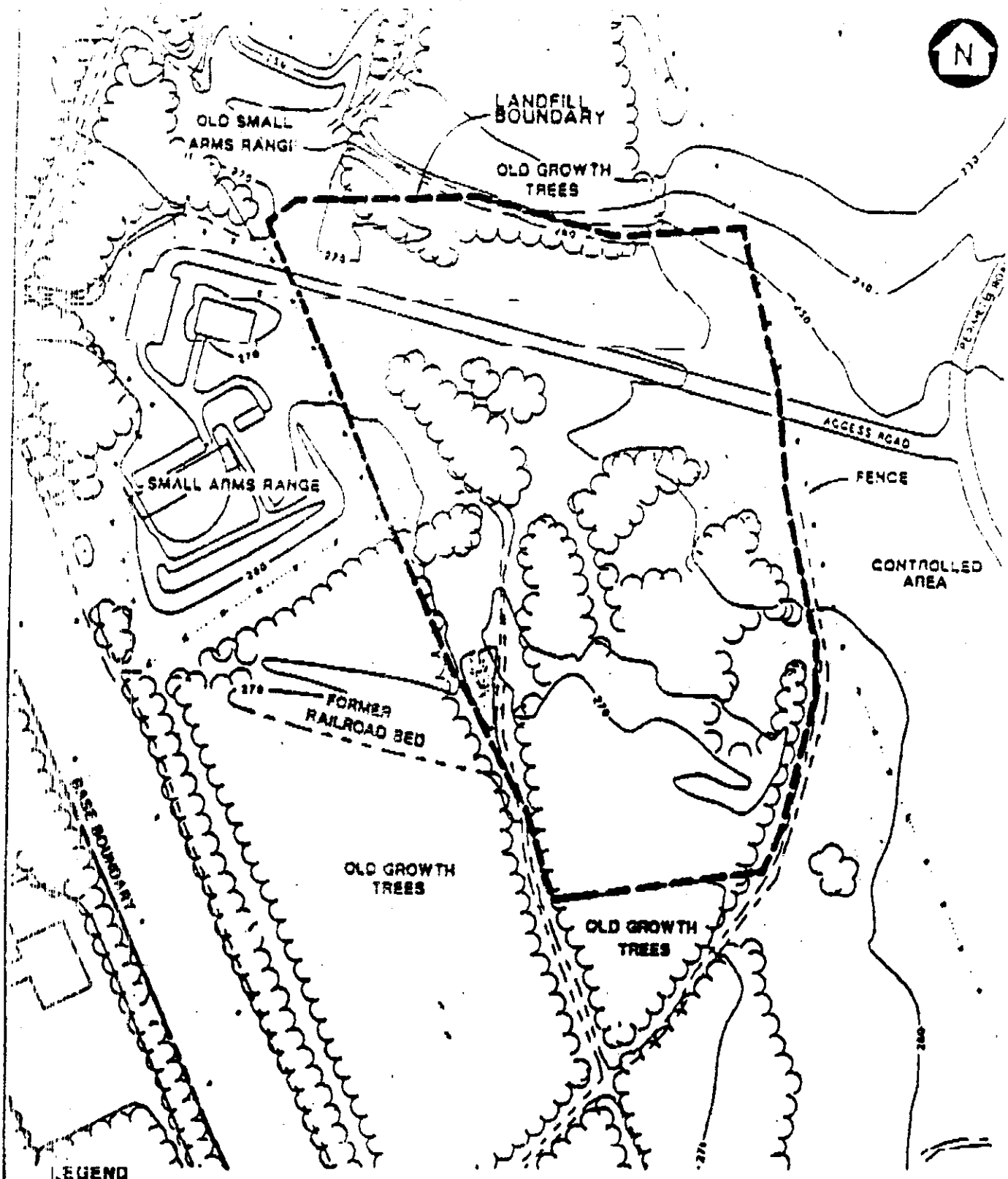

FIGURE 3
SITE FEATURES
LF-022 RECORD OF DECISION
PLATTSBURGH AFB
ABB Environmental Services, Inc.

The plant community at LF-022 consists of staghorn sumac, mullein, grasses, cottonwood, and pines. The plant community of the depression north of LF-022 is dominated by cattail, red-osier dogwood, pussy willow, black willow, and sensitive fern. Sumac and trembling aspen occur in upland areas surrounding this area. No wetlands regulated by the New York State Department of Environmental Conservation (NYSDEC) are present on or adjacent to LF-022. Several species of birds, mammals, reptiles, and amphibians could inhabit the site; however, no state or federally listed or proposed endangered or threatened species are known to exist within 2 miles of Plattsburgh AFB.

Site geology consists of approximately 80 feet of sand, 10 feet of clay, and 30 feet of till overlying carbonate bedrock. Soil within the landfill is poorly graded, medium-to-fine sand with trace to some silt, and appears to be native soil. Two aquifers at the site include an unconfined aquifer in the sand unit on which LF-022 was constructed and a confined aquifer in the bedrock. The water table in the unconfined aquifer is approximately 30 feet below ground surface (bgs) (below the depth of waste) and the upper surface of the confined aquifer in the bedrock is approximately 125 feet bgs. Groundwater in the unconfined aquifer flows east toward Lake Champlain and dominates local flow patterns at the site. LF-022 is located on a topographic high on the western side of the base, which also affects local groundwater flow. Groundwater in the confined aquifer also flows east toward Lake Champlain.

A more complete description of LF-022 can be found in the LF-022/LF-023 Remedial Investigation (RI) Report on pages 1-5 through 1-8, and 3-1 through 3-15 (ABB-ES, 1992a).

2.0 SITE HISTORY

In accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Plattsburgh AFB is publishing this Record of Decision (ROD) to address public review and comment on the selected alternative. Plattsburgh AFB, in consultation with the U.S. Environmental Protection Agency (USEPA) and NYSDEC, considered public comments as part of the final decision-making process for selecting the remedy for LF-022. This ROD summarizes the results and conclusions of the RI, Feasibility Study (FS), and Proposed Plan.

2.1 LAND USE AND RESPONSE HISTORY

LF-022, approximately 500 feet wide and 1,200 feet long, is on the western side of Plattsburgh AFB, approximately 500 feet from the base boundary (see Figure 3). This landfill received domestic wastes from Plattsburgh AFB for disposal from 1959 to 1966. Daily operations consisted of digging 25-foot-deep trenches, spreading and burning the trash in the trenches, and covering it with sandy soil. While the landfill was active, several different disposal methods were available for hazardous waste. Explosive ordnance was deactivated or detonated by the explosive ordnance disposal personnel on base; residue was then disposed of in the landfill as nonhazardous waste. Other hazardous wastes were handled by civil engineering service contractors, or taken to the Defense Reutilization and Marketing Office and disposed of or recycled off site by hazardous waste contractors. Liquids such as out-of-specification fuel, waste solvents, and waste oil, were also taken to fire-training area FT-002 and burned during fire-training activities. Because appropriate methods of hazardous waste disposal were available during operation of the landfill, it is unlikely that hazardous wastes were disposed of in LF-022. The maximum volume of fill is estimated at 524,000 cubic yards. Since landfilling operations ceased, vegetative growth (i.e., trees and brush) covers the site, a small arms range has been constructed on the northwestern side of the site, and an access road to the small arms range has been built across the landfill.

Several site investigations have been conducted at LF-022 as part of the Installation Restoration Program (IRP) at Plattsburgh AFB. A Preliminary Assessment evaluated whether the site was potentially contaminated and required further investigation. The Preliminary Assessment prompted a Site Inspection (SI) to confirm the presence of contamination. SI activities included a magnetometer survey,

test pits, and groundwater sampling. Because SI results indicated the presence of contaminants, an RI was conducted to characterize the nature and extent of contamination at LF-022. RI activities included groundwater and soil/waste sampling. A more detailed description of the site history can be found in the RI Report on pages 1-8 through 1-10, and 5-29 through 5-32 (ABB-ES, 1992a).

2.2 FEDERAL FACILITIES AGREEMENT HISTORY

Activities at LF-022 have been conducted as part of the Defense Environmental Restoration Program (DERP), which was established to clean up hazardous waste disposal and spill sites at Department of Defense facilities nationwide. The IRP is the U.S. Air Force subcomponent of the DERP that specifically handles investigating and remediating sites associated with suspected releases of toxic and hazardous materials, such as Plattsburgh AFB. The IRP operates under the scope of CERCLA, as amended by the 1986 Superfund Amendments and Reauthorization Act.

The U.S. Air Force Strategic Air Command (SAC) entered into an Interagency Agreement (IAG No. 1758-1758-A1) with the Department of Energy (DOE), under which DOE provides technical assistance for implementation of SAC IRPs and related activities. SAC requested DOE support in assessing the extent of contamination at sites on Plattsburgh AFB. Martin Marietta Energy Systems, Inc. (MMES) was assigned the responsibility for managing the contamination assessment effort under the IAG through the Hazardous Waste Remedial Actions Program. In 1985, the IRP technical performance at Plattsburgh AFB was assigned to ABB Environmental Services, Inc. (ABB-ES) (formerly E.C. Jordan Co.), an MMES subcontractor. The IRP at Plattsburgh AFB has included (1) a Preliminary Assessment to evaluate which sites are potentially contaminated, (2) SIs to confirm the presence or absence of contamination at identified sites, and (3) an ongoing RI program at sites confirmed to have contamination. On November 21, 1989, Plattsburgh AFB was included on the National Priorities List (NPL) of sites and will be remediated according to the federal facilities agreement entered into among the U.S. Air Force, USEPA, and NYSDEC.

3.0 COMMUNITY PARTICIPATION

Plattsburgh AFB has kept the community and other interested parties apprised of activities at LF-022 through informational meetings, fact sheets, press releases and public meetings. On August 1, 1989, Plattsburgh AFB held its first Technical Review Committee (TRC) meeting to involve members of the Clinton County community and state and federal regulatory agencies in decisions concerning IRP environmental response activities. The TRC currently meets quarterly to discuss plans and results of the RI/FS activities. In December 1990, Plattsburgh AFB released a community relations plan outlining a program to address community concerns and keep citizens informed about and involved in activities during remedial activities.

On August 4, 1992, Plattsburgh AFB made the LF-022 Administrative Record available for public review at Plattsburgh AFB in Plattsburgh, New York. Plattsburgh AFB published a notice and brief analysis of the Proposed Plan in the Press-Republican and made the Proposed Plan available to the public at Plattsburgh Public Library.

On August 4, 1992, Plattsburgh AFB held a public informational meeting to discuss the results of the RI and the clean-up alternatives in the FS, present the Proposed Plan, and answer questions from the public. Immediately following the information meeting, Plattsburgh AFB held a public hearing to discuss the Proposed Plan and to solicit and accept any oral comments. From August 4, 1992 to September 3, 1992, Plattsburgh AFB held a 30-day public comment period to accept public comment on the alternatives presented in the FS and the Proposed Plan and on any other documents previously released to the public. A transcript of the public hearing, the written comments received during the public comment period, and Plattsburgh AFB's response to comments are included in Appendices C and D.

4.0 SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

Due to the nature of its primary mission, Plattsburgh AFB is engaged in a wide variety of operations. A number of operations require the use, handling, storage, or disposal of hazardous materials. The IRP addresses past instances when these materials came into contact with the environment through accidental spills, leaks in supply piping, landfill operations, burning of waste liquids during fire training exercises, and the cumulative effect of operations conducted at the base's flightline and industrial area. These are the activities and circumstances through which contaminants of concern came into contact with site-related soil, sediment, surface water and/or groundwater. The suspected sources of contamination at Plattsburgh AFB sites are solvents, fuels, pesticides, and polychlorinated biphenyls (PCBs). Currently, there are thirty-nine IRP sites at Plattsburgh AFB.

The selected remedy for the LF-022 source control operable unit will meet the remedial response objective identified for this site: Minimize potential current and future ecological risks associated with exposure to pesticides in surface soil. The remedy will achieve the response objective by: (1) clearing and grubbing the site; (2) managing surface water runoff to minimize erosion of the final cover and minimize maintenance requirements; (3) establishing a cover thickness; (4) establishing vegetation to minimize erosion of the final cover and enhance evapotranspiration; (5) developing a post-closure plan to monitor, maintain, and inspect the site; (6) monitoring groundwater; and (7) conducting five-year site reviews.

Groundwater contaminants were not found in levels that warrant remedial action. However, the groundwater will be monitored as part of the landfill closure plan.

5.0 SUMMARY OF SITE CHARACTERISTICS

Subsection 1.4 of the Landfill LF-022 FS report contains an overview of the RI. Concentrations and frequencies of detection of site contaminants in the various media at LF-022 are presented in Table 1. Figure 4 diagrams potential migration pathways and receptors. RI activities included a topographic survey, geophysical surveys, and groundwater and soil sampling. The significant findings of the RI are summarized in the following subsections. Subsection 5.1 describes soil and waste characteristics; Subsection 5.2 discusses results of groundwater sampling. A complete discussion of site characteristics can be found in the RI report on pages 3-15 through 3-54 (ABB-ES, 1992a).

5.1 WASTE/SOIL

Geophysical survey techniques were used to investigate the depth and areal extent of the landfill. Seismic refraction and terrain conductivity surveys did not provide useful information; a magnetometer survey conducted during the SI, site walkovers, and a review of aerial photographs provided the information necessary to delineate the areal extent of the landfill. The landfill area is estimated to be 566,000 square feet. Information from the Preliminary Assessment indicated that wastes could have been buried as deep as 25 feet bgs in some areas. A profile of the depth of the landfill, however, could not be discerned by the seismic refraction survey. The volume of material at the landfill is also difficult to estimate because of the nonuniform manner in which wastes were disposed. Therefore, based on a maximum depth of 25 feet and the areal extent of the landfill, the maximum volume of fill material in LF-022 is estimated to be 524,000 cubic yards.

A passive soil gas survey was conducted for LF-022 to identify areas of potential contamination and help identify the locations of future explorations. Areas of high flux values for some compounds were detected primarily along the access road. However, results from subsequent surface soil and groundwater sampling do not suggest the presence of contaminant "hot spots."

The site was divided into quadrants for surface soil sampling. Composite surface soil samples were collected from each quadrant and analyzed for semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls, and inorganics. Discrete surface soil samples were collected from four locations and analyzed for volatile

TABLE 1
LF-022 SITE CONTAMINANTS BY MEDIA

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Detections	Concentration Range[1] Minimum	Concentration Range[1] Maximum	Frequency of Detection[2]
Groundwater (ug/L)			
Iron	<100[3]	8,760	3/12
Manganese	<15	877	5/12
Surface Soils[4] (ug/kg)			
DDD	<16	16,000	2/4
DDE	<16	855	1/4
DDT	<16	3,505	2/4
Subsurface Soils (mg/kg)			
Lead	4.1	116	2/3
VOA[5] (ug/kg, unless otherwise noted)			
Carbon tetrachloride	<5	18,000	1/7
Chloroform	<5	19,000	1/7
Bis(2-Ethylhexyl)Phthalate (ug/kg)	<300	1,700	1/2
BTEX	<1	2,100	5/6
Aluminum	<40	128,000	3/7
Cadmium	<1	151	3/7
Chromium	<10	412	1/7
Copper	<5	5,150	3/7
Iron	140	130,500	2/7
Lead	<1	974	4/7
Manganese	<3	7,365	1/7
Silver	<2	18	3/7
Sodium	<1000	23,300	1/7
Zinc	18	33,300	5/7

Notes:

1 Concentrations of duplicate samples were averaged.

2 Number of samples in which the compound was detected above background concentrations or appropriate standards divided by the total number of samples analyzed for that parameter. Duplicate samples represent one sample.

3 <100 denotes that the minimum sample concentration was below the identified Contract Required Quantitation Limit (e.g., 100 µg/kg).

4 Concentrations detected in composite samples.

DDD Dichlorodiphenyldichloroethane
DDE Dichlorodiphenyldichloroethene
DDT Dichlorodiphenyltrichloroethane
PHC Petroleum Hydrocarbons, as detected by USEPA method 418.1

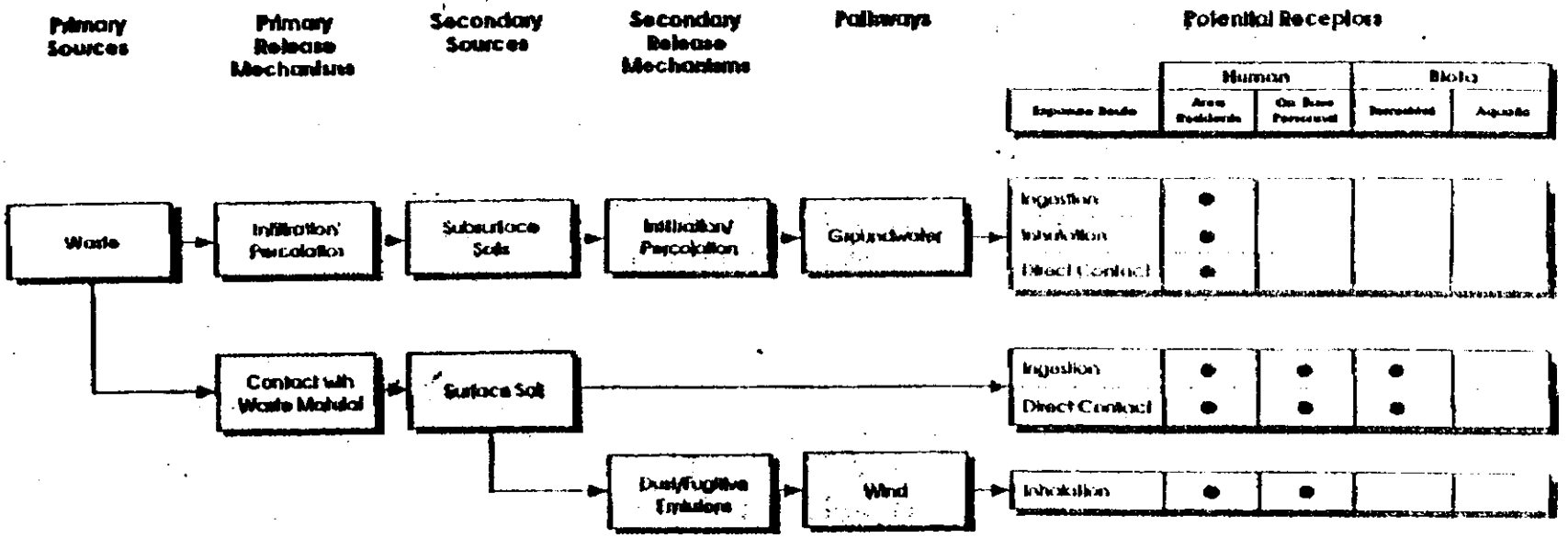

FIGURE 4
LF-022 MIGRATION PATHWAYS AND POTENTIAL RECEPTORS
LF-022 RECORD OF DECISION
PLATTSBURGH AFB
ABB Environmental Services, Inc.

organic compounds (VOCs). The VOC sample locations were selected based on soil gas survey results. No VOCs or SVOCs were detected above background detection limits in LF-022 surface soil samples. The man-made organochlorine pesticide dichlorodiphenyltrichloroethane (DDT) and associated analogs dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethene (DDE) were identified as site surface soil contaminants. No inorganic analytes were detected in surface soils at concentrations above background.

Test pits were dug during the SI to evaluate the nature of contamination in subsurface soil and buried waste. Material uncovered during test pitting indicates that most of the wastes disposed of at this site were household trash that was burned prior to burial under at least 1 foot of sandy fill. No organic contaminants were identified in subsurface soil. Lead was detected at concentrations above background in soil collected from just below the waste; lead is considered a site contaminant.

5.2 GROUNDWATER

Groundwater monitoring wells were installed at LF-022 to collect groundwater samples and to measure groundwater elevations. Two inorganic analytes, iron and manganese, were detected in groundwater at concentrations exceeding New York State groundwater quality standards. No organic compounds were identified as site contaminants.

6.0 SUMMARY OF SITE RISKS

A baseline risk assessment was conducted for LF-022 to evaluate whether site contaminants pose a risk to human and/or ecological receptors. This section summarizes the human health and ecological risk assessments for the site. Although the baseline risk assessment is presented in the RI report, it is summarized here to provide the rationale for selecting contaminants of concern and developing remedial action strategies. In addition, any assumptions used to describe the distribution and/or fate of contaminants in the environment have been identified to the extent possible.

The risk assessment was conducted in accordance with USEPA and NYSDEC guidance. The human health risk assessment was conducted in accordance with USEPA's *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A)* (USEPA, 1989b). Guidance followed in conducting the ecological risk assessment included the *Risk Assessment Guidance for Superfund: Environmental Evaluation Manual* (USEPA, 1989a) and the *Habitat-Based Assessment Guidance Document for Conducting Environmental Risk Assessments at Hazardous Waste Sites* (NYSDEC, 1989).

6.1 APPROACH OF THE BASELINE RISK ASSESSMENT

The baseline risk assessment for LF-022 consisted of three components: (1) data evaluation, (2) human health risk assessment, and (3) habitat-based environmental risk assessment (ERA). The purpose of the Data Evaluation was to identify the environmental data suitable for use in the risk assessment based on results of the RI. The purpose of the baseline human health risk assessment was to evaluate whether contamination at the landfill poses risks to human health in the absence of any remedial action. The baseline human health risk assessment was composed of the following components:

- exposure assessment
- toxicity assessment
- risk characterization

Collectively, these components describe (1) human populations that might come in contact with contaminants at the site and the pathways by which they could be exposed; (2) site contaminants that pose a potential risk to public health and the

potential toxic effects and toxic potency of contaminants; and (3) potential risks associated with contaminant exposure.

The purpose of the habitat-based ERA for LF-022 was to define potential ecological effects resulting from exposure to chemicals in environmental media at the site. The ERA contained the following elements:

- ecological exposure assessment
- hazard identification
- ecological risk characterization

The following subsections summarize the approach used and principal assumptions and conclusions of the LF-022 baseline risk assessment. The data evaluation, human health, and ecological components of the baseline risk assessment are discussed separately.

6.2 LF-022 Data Evaluation

Contaminants associated with LF-022 were detected in groundwater, surface soil, and subsurface soil/waste material during the RI. No surface water is associated with this site. Site contaminants were initially identified in the RI based on comparisons with New York State or federal standards or background levels. These contaminants were further evaluated for their potential effects on human health and the environment. Based on this analysis, contaminants of potential concern were chosen for the baseline risk assessment.

The only organic contaminants detected in groundwater were bis(2-ethylhexyl)phthalate (BEHP) and 2-butanone, both of which were attributed to laboratory contamination. The only elements considered to be site-related in groundwater were iron and manganese. Neither of these inorganic compounds are highly toxic to humans. However, these two elements were detected above New York State groundwater quality standards (i.e., 300 micrograms per liter [μg/L] for each element or 500 μg/L for both elements). Therefore, iron and manganese represent contaminants of potential concern.

Nine inorganic contaminants were detected in subsurface soil/waste material at concentrations above the expected range for soils in the Plattsburgh AFB area: aluminum, cadmium, copper, iron, lead, manganese, silver, sodium, and zinc. Of these, only cadmium, copper, lead, manganese and silver are of toxicological concern

to humans or ecological receptors. Aluminum, iron, sodium, and zinc were not detected at concentrations that are of toxicological concern; therefore, they do not warrant further consideration. The only organic compound detected in subsurface soil/waste was BEHP, a probable human carcinogen. This compound was detected once in association with a sample of white ash believed to be incinerator ash. Its presence is likely the result of leaching from waste materials and it is considered to be a site-related contaminant. Therefore, cadmium, copper, lead, manganese, silver, zinc, and BEHP represent contaminants of potential concern in LF-022 subsurface soils/waste.

The only organic contaminants detected in surface soils at LF-022 above analytical quantitation limits were DDD, DDE, and DDT. VOCs and SVOCs were not detected. The concentrations of inorganic compounds were within typical background ranges, and therefore were not considered site-related. Because DDD, DDE, and DDT were the only contaminants detected in surface soils, these three compounds represent the only contaminants of potential concern for surface soils at the LF-022 site.

6.3 LF-022 Human Health Risk Assessment

The LF-022 site was evaluated to identify the populations that could come in contact with site-related contaminants and the pathways through which exposure could occur. There are three potential sources of exposure associated with the LF-022 site: groundwater, subsurface soil/waste materials, and surface soil. However, based on current site uses, surface soil is the only media to which individuals could be exposed. Groundwater is not used as a drinking water source downgradient of the site; however, USEPA guidance suggests that reasonable future-use exposure scenarios should be incorporated into the human health risk assessment. Therefore, future exposure to groundwater contaminants was evaluated in the risk assessment. Exposure to subsurface soil/waste materials was not evaluated because construction/excavation at this site is not currently planned or proposed.

As a result of the exposure assessment, the following four exposure scenarios were identified as being possible at LF-022 under current and future site conditions:

Current Site Conditions

1. Incidental Ingestion of and Direct Contact with Surface Soil by a Child Trespasser.

Future Site Conditions

1. Ingestion of and Direct Contact with Groundwater by a Future Resident.

2. Incidental Ingestion of and Direct Contact with Surface Soil by a Future Resident.

3. Inhalation of Vapors and Fugitive Dusts by a Future Resident.

Potential intake of contaminants as a result of these exposure pathways was calculated using a series of standard equations identified in USEPA risk assessment guidance. Estimates of the intake of surface soil contaminants were calculated using two surface soil data sets: (1) the sitewide average soil concentrations from four composite samples collected from the four quadrants of the site; and (2) the concentrations from the most contaminated quadrant of the landfill. The former provides an estimate of intake if exposure were to occur across the entire landfill, while the latter provides an estimate of intake if exposure were to occur in one quadrant.

A toxicity assessment was conducted to identify the relevant oral and inhalation toxicity values for carcinogenic and noncarcinogenic effects of the LF-022 contaminants of potential concern. These values were identified from either the USEPA's Integrated Risk Information System database or USEPA's Health Effects Assessment Summary Tables. When values could not be identified from either of these two sources, surrogate values were identified based on similarities in toxicity and/or chemical structure of the compounds.

Risk characterization involves the qualitative or quantitative evaluation of potential health risks associated with exposure to chemicals in the environment. For LF-022, quantitative estimates of both carcinogenic and noncarcinogenic risks were calculated for each contaminant of potential concern identified in the toxicity assessment and each complete exposure scenario identified in the exposure assessment.

To evaluate the significance of risk estimates, a comparison was made with established target risk levels. USEPA has established target risk levels for the evaluation of both carcinogenic and noncarcinogenic risks at hazardous waste sites. USEPA's guidelines state that the total incremental carcinogenic risk for an individual resulting from exposure at a hazardous waste site should be below or within a range of 10^{-6} to 10^{-4} (USEPA, 1989b). Cancer risks below 10^{-6} are considered acceptable; risks above 10^{-4} are considered unacceptable. The target risk level for noncarcinogenic effects is a Hazard Index (HI) of below or equal to 1.0 (USEPA, 1989b).

The total site risk estimates calculated for the one exposure scenario under current site conditions are below the USEPA target risk levels (Table 2). The estimated total current site cancer risks for the child trespassing on the site, using the two sets of surface soil data, are below the USEPA target cancer risk range and therefore are not considered significant. Total site cancer risks range between $2x10^{-8}$ and $7x10^{-8}$. The two sets of total site HIs of 0.001 and 0.004 are also below the USEPA target HI of 1.0.

Under future site conditions, a nearby resident was selected as the receptor at greatest potential risk. This individual was assumed to be exposed to surface soil, groundwater, and fugitive emissions while residing near the landfill, both as a child and as an adult. The estimated total site cancer risks for this receptor, calculated by combining all pathway-specific risks, were between $6x10^{-6}$ and $1x10^{-5}$. Both estimates are below or within the USEPA target risk range (Table 3).

The total site HIs for this hypothetical receptor were 1.0 and 2.0 for the child using the sitewide average soil concentrations and the soil concentrations from the more contaminated northwest quadrant, respectively, and 0.3 for the adult using either data set. Only the latter HI for the child, which incorporates the surface soil pathway using maximum concentrations, is above the USEPA target of 1.0. Most of the elevated index for a child receptor is associated with ingestion of manganese in groundwater.

TABLE 2
SUMMARY OF LF-022 SITE RISK ESTIMATES - SECURITY POLICE

LF-022 RECORD OF DECISION
PLATTSBURGH AFB

TYPE OF EFFECT	EXPOSURE ROUTE, MEDIUM AND EXPOSURE POINT	PATHWAY-SPECIFIC CANCER RISK OR HAZARD INDEX	TOTAL CANCER RISK OR HAZARD INDEX
CARCINOGENIC EFFECTS			
Site-wide Average	Direct contact with surface soil	2E-08	
	Ingestion of surface soil	8E-09	2E-08
Northwest Quadrant	Direct contact with surface soil	5E-08	
	Ingestion of surface soil	2E-08	7E-08
NONCARCINOGENIC EFFECTS			
Site-wide Average	Direct contact with surface soil	0.0009	
	Ingestion of surface soil	0.0004	0.001
Northwest Quadrant	Direct contact with surface soil	0.003	
	Ingestion of surface soil	0.001	0.004

TABLE 3
SUMMARY OF LF-022 SITE RISK ESTIMATES - FUTURE RESIDENT

LF-022 RECORD OF DECISION
PLATTSBURGH AFB

TYPE OF EFFECT	EXPOSURE ROUTE, MEDIUM AND EXPOSURE POINT	PATHWAY-SPECIFIC CANCER RISK OR HAZARD INDEX		TOTAL CANCER RISK OR HAZARD INDEX	
		CHILD	ADULT	CHILD	ADULT
CARCINOGENIC EFFECTS					
Site-wide Average	Direct contact with surface soil	1E-06	2E-06		
	Ingestion of surface soil	8E-07	3E-07	2E-06	2E-06
Northwest Quadrant	Direct contact with surface soil	3E-06	4E-06		
	Ingestion of surface soil	2E-06	9E-07	5E-06	5E-06
	Inhalation of vapors and dusts	1E-06	1E-06	1E-06	1E-06
		Total: Site-Wide Average		3E-06	3E-06
		Total: Northwest Quadrant		6E-06	6E-06
		Total: Site-wide Average		6E-06	
		Total: Southeast Quadrant		1E-05	
NONCARCINOGENIC EFFECTS		CHILD	ADULT	CHILD	ADULT
	Direct contact with groundwater	0.0006	0.0003		
	Ingestion of groundwater	1	0.2	1	0.2
Site-wide Average	Direct contact with surface soil	0.09	0.03		
	Ingestion of surface soil	0.07	0.006	0.2	0.04
Northwest Quadrant	Direct contact with surface soil	0.3	0.1		
	Ingestion of surface soil	0.2	0.02	0.5	0.1
	Inhalation of vapors and dusts	0.09	0.02	0.09	0.02
		Total: Site-wide Average		1	0.3
		Total: Northwest Quadrant		2	0.3

6.4 LF-022 Habitat-Based Environmental Risk Assessment

The following paragraphs summarize the three components of the habitat-based environmental risk assessment for LF-022.

An ecological exposure assessment was conducted to evaluate the potential for exposure of ecological receptors to the site-related chemicals at LF-022. This involved identification of actual or potential exposure routes to receptors and evaluation of the magnitude of exposure. Exposure concentrations were developed for each receptor via each pathway.

Terrestrial organisms may be exposed to chemicals in surface soils through several exposure pathways. No exposure pathways exist for groundwater or subsurface soil at the site because terrestrial organisms are not expected to come in contact with subsurface (i.e., below an approximate 2-foot depth) media and no prey of these species exist in subsurface areas. Additionally, because there are no aquatic habitats at the site, there are no exposure pathways for aquatic organisms.

Exposure to constituents in surface soil may occur via direct contact with and ingestion of surface soils, and ingestion of biota that have bioaccumulated chemicals in their tissues. Because of the lack of species-specific data concerning uptake of chemicals via dermal contact and the inherent variability in uptake rates among species, the dermal contact exposure pathway was not evaluated. Five indicator species were selected to represent exposures to terrestrial organisms via ingestion of food and soil:

- White-footed mouse (*Peromyscus leucopus*), small mammal, omnivore
- Wood thrush (*Hylocichla mustelina*), small bird, omnivore
- Garter snake (*Thamnophis s. sirtalis*), herptile, carnivore
- Red fox (*Vulpes*), predatory mammal, omnivore
- Red-tailed hawk (*Buteo jamaicensis*), predatory bird, carnivore

These species were selected because they are representative of exposures to the range of mammals, birds, and herpetofauna (reptiles and amphibians) that may occur at the site. They are relatively common species in the vicinity of Plattsburgh AFB and were selected based on the types of habitat at the site and feeding preferences. These species are used to represent small mammals, small birds, herpetofauna, predatory mammals, and predatory birds.

In the Hazard Identification, the toxicity of each site-related chemical was described. Information necessary to evaluate the potential effects to receptors consisted of published laboratory-derived toxicological data and threshold toxicity values developed using extrapolation techniques. Based on these data, Reference Toxicity Values (RTVs) were developed for terrestrial organisms that represent a toxic threshold concentration in soil or food.

Toxicity data for terrestrial receptors consist of acute and chronic ingestion studies. From the toxicological data set, the lowest acute or chronic value for each type of receptor (e.g., small mammals and small birds) was selected as the acute or chronic RTV, respectively. However, because of their structural similarity, the same RTVs were used for DDD, DDE, and DDT for a given indicator species.

The risks to terrestrial receptors potentially exposed to DDD, DDE, and DDT in surface soil at LF-022 were identified. Risks to terrestrial biota were evaluated by comparing the acute and chronic Potential Dietary Exposures (PDEs) for each indicator species with the acute and chronic RTVs, respectively. By dividing the PDE by the appropriate RTV, an HI was calculated. The HIs for individual chemicals were then summed to yield a total HI for the receptor. A technique developed for the ecological evaluation of pesticides (USEPA, 1986) was adopted to evaluate the significance of the calculated HI risk estimates:

$HI < 0.1$	No Adverse Effects
$0.1 \leq HI < 10$	Possible Adverse Effects
$HI \geq 10$	Probable Adverse Effects

This ranking scheme reflects effects on individual organisms, and does not provide an indication of potential population-level effects. Because the number of affected individuals presumably increases with increasing HI values, the likelihood that population-level effects are occurring is expected to increase as the HI increases.

Application of this ranking scheme indicates that chronic effects to small mammals, small birds, and herpetofauna are possible in the northwest and southeast quadrants, as well as from sitewide exposure (Table 4). Because the summary HIs for the northwest and southeast quadrants and the entire site are on the lower end of the 0.1 to 10 range, effects are expected to be limited to a few individuals, with effects on populations unlikely. No effects are predicted for the southwest and northeast quadrants, and no effects are predicted for predatory birds or mammals exposed to chemicals in any quadrant. Acute effects are possible for all modeled receptors in

TABLE 4
SUMMARY OF ECOLOGICAL RISK ASSESSMENT FOR LF-022

LF-022 RECORD OF DECISION
PLATTSBURGH AFB

INDICATOR SPECIES	CHRONIC SUMMARY HAZARD INDEX BY AREA				
	Entire Site	Northwest	Southeast	Southwest	Northeast
White-footed Mouse	2.9×10^{-1}	6.5×10^{-1}	3.3×10^{-1}	1.2×10^{-3}	1.2×10^{-3}
Wood Thrush	3.4×10^{-1}	9.9×10^{-1}	3.9×10^{-1}	1.4×10^{-3}	1.4×10^{-3}
Garter Snake	1.4×10^{-1}	3.8×10^{-1}	1.1×10^{-1}	5.1×10^{-4}	4.2×10^{-4}
Red Fox	1.6×10^{-2}	1.4×10^{-2}	3.6×10^{-3}	1.6×10^{-5}	1.4×10^{-5}
Red-Tailed Hawk	6.5×10^{-3}	5.6×10^{-3}	1.5×10^{-3}	7.4×10^{-6}	5.9×10^{-6}

INDICATOR SPECIES	ACUTE SUMMARY HAZARD INDEX BY AREA				
	Entire Site*	Northwest	Southeast	Southwest	Northeast
White-footed Mouse	1.4×10^{-0}	1.4×10^{-0}	4.9×10^{-1}	2.1×10^{-3}	2.0×10^{-3}
Wood Thrush	3.2×10^{-1}	3.2×10^{-1}	1.2×10^{-1}	4.8×10^{-4}	4.6×10^{-4}
Garter Snake	1.4×10^{-1}	1.4×10^{-1}	4.9×10^{-2}	2.1×10^{-4}	2.0×10^{-4}
Red Fox	1.0×10^{-0}	1.0×10^{-0}	3.8×10^{-1}	1.6×10^{-3}	1.5×10^{-3}
Red-Tailed Hawk	2.0×10^{-1}	2.0×10^{-1}	7.3×10^{-2}	3.1×10^{-4}	2.9×10^{-4}

Notes:

* Acute summary HI for entire site is the highest HI of the four quadrants.

RELATIVE HAZARD RANKING (USEPA, 1986d):

HI < 0.1 — No Adverse Effects
0.1 ≤ HI < 10 — Possible Adverse Effects
HI ≥ 10 — Probable Adverse Effects

the northwest quadrant, and for small mammals, small birds, and predatory mammals in the southeast quadrant. DDD is the greatest contributor to total chronic risks in the northwest quadrant and from sitewide exposure, while DDT is the greatest contributor to risks in the southeast quadrant. Effects are expected to be limited to a few individuals, with no population-level effects expected.

6.5 Conclusions of the Baseline Risk Assessment

For the human health baseline risk assessment, all estimated total site risks for the one current and three future exposure scenarios were at or below USEPA target risks with one exception: the HI for a child receptor assumed to be simultaneously exposed to surface soil, groundwater, and fugitive emissions was above the USEPA target of 1.0. This elevated HI is mostly associated with ingestion of manganese in groundwater. This elevated HI does not indicate a significant risk and human health is expected to be protected under current and future site conditions at LF-022.

Adverse ecological effects associated with surface soil exposure are not expected in the southwest and northeast quadrants of the site. Acute effects predicted for the northwest and southeast quadrants are expected to be limited to individuals and not populations at the site. Therefore, there are current and future ecological risks associated with exposure to chemicals in LF-022 surface soils.

7.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

Five alternatives were developed and screened in the FS. Three of these alternatives were retained for detailed analysis. The following subsections describe the response objectives and the development and screening of alternatives.

7.1 STATUTORY REQUIREMENTS/RESPONSE OBJECTIVES

Under its legal authorities, Plattsburgh AFB's primary responsibility at this NPL site is to undertake remedial actions that are protective of human health and the environment. Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that the remedial action, when complete, must comply with all federal and more stringent state environmental standards, requirements, criteria or limitations, unless a waiver is invoked; a requirement that the selected remedial action is cost-effective and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies that include treatment that permanently and significantly reduces the mobility, toxicity or volume of hazardous substances is a principal element over remedies not involving such treatment. Response alternatives were developed to be consistent with these congressional mandates.

Based on types of contaminants, environmental media of concern, and potential exposure pathways, a remedial action objective was developed to aid in the development and screening of alternatives:

- Minimize potential current and future ecological risks associated with exposure to pesticides in surface soil.

7.2 TECHNOLOGY AND ALTERNATIVE DEVELOPMENT AND SCREENING

CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives was developed for the site. With respect to source control, the RI/FS developed a limited number of remedial alternatives appropriate for large landfill sites, focusing

obtaining response objectives for source control and mitigating risks associated with surface soils. A no action alternative was also developed.

As discussed in Subsection 4.1 of the LF-022 FS, the RI/FS identified, assessed, and screened technologies based on the approach outlined in the NCP and USEPA's *Streamlining the RI/FS for CERCLA Municipal Landfill Sites* (USEPA, 1990). Subsection 4.2 of the FS presented the remedial alternatives developed by combining the technologies retained in the screening process in the categories identified in Section 300.430(e)(3) of the NCP. Technologies were combined into source control alternatives ranging from an alternative that eliminates the need for long-term management by removing or destroying contaminants to the maximum extent feasible, to alternatives that provide no treatment but do protect human health and the environment. Section 5.0 of the FS presented the initial screening of LF-022 alternatives. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was evaluated and screened based on its effectiveness, implementability, and cost.

In summary, of the five remedial alternatives screened in Section 5.0 of the FS, three were retained for detailed analysis. Table 5 identifies the alternatives that were retained through the screening process, as well as those eliminated from further consideration.

TABLE 5
SUMMARY OF ALTERNATIVES SCREENING

LF-02: FEASIBILITY STUDY REPORT
PLATTSBURGH AFB

ALTERNATIVE		STATUS
Alternative 1:	No Action	Retained for detailed analysis.
Alternative 2:	Site Grading and Vegetation Establishment	Retained for detailed analysis.
Alternative 3:	Installation of a Low-Permeability Barrier Cover System	Retained for detailed analysis.
Alternative 4:	Excavation and Incineration	Eliminated from further consideration.
Alternative 5:	Stabilization/Solidification	Eliminated from further consideration.

8.0 DESCRIPTION OF ALTERNATIVES

This section provides a narrative summary of each alternative evaluated. A detailed description of each alternative can be found in Section 6.0 of the FS report. The source control alternatives analyzed for LF-022 include No Action (Alternative 1), Site Grading and Vegetation Establishment for Closure (Alternative 2), and Installation of a Low-Permeability Barrier Cover System (Alternative 3).

8.1 ALTERNATIVE 1: NO ACTION

The No Action Alternative provides a baseline against which the other alternatives can be compared, and also assesses the effects on human health and the environment if no remedial actions are taken. The No Action Alternative includes a program to monitor the status of groundwater and surface water quality, with five-year reviews to evaluate how human health and the environment are protected. This monitoring program would meet the relevant and appropriate requirements of Part 360 of the New York State Solid Waste Management Facility Rules for closure and post-closure of solid waste landfills (hereinafter referred to as Part 360) requirements for long-term monitoring. The No Action Alternative would not meet the remedial response objective.

Estimated Time for Construction: immediate

Estimated Time of Operation: 30 years

Estimated Capital Cost: $0

Estimated Operation and Maintenance (O&M) Costs (30 years, net present worth): $676,000

Estimated Total Costs (30 years, net present worth): $676,000

8.2 ALTERNATIVE 2: SITE GRADING AND VEGETATION ESTABLISHMENT FOR CLOSURE

Alternative 2 consists of a 12-inch soil cover (i.e., no low-permeability layer) to support grass growth and reduce precipitation infiltrating to buried wastes. The alternative includes:

1. Clearing and grubbing of the landfill site

2. Surface water runoff management to minimize erosion of the cover and minimize maintenance requirements

3. Cover thickness establishment

4. Vegetation establishment to minimize erosion of the final cover and enhance evapotranspiration

5. Post-closure plan development to monitor, maintain, and inspect the site

6. Groundwater monitoring

7. Five-year site reviews

Existing vegetation such as trees and brush would be cut, chipped, and removed from the site. The cleared site would be suitably regraded to control rainwater runoff and minimize erosion. Because the existing organic soil layer is thin or nonexistent over most of the landfill, additional soil is needed. Six inches of compacted common borrow covered by 6 inches of topsoil would be laid down to support grass growth, which, through evapotranspiration, would reduce the amount of precipitation reaching the buried waste. Consequently, the potential for contaminants to migrate from buried waste would be reduced.

A post-closure plan would be developed specifying the inspection, monitoring, and maintenance programs for the closed landfill, to be continued for at least 30 years. Post-closure activities would be reviewed every five years as required by the NCP when contaminants remain on site. This alternative would meet the response objective.

Estimated Time for Construction: 4 months

Estimated Time of Operation: 30 years

Estimated Capital Cost: $1,248,000

Estimated O&M Costs (30 years, net present worth): $866,000

Estimated Total Costs (30 years, net present worth): $2,114,000

8.3 ALTERNATIVE 3: INSTALLATION OF A LOW-PERMEABILITY BARRIER COVER SYSTEM

Alternative 3 consists of a low-permeability cover system to achieve the response objective identified in Section 7.0. The alternative includes:

1. Clearing and grubbing of the site
2. Surface water runoff management to minimize erosion of the cover and minimize maintenance requirements
3. Installation of a gas detection and management system
4. Construction of a hydraulic barrier layer consisting of recompacted low-permeability soil or a synthetic liner
5. Placement of a barrier protection layer of soil over the low-permeability layer
6. Installation of a topsoil cover layer
7. Vegetation establishment to minimize erosion of the final cover and enhance evapotranspiration
8. Post-closure plan development to monitor, maintain, and inspect the site
9. Groundwater monitoring
10. Five-year site reviews

These components are identical to those of Alternative 2 except for components 3, 4, and 5. Under this alternative, a gas detection system would be installed to monitor gas migration beyond the boundaries of the closed landfill. The barrier layer, placed above the gas-venting layer, would be formed of low-permeability soil (i.e., a recompacted, fine-grained soil such as clay that is difficult to penetrate) or a synthetic liner to keep rainwater or snowmelt from infiltrating the landfill. Over this, a

3.5-foot barrier protection layer would be installed to protect the barrier layer from frost action or root penetration. The additional soil over the barrier layer will provide an area for small plants to root. However, large plants requiring deeper soil for their root systems will not be allowed to grow over the barrier cover in order to prevent root penetration into the synthetic liner. This alternative would reduce the exposure to pesticide contaminants in surface soils at LF-022.

Estimated Time for Construction: 5 months

Estimated Time of Operation: 30 years

Estimated Capital Cost: $4,196,000

Estimated O&M Costs (30 years, net present worth): $866,000

Estimated Total Costs (30 years, net present worth): $5,062,000

9.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that, at a minimum, Plattsburgh AFB is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the NCP articulates nine evaluation criteria to be used in assessing the individual remedial alternatives.

A detailed analysis was performed on the alternatives using the nine evaluation criteria to select a site remedy. The following is a summary of the comparison of each alternative's strengths and weaknesses with respect to the nine evaluation criteria. These criteria and their definitions are as follows:

9.1 THRESHOLD CRITERIA

The two threshold criteria described below must be met for the alternatives to be eligible for selection in accordance with the NCP:

- **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

- **Compliance with Applicable or Relevant and Appropriate Requirements** (ARARs) addresses whether or not a remedy will meet all of the ARARs of other federal and state environmental laws and/or provide grounds for invoking a waiver.

9.2 PRIMARY BALANCING CRITERIA

The following five criteria are utilized to compare and evaluate the elements of one alternative to another that meet the threshold criteria:

- **Long-term effectiveness and permanence** assesses alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.

- **Reduction of mobility, toxicity, or volume through treatment** addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.

- **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment.

- **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- **Cost** addresses the estimated capital and O&M costs on a present-worth basis.

9.3 Modifying Criteria

The modifying criteria are used on the final evaluation of remedial alternatives after Plattsburgh AFB has received public comment on the RI/FS and Proposed Plan.

- **State acceptance** addresses the state's position and key concerns related to the preferred alternative and other alternatives, including the state's comments on ARARs or the proposed use of waivers.

- **Community acceptance** addresses the public's general response to the alternatives described in the RI/FS and Proposed Plan.

A detailed tabular assessment of each alternative according to the nine criteria can be found in Tables 6-4, 6-7, and 6-9 of the FS report. Following the detailed analysis of each individual alternative, a comparative analysis, focusing on the relative performance of each alternative against the nine criteria, was conducted. This comparative analysis can be found in Table 7-1 of the FS report (ABB-ES, 1992b).

9.4 Comparative Analysis of Alternatives Summary

The subsection below presents the nine criteria and a brief narrative summary of the alternatives and their strengths and weaknesses according to the detailed and comparative analyses.

9.4.1 Overall Protection of Human Health and the Environment

Alternative 1, the No Action Alternative, would not include any measures to protect human health or the environment. Alternatives 2 and 3 would both minimize the potential human health and ecological risks associated with surface soil exposures. Alternatives 2 and 3 would both reduce precipitation infiltrating to the landfilled wastes and subsequently reduce the potential for contaminants to migrate from waste material. The low-permeability barrier layer associated with the Alternative 3 cover system would reduce the precipitation infiltration and the potential for contaminant migration from waste material to a greater degree than the Alternative 2 cover system.

9.4.2 Compliance with Applicable or Relevant and Appropriate Requirements

All of the alternatives comply with provisions of the Clean Air Act, New York Ambient Air Quality Standards, and Occupational Safety and Health Administration regulations.

Alternatives 2 and 3 would comply with the surface water runoff management, topsoil thickness, post-closure care, and groundwater monitoring relevant and appropriate requirements of the New York Regulations for solid waste landfills (6 NYCRR Part 360). Alternative 3 would also meet the relevant and appropriate requirements of Part 360 for a gas-venting layer, a low-permeability barrier layer, and a barrier protection layer. Alternative 1 would not meet the Part 360 requirements.

9.4.3 Long-term Effectiveness and Permanence

Alternative 1 would provide the least long-term protection because no remedial measures would be implemented to reduce, eliminate, or control access to contaminated media. Some animals would remain at risk from exposure to pesticides at LF-022 surface soil. Alternative 2 provides long-range protection of human health and effectively reduces ecological risks by covering contaminated surface soil with a 12-inch soil barrier and seeding the new topsoil. The cover would also reduce the

amount of precipitation reaching the landfilled wastes. The post-closure monitoring program would maintain the cover system. Alternative 3 provides the greatest long-term effectiveness because the cover system is the least permeable and it reduces the amount of water infiltrating to landfilled wastes. The post-closure monitoring program would also maintain the cover system.

9.4.4 Reduction of Mobility, Toxicity, or Volume of Contaminants through Treatment

Reduction of Mobility, Toxicity, or Volume of Contaminants through Treatment are three principal measures of the overall performance of an alternative. This criterion essentially does not apply to the source control alternatives evaluated for LF-022, because treatment would not be employed as a principal element. Treatment is a statutory preference under CERCLA; however, cover systems are often more appropriate for landfill sites such as LF-022.

9.4.5 Short-term Effectiveness

No short-term impacts are anticipated for Alternative 1 because remedial actions would not be implemented. Because Alternatives 2 and 3 involve removing existing vegetation and grading the landfill surface, dust containing pesticides could be generated and inhaled by on-site workers. Dust suppression measures and worker protective equipment would minimize this. Alternatives 2 and 3 would result in similar direct short-term impacts to potential ecological receptors from clearing and grubbing activities.

9.4.6 Implementability

Alternative 1 would be readily implementable because no remedial actions would be conducted. The implementability of Alternatives 2 and 3 would be similar; however, a suitable borrow source for the low-permeability hydraulic barrier material must be identified before implementation of Alternative 3, unless a synthetic liner is used.

9.4.7 Cost

Alternative 1 would be the least expensive because it would involve no remedial actions. Alternative 3 would be the most costly of the two cover system alternatives; however, the increased cost is associated primarily with the hydraulic barrier cover materials.

9.4.8 State Acceptance

The State Acceptance criterion has been addressed by incorporating comments received from NYSDEC, on behalf of the state, into the Proposed Plan. The state has had the opportunity to review and comment on all documents produced for LF-022.

9.4.9 Community Acceptance

Plattsburgh AFB has not received public comment on the LF-022 Proposed Plan. If the public had commented on the Proposed Plan, the comments would have been addressed in the Responsiveness Summary attached as an appendix to this ROD.

10.0 THE SELECTED REMEDY

Plattsburgh AFB has chosen Alternative 2 as the selected alternative to address source control for LF-022. Source remediation at LF-022 will be consistent with future groundwater remedies and will mitigate releases of hazardous substances from the former landfill to groundwater.

10.1 CLEAN-UP LEVELS

Clean-up levels have not been established for the surface soil contaminants of concern identified in the baseline risk assessment that were found to pose an unacceptable risk to either human health or the environment. Chemical-specific ARARs are not available for contaminants in soil. In the absence of a chemical specific ARAR, or other suitable criteria to be considered, a 10^{-6} excess cancer risk level for carcinogenic effects or a concentration corresponding to an HI of 1.0 for compounds with noncarcinogenic effects is typically used to set clean-up levels. In this case, risk-based target clean-up levels were not developed because discrete source areas (i.e., hot spots) were not found. Remedial alternatives developed for LF-022 included containment options to address the entire landfill area and treatment options to address all landfilled soil and waste. These alternatives were developed to address mitigation of surface soil risks.

Periodic assessments of the protection afforded by remedial actions will be made as the remedy is being implemented and at the completion of the remedial action. If the source control remedial action is not found to be protective, further action shall be required.

10.2 DESCRIPTION OF REMEDIAL COMPONENTS

Alternative 2, Site Grading and Vegetation Establishment for Closure, consists primarily of placing 12 inches of soil over the landfill and planting it with grass to achieve the response objective identified in Section 7.0 of this document.

Existing vegetation such as trees and brush would be cleared, grubbed, and removed from the site. The cleared site would be regraded to control rainwater runoff and minimize erosion.

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Six inches of compacted common borrow covered by 6 inches of topsoil would be laid down to support grass growth, which, through enhanced evapotranspiration, will reduce the amount of precipitation reaching the buried waste. Consequently, the potential for contaminants to migrate from buried waste will be reduced. Additional fill for design subgrade elevations would consist of common borrow or regraded site soils. Figures 5 through 7 illustrate the proposed final grading schematic, proposed cover system cross-section, and the proposed cover system components for Alternative 2.

A post-closure plan will be developed specifying the inspection, monitoring, and maintenance programs for the closed landfill to be continued for 30 years. These post-closure activities will be subject to five-year site reviews as required by the NCP when contaminants remain at a site. In addition, institutional controls for this site will be incorporated into the Plattsburgh AFB Comprehensive Plan. This will ensure that future owners will be made aware of the landfill location and are informed that the integrity of the final cover or any other component of the containment or monitoring system must not be compromised.

11.0 STATUTORY DETERMINATIONS

The remedial action selected for implementation at LF-022 is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs, and is cost-effective. The selected remedy uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable for this site. However, it (as well as the other alternatives evaluated) does not satisfy the statutory preference for treatment which permanently and significantly reduces the mobility, toxicity or volume of hazardous substances as a principal element.

11.1 THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT

The remedy at LF-022 will permanently reduce the risks posed to human health and the environment by eliminating, reducing, or controlling exposures to human and environmental receptors through engineering controls (i.e., reduced permeability vegetation cover system). Moreover, the selected remedy will reduce infiltration of precipitation into landfilled waste material and minimize the potential for contaminant migration from waste materials. Finally, implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts because the selected remedy includes elements to mitigate potential impacts (e.g., erosion control measures, and maintenance and monitoring programs).

11.2 THE SELECTED REMEDY ATTAINS ARARS

This remedy will attain all applicable or relevant and appropriate federal and state requirements that apply to the site and selected remedy. Environmental laws from which ARARs for the selected source control remedial action are derived, and the specific ARARs, are listed below.

Applicable or Relevant and Appropriate Requirements:

Location-specific:

No location-specific ARARs apply to site LF-022.

Chemical-specific:

No federal or state chemical-specific ARARs have been promulgated for contaminants in soil. However, the following chemical-specific ARARs and guidelines pertain to potential air emissions resulting from construction activities at the site:

- Clean Air Act (40 CFR Part 50), applicable for particulate matter (e.g., fugitive dusts) entrained in air during clearing, grading, cover system construction activities.

- NYSDEC Ambient Air Quality Standards (6 NYCRR Part 257), applicable for particulate matter (e.g., fugitive dusts) entrained in air during clearing, grading, and cover system construction activities.

Action-specific:

- NYSDEC Solid Waste Management Facility Rules (6 NYCRR Part 360), applicable to solid waste landfills, specifies closure and post-closure criteria.

- Clean Air Act (40 CFR Part 50), applicable for particulate matter (e.g., fugitive dusts) entrained in air during clearing, grading, and cover system construction activities.

- Occupational Safety and Health Administration Regulations (29 CFR Parts 1904, 1910, and 1916), applicable for all work conducted on site.

- NYSDEC Groundwater Classification and Water Quality Standards (6 NYCRR Parts 701 and 703), promulgated for iron and manganese, are exceeded in LF-022 groundwater. However, the results of the baseline risk assessment provide the rationale for not developing groundwater response objectives (see Section 6.0).

- New York State Department of Health Drinking Water Supplies (10 NYCRR Chapter 5, Subpart 5-1) standards for iron and manganese are exceeded in LF-022 groundwater. However, the results of the baseline risk assessment provide the rationale for not developing remedial response objectives (see Section 6.0).

- NYSDEC Division of Air Resources Regulations (6 NYCRR Parts 200-202, 257), applicable for particulate matter (e.g., fugitive dusts) entrained in air during clearing, grading, and cover system construction activities.

A more detailed discussion of why these requirements are applicable or relevant and appropriate may be found in the FS report on pages 3-1 through 3-8, and 4-7 through 4-10. Within these pages of the FS report, other laws that are not applicable or relevant and appropriate to this site are discussed and the rationale for their exclusion as ARARs is presented.

Federal Nonregulatory Criteria:

In addition to the federal and state ARARs, federal non-promulgated advisories or guidance must be considered when ARARs for specific contaminants are not available. The following policies, criteria, and guidance to be considered in the baseline risk assessment for LF-022 are USEPA Health Advisories, USEPA reference doses (RfDs), and USEPA Human Health Assessment Group Cancer Slope Factors.

11.3 THE SELECTED REMEDIAL ACTION IS COST-EFFECTIVE

In Plattsburgh AFB's judgment, the selected remedy is cost-effective (i.e., the remedy affords overall effectiveness proportional to its costs). In selecting this remedy, once Plattsburgh AFB identified alternatives that are protective of human health and the environment and that attain ARARs, Plattsburgh AFB evaluated the overall effectiveness of each alternative by assessing the relevant three criteria: long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness, in combination. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs. The costs of this remedial alternative are:

Estimated Capital Cost: $1,248,000

Estimated O&M Costs (30 years, net present worth): $866,000

Estimated Total Costs (30 years, net present worth): $2,114,000

Alternative 2 is considered the most cost-effective alternative because it provides the protection against contact with surface soil contamination. Alternative 2 is similar to Alternative 3 in regard to short-term impacts. None of the alternatives evaluated in detail include a treatment component.

11.1 THE SELECTED REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the source control remedial action, and is cost-effective. The selected remedy uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable for this site.

The source control remedy was selected by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: (1) long-term effectiveness and permanence; (2) reduction of mobility, toxicity, or volume through treatment; (3) short-term effectiveness; (4) implementability; and (5) cost. The balancing test emphasized long-term effectiveness and permanence and the reduction of toxicity, mobility and volume through treatment; and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance. The selected remedy provides the best balance of trade-offs among the alternatives.

The principal element of the selected remedy is source control. This element addresses the primary threat at LF-022: environmental risks associated with surface soil contamination. The selected remedy was chosen primarily because it affords protection to human health and the environment. The short-term effects of implementing the selected remedy are comparable to Alternative 3. None of the three source control alternatives evaluated in the FS included a treatment component to reduce mobility, toxicity, or volume.

The selected alternative complies with state regulations governing closure and post-closure of solid waste landfills, and NYSDEC has had the opportunity to review and comment on all documents produced for LF-022. State and public comments received on the LF-022 FS and Proposed Plan to date have been incorporated into this ROD.

11.5 THE SELECTED REMEDY DOES NOT SATISFY THE PREFERENCE FOR TREATMENT WHICH PERMANENTLY AND SIGNIFICANTLY REDUCES THE TOXICITY, MOBILITY OR VOLUME OF THE HAZARDOUS SUBSTANCES AS A PRINCIPAL ELEMENT

Because treatment of the principal threats at the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. Treatment technologies were considered during the identification of remedial technologies and the development and initial screening of alternatives, but were considered to be infeasible for the LF-022 landfill site. The size of the landfill and the fact that there are no on-site hot spots that represent the major sources of contamination preclude a remedy in which contaminants could be excavated and treated effectively.

12.0 DOCUMENTATION OF NO SIGNIFICANT CHANGES

Plattsburgh AFB presented a Draft Final Source Control Proposed Plan for the preferred alternative for remediation of LF-022 in August 1992. The preferred alternative for source control included:

1. Clearing and grubbing of the site
2. Surface water runoff management to minimize erosion of the cover and minimize maintenance requirements
3. Cover thickness establishment
4. Vegetation establishment to minimize erosion of the final cover and enhance evapotranspiration
5. Post-closure plan development to monitor, maintain, and inspect the site
6. Groundwater monitoring
7. Five-year site reviews

The chosen remedial action does not differ from the preferred alternative presented in the Proposed Plan.

13.0 REGULATORY ROLE

The EPA and NYSDEC has reviewed the various alternatives and have indicated their support for the selected remedy. The EPA and NYSDEC have also reviewed the RI, risk assessment and FS to determine if the selected remedy is in compliance with applicable or relevant and appropriate federal and New York State environmental laws and regulations. The EPA and NYSDEC concur with the selected remedy for LF-022. The EPA indicates its concurrence with the LF-022 ROD by cosigning the document with Plattsburgh AFB. A copy of the NYSDEC declaration of concurrence is attached as Appendix B.

ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
AFB	Air Force Base
ARAR	Applicable or Relevant and Appropriate Requirement
BEHP	bis(2-ethyhexl)phthalate
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (the Superfund statute)
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DERP	Defense Environmental Restoration Program
DOE	Department of Energy
ERA	environmental risk assessment
FS	Feasibility Study
HI	Hazard Index
IAG	Interagency Agreement
IRP	Installation Restoration Program
MMES	Martin Marietta Energy Systems, Inc.
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
PDE	Potential Dietary Exposure
RfD	reference dose
RI	Remedial Investigation
ROD	Record of Decision
RTV	Reference Toxicity Value

ACRONYMS

SAC	Strategic Air Command
SI	Site Inspection
SVOC	semivolatile organic compound
TRC	Technical Review Committee
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

REFERENCES

ABB Environmental Services (ABB-ES), 1992a. "Installation Restoration Program (Remedial Investigation/Feasibility Study) at Plattsburgh Air Force Base, New York; Final LF-022/LF-[illegible] Remedial Investigation Report"; ABB Environmental Services,Inc., Portland, Maine; February 1992.

New York State Department of Environmental Conservation (NYSDEC), 1989. "Habitat-Based Assessment Guidance Document for Conducting Environmental Risk Assessments at Hazardous Waste Sites"; Draft Division of Technical and Administrative Guidance Memorandum (TAGM); December 28, 1989.

U.S. Environmental Protection Agency (USEPA), 1986. "Hazard Evaluation Division Standard Evaluation Procedure: Ecological Risk Assessment"; Office of Pesticide Programs; EPA-540/9-85-001; Washington, DC; June 1986.

U.S. Environmental Protection Agency (USEPA), 1989a. "Risk Assessment Guidance for Superfund: Volume 2 - Environmental Evaluation Manual"; Interim Final; Office of Emergency and Remedial Response; EPA/540/1-89/001; Washington, D.C.; March 1989.

U.S. Environmental Protection Agency (USEPA), 1989b. "Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part A); Interim Final"; Office of Emergency and Remedial Response, EPA/540/1-89/002; Washington, D.C.; December 1989.

U.S. Environmental Protection Agency (USEPA), 1990. "Streamlining the RI/FS for CERCLA Municipal Landfill Sites"; Office of Emergency and Remedial Response Hazardous Site Control Division; Washington, D.C.; September 1990.

APPENDIX A - ADMINISTRATIVE RECORD INDEX

PLATTSBURGH AFB ADMINISTRATIVE RECORD DOCUMENT INDEX
SITE LF-022

DOC #	TYPE	SUBJECT	Author	TO	DATE
LF-022		1.0 Site Identification			
1.10	R	IRP Records Search-see Doc [illegible]	Radian Corp, McLean VA	Plattsburgh AFB	[illegible]
		2.0 Site Inspection			
2.01	[illegible]	See document No M-8, Site Inspection Report	E.C. Jordan Co Portland	Plattsburgh AFB, NY	JUL 89
2.02	[illegible]	See document No M-9, Appendix I			JUL 89
2.03	[illegible]	See document No M-10, Appendix II			JUL 89
		3.0 Remedial Investigation (RI)			
		3.1 Sampling and Analysis--see also LF-022/LF-023 RI Report Appendices-LF-022 3.48			
3.10	D	LF-022/LF-023 RI Report-Laboratory blank data	ABB Env. Svcs, Inc.	Doug Draper, HAZWRAP	13 NOV 91
3.11	L	LF-022 Surface soil pesticides/pcb samples	J. Huru, PE, PAFB	J. Lister, PE, NYSDEC	11 DEC 91
3.12	L	LF-022 Surface soil pesticides/pcb samples	J. Huru, PE, PAFB	Wm. Roach, PE, USEPA	11 DEC 91
3.13	D	LF-022 Surf. soil pesticides/pcb samples data	ABB Env. Svcs, Inc.	Doug Draper, HAZWRAP	11 DEC 91
3.14	L	Validated sample results- LF-022 and LF-023	Col. Hrapla, PAFB	Wm. Roach, PE, USEPA	13 FEB 92
3.15	L	Validated sample results- LF-022 and LF-023	Col. Hrapla, PAFB	J Lister, PE, NYSDEC	13 FEB 92
		3.4 RI reports and comments			
3.40	L	NYSDEC Comments on LF-022/LF-023 RI Report	J Lister, PE, NYSDEC	P.Von Bargen, PAFB	15 OCT 91
3.41	L	Resp. to Comments on LF-022/LF-023 RI Report	J. Huru, PE, PAFB	Wm. Roach, PE, USEPA	31 DEC 91
3.42	L	Resp. to EPA Comments on LF-022/023 RI Report	J. Huru, PE, PAFB	J Lister, PE, NYSDEC	31 DEC 91
3.43	[illegible]	Meeting Minutes, LF-022/LF-023 RI/FS	Plattsburgh AFB	Attendees	04 MAR 92
3.44	L	NYSDEC comments-LF-022/LF-023 Final RI Report	J Lister, PE, NYSDEC	Al Rascoe, PE, PAFB	23 MAR 92
3.45	L	USEPA comments-LF-022/LF-023 Final RI Report	Wm. Roach, PE, USEPA	P. Maloy, PAFB	26 MAR 92
3.46	L	EPA approval of LF-022/LF-023 Final RI Report	Wm. Roach, PE, USEPA	Al Rascoe, PE, PAFB	08 APR 92
3.47	R	LF-022/LF-023 RI Report-Final	ABB Env. Svcs, Inc.	Plattsburgh AFB	FEB 92
3.48	R	LF-022/LF-023 RI Report-Final-Appendices	ABB Env. Svcs, Inc.	Plattsburgh AFB	FEB 92
		4.0 Feasibility Study (FS)			
4.05	L	Identification of ARARS for LF-022 and LF-023	ABB Env. Svcs, Inc.	Doug Draper, HAZWRAP	26 SEP 91
4.10	L	NYSDEC Comments on LF-022 Draft FS	J Lister, PE, NYSDEC	Al Rascoe, PE, PAFB	18 FEB 92
4.11	R	Landfill LF-022 FS Report Draft Final	ABB Env. Svcs, Inc.	Plattsburgh AFB	APR 92
4.20	R	Landfill LF-022 Proposed Remedial Action Plan	ABB Env. Svcs, Inc.	Plattsburgh AFB	JUN 92
4.21	L	NYSDEC Comments on LF-022 Draft PRAP	Michael J O'Toole NYSDEC	Al Rascoe, PE, PAFB	3 JUN 92
		8.0 Health Assessments			
8.10	L,R	Landfill LF-022/LF-023 Risk Assessment, based on unfiltered sampling results	J. Huru, PE, PAFB	Wm. Roach, PE, USEPA	15 JUN 92
			J. Huru, PE, PAFB	J Lister, PE, NYSDEC	15 JUN 92

NOTE: TYPE BLOCK MEANINGS-- L=Letter M=Message D=Data R=Report

APPENDIX B - STATE LETTER OF CONCURRENCE

The State letter of concurrence will be placed here after NYSDEC reviews and concurs with the Draft Final ROD

APPENDIX C - PUBLIC MEETING TRANSCRIPT

TRANSCRIPT OF TOWN MEETING AUGUST 4, 1992

LT. LIAS: We simply stated to the reporters that we're very concerned. We're going to restore. We're going to comply. (inaudible) And we're very proud of our accomplishments in these areas, and I'll mention two of those here in a second. Hopefully, you're all familiar with them. The other goal that we had related to the community. We want to be good neighbors. We are members and we are co-inhabitants of the lovely north country, wedged here between Lake Champlain and the Adirondacks. And to be a good neighbor, we've got to be just as kind to the environment as possible. So, those are our goals. They're right up there with the rest of our goals, and we take them very seriously. The (inaudible) this past year are a team of real professionals working on environmental issues and they've won numerous awards. And I'm going to have to get a card to read them because I can't remember them all. The Strategic Air Command in 1991, they won the Thomas E. White award competition for winner of the installation individual awards for environmental compliance; winner of the installation individual awards for environmental restoration. We won the installation individual awards for pollution prevention. At the Air Force level, we won the installation award for environmental compliance. We also received honorable mentions in the award for pollution--environmental restoration, pollution prevention. And at the Department of Defense level, we're currently competing for the 1991 Thomas E. White award for--installation award environmental compliance. We're keeping our fingers crossed, because we know that we're a leading force in that competition, and we're very proud of it. And our people are very proud of that because it takes more than just our environmental technicians that work in Civil Engineering. It takes (inaudible) wrench bender who works down in the maintenance shops to be aware. It takes the guys--our civilians that worked here for years to bring areas of possible problems to the staff, our environmental people, and we go out there and research it. (inaudible) talk about it tonight. The purpose of this meeting is to inform the people of our findings and our recommended remedies, and the environmental impacts of our selected remedial alternatives regarding two landfills. And I'll turn it over to our experts. Hopefully, you'll find (inaudible).

PURSER: Thank you, sir. My name is Lieutenant Darren Purser and I'm the Deputy Chief of Public Affairs here at Plattsburgh Air Force Base. Basically, I just wanted to introduce you to the speakers, as well as some of our guests. To my left is Mr. Phil Von Bargen, who is our IRP remedial project manager, Ms. Rachel Becker, our IRP chemical engineer, and in the audience we're pleased to have Mr. Jim Lister, a state regulator, Mr. Bill Roach with the EPA, and Mr. Tom Lawson from URS, which is one of our engineering facilities. At this point,

[illegible]: Basically, I wanted to run down the basic community involvement between us and our neighbors regarding the IRP, one of which is fact sheets. We've had a series of fact sheets in print, and tonight we are releasing four more. It basically gives an overview and kind of sums up what the IRP program is all about. The administrative record is here at Plattsburgh Air Force Base and contains all the documents leading up to remedial as well as removal actions. The information repository is a condensed version of this record and that is available at the Plattsburgh Public Library. Quarterly TRC meetings, one which met on the 16th of last month--they did a site tour and visited I believe seven sites. And the TRC is made up of local community leaders, as well as our base environmental group, and again, the state and federal regulators. News releases--anytime the program reaches a milestone or a note of interest, we have varied channels with the local media so there is very good communication at that end. Public meetings like the one we're having tonight kicks off what is a 30 day comment period in which we invite the public to offer their input into projects that we are undergoing, and these are all included in the final decision. The mailing list--if you signed the sign-up sheet, you'll be added to the IRP mailing list. And again, anytime there is notes of interest or important information, we like to stay in close touch. And at this point, I'm going to turn it over to Mr. Von Bargen and he will give you the breakdown of our program.

VONBARGEN: Thank you. We'll work right from the overhead. First, I'd like to start off with just a simple overview of the Installation Restoration Program, and that's to explain what its purpose is. And that's simply to identify, investigate, evaluate, and preempt any task releases that are necessary to do so. Our process is driven by the CERCLA legislation of 1980, and that was reauthorized in 1986. It was that legislation that created the National Priority List process, of which Plattsburgh Air Force Base was proposed to be on that list in July of 1989, and was final on that list in November of 1989. That puts us as a priority site among locations across the United States to deal with these environmental releases. Along with that then we have a Federal Facilities Agreement, which became effective on 12 September 1991. And that was an agreement that was entered between the Air Force, the USEPA and the State of New York. And that Federal Facilities Agreement then drives the process by which we deal with each and every site on of Plattsburgh Air Force Base. It's broken up very simply into these four stages--identification, investigation, cleanup, and then eventually the closeout of that site. We currently are working--at this public meeting right here--we're in that stage of which we've gone out and investigated these two landfills, documented our findings, and then evaluated the number alternatives, of which we're going to be addressing tonight, and then come up with an Air Force preferred remedy that we're putting up for public

VONGARGEN: comment and con[illegible]tation and concurrence, with the State of New York and the USEPA ... what we're dealing with tonight are the investigative and feasibility stages of this process. Resources to get this projects moving along--the Department of Defense has its own separate account, that is an analogous to like the superfund account. We have here at the base an environmental management flight where we have a staff of approximately 17 people working in the Civil Engineering Squadron under the direct leadership of the Environmental Protection Committee Chairman, Colonel Lias. We have our Environmental Working Group, members of which are here tonight, that meets on a bi-weekly basis and goes over these issues with our sites. We have other government agencies involved, which is obvious with the State of New York and USEPA here. We also have the Army Corp of Engineers and the Department of Energy, and then finally, we have our engineering contractors, from which we go ahead and procure--receive services from under a contractual relationship. Okay. Well, this particular program then is moving in the direction that the two sites that we're working with tonight--well, actually this is a map of 24 sites, and we're working tonight with sites--landfills 22 and 23, which are located on the west side of the base. Now, I'm going to go right into a little bit of background about landfill 23. And what we're going to do is we're going to treat each landfill separately. So, right now we'll address landfill 23. This site was active from 1966 until 1981, and it received residential and municipal waste. And I want to clarify that, that municipal waste is totally from the base facility itself, not from any outside entities. Now, these wastes were deposited into trenches, which were approximately 25 feet and were covered daily. Hazardous wastes were not routinely disposed of in this landfill. However, in our phase I records search, there was a report of a suspected incident of hazardous material being disposed of in the landfill. Ground water associated with this landfill, I do want to mention, is being treated separately. However, the remedy that we select for the landfill unit itself is going to kind of address some of the problems associated with ground water. However, there is a feasibility study process being conducted just for that ground water unit itself. Okay. Well, what kind of activities have occurred there? Again, I go back to 1985, a phase I records search, at which there were interviews that were conducted. A site inspection was performed and documented in July of 1989, when we went out and confirmed basically that there was ground water contamination and some wastes were identified at that time. A remedial investigation was then performed, with the final report being released this past February, and then the feasibility study report, which Rachel--which Ms. Becker will be talking about in a little while. And that feasibility study, which evaluates a number of alternatives, then has a selected remedy that is put forth in a proposed plan, which is what is open for public comment right now. Actually, the feasibility study and the proposed plan are both up for public comment. Okay. Well, very quickly, the type of events that took place to investigate the site involved the

NBARDEN: surface soils, subsurface soils, ground water, the surface water associated with [illegible]--a distance away from the site, the actual waste material in the landfill, and some sediments in some seepage areas south of that landfill. The methods that we used to determine what the extent of the landfill was included test trenching, a seismic survey to give us a profile of the geology at the site, a magnetometer survey where we went out and looked for metal anomalies to see if there were any sites of perhaps buried drums, discreet soil sampling, composite sampling of the soils at the surface, a passive soil gas study, and ground water testing. And all of that information is contained in the remedial investigation report. Okay. Well, our findings--basically, we identified 16 different semi-volitile organic compounds in the surface soils, and we also found some trace silver. And one sample has a trace level of PCB, which was about 220 parts per billion. Test trenches dug show that the waste included bagged household trash, construction debris, and scrap metal. And there were no anomalies such as buried drums in large quantities found there. A nearby seep in the water sample included aluminum, arsenic, zinc, and iron. Also, in the sediment sample located near--by that surface water sample were some (inaudible) Again, I do mention that the ground water is being treated separately at this site. And the general conclusions that we can make about this particular landfill were that we found no areas of concentrated elevations that we considered to be hot spots of any signifance were found in that site. Our primary concern at that landfill is surface soil and minimizing infiltration of rainfall through that landfill basin. At this point, Ms. Becker is going to give us an overview and information pertaining to a risk assessment and a feasibility study process and that result.

BECKER: Thanks, Phil. After we obtained the data from our remedial investigation, we proceed on in the process by performing a risk assessment. And risk assessments are basically performed to determine whether remedial action at a site is necessary. These are broken into two groups. There is a human health risk assessment and a habitat risk assessment, which are further broken down into risk groups. There is carcinogenic risk, the non-carcinogenic risk for humans, and the acute risks and chronic risks for the environmental based risk assessment. The EPA has determined that a risk value for carcinogenic risk of 10 to the negative 6 to 10 to the negative 4 is considered acceptable. This is basically a unitless probability of any adverse effects occurring for a population. This level has been determined to be acceptable. In addition, the non-carcinogenic risk is measured as a hazard index, and a hazard index of less than one is considered acceptable. For the ecological risk, it's broken down just a little bit differently. A hazard index of less than .1 indicates that no possible effects will occur. A hazard index between .1 and 10 indicates that possible adverse effects may occur, and a hazard index greater than 10 indicates that probable adverse effects may occur to some individuals.

[illegible]ER: There are handouts on the table that break this process down in a little bit more detail. But, just for simplicity, I'd generalize that the risk rankings, according to the different scenarios that we looked at--part of the risk assessment is developing scenarios in order to assess the risk. And based on landfill 20, we have three risk scenarios. One involves the security police, which use an obstacle course that's located on this landfill. Another is that of a child trespasser. And we also include a hypothetical future resident in our risk evaluation to ensure that we're looking in the long term. Based on these numbers, the security police and child trespasser risks are within acceptable levels. However, the future resident does show an unacceptable risk based on EPA risk levels for carcinogenic risk as well as non-carcinogenic risk for children. For the ecological assessment, we looked at several receptors that we felt were representative of our landfills. These were the white footed mouse, the wood thrush, the garter snake, and red fox, as well as the red tail hawk. And we tried to take a nice representative of carnivores as well as birds and things of that nature. And based on our risk assessment, which again is in more detail in the handout, it indicates that the hazard index is primarily between .1 and 10, which means that possible effects could occur to some individuals. However, wide-spread population effects were not anticipated. After we get done the risk assessment, we determine whether remedial action is necessary. In this case, we have determined that it is. The first thing that we need to do is develop remedial response objectives. With those objectives, we develop a string of alternatives, screening the ones out that we don't feel are appropriate for the site, analyze the several alternatives we pick, and then compare them to chose our preferred alternative. For this site we developed several objectives. Primarily, they're based on minimizing the potential threat and future human and ecological risks of the contaminants found on site, as well as minimize the infiltration of parcipitation through the waste and into the ground water, which is what Phil was trying to impress upon you. The purpose of this feasibility study is not to clean up the ground water. However, it addresses source control aspects of the landfill. Thereby, one of our objectives being preventing more migration through the waste and into the ground water. From our objectives, we came up with several alternatives. One is no action, which includes just monitoring the site. The second one is site grading and a vegetation establisnment, which is just basically adding approximately a foot of soil and putting a vegetative cover. Installation of a low permeability barrier cover system, which entails a lot more soil as well as an impermeable membrane. Excavation and incineration means basically removing all the waste and destroying it through incineration. And stablization/solidification, which is an on-site process of solidifying the waste in place. We screened these alternatives using essentially three different criteria, that is, effectiveness, implimentability, and cost.

COVER This is our way of not having to spend a lot of time evaluating alternatives that probably won't be applicable to the site. And based on our evaluation, we determined that the no action vegetative cover and the permeability cover systems were the most appropriate for our site because excavation and incineration and stabilization solidification are really dependent upon having hot spots or things of that nature. It also entails a lot of extra excavation that may--may bring short term effects to the workers in the area. And we didn't feel that it was any more protective than the other three alternatives, in addition to its being extremely costly. Our three alternatives were evaluated using nine criteria. Basically, the nine criteria is to evaluate whether it is protective of human health and the environment, its permanence and long-term effectiveness, it's implement-ability cost, and compliance with regulations. In addition, the last two criteria are state acceptance and the community acceptance. At this point, we have gotten concurrence from the State and EPA on our preferred alternative, and the community acceptance criteria will be evaluated after all community comments have been submitted. Based on our evaluations, Plattsburgh Air Force Base feels that the preferred remedial alternative is alternative three, the installation of a low permeability variable cover system, which in addition to it being very protective, it also fulfills the Part 360 New York State requirement. It provides overall protection of human health and the environment. It provides long-term effectiveness. And it has the greatest effect on reducing the potential for additional contaminants to migrate through the waste into the ground water at this landfill. And at this point, that concludes the presentation on landfill 23. And Mr. Von Bargen will come back and brief the background on landfill 22.

VONBARGEN: There are--aside from the background, there are a lot of similarities between the two landfills as we progress along here. The age of this landfill is slightly older. It was active from 1959 through 1966. It again also received primarily residential and again, waste from the base entity, in trenched cells. It also reportedly received sludge waste from our base industrial waste water pretreatment facility, which was basically a kind of oil and water separator process. And sludges from that, as they were put out into tanks, were then just apparently disposed of over in that landfill. It also received spent aircraft starter cartriges, which were at one time thought to have been the disposition of munitions waste. However, it really was aircraft starter cartriges. Again, the process is very similar to the landfill 23. This site was looked at in the phase I report in 1985. However, at that time, it was not ranked--it was not considered for further action. In reevaluating the records and understanding the waste water treatment facilities operations and the waste going over there, we reconsidered that site in the site inspection stage. We went out and did some sampling of the waste and thought that we needed to go

HARRIS: farther into a remedial investigation report. That was finalized in February of 92, just recently, and that identifies the nature and extent of the contamination we found in that report. It also contains the risk assessment that Miss Becker speaks about. The feasibility study report was just recently completed, which identifies the various alternatives that were considered. And then the proposed plan, which is being put out right now, is for the recommended remedy for that site, and Rachel Becker will speak about that. And again, what did we do out there. It was somewhat similar, except that at this particular site, we didn't have surface water and sediments to go out and sample, but we sampled the surface soil and subsurface ground water, and the waste. We used very similar techniques as we did over at landfill 23. And our findings for this particular landfill were--in this case, there were no volitile or semi-volitile organic compounds in the surface soils. There was DDT, a pesticide, detected at less than 20 parts per million in the surface soils. The wastes themselves were analyzed and detected carbon tetrochloride and choiroform. This (inaudible) petroleum hydrocarbons and (inaudible) metals. However, the only contaminant that was site related for basically throughout the site was lead. Our general conclusion would be, again, that there are no zones of elevated contamination or what are known as hot spots, and that we also believe that the site condition--the low oxygen site conditions which are typical of many landfills may be increasing the solubility of the naturally occurring iron and maganese, which are in elevated concentrations at that site. I should also say that the ground water--and I don't see it on the bullet there--that the ground water did have levels of--levels of iron and maganese that exceeded New York State ground water standards. And again, that may be because of the anerobic conditions at the site and the iron and maganese that naturally occur going into the solution, or it could also possibly be from metals that are rusting away basically at the landfill site. There also--we don't believe that there is any horizontal--or limited horizontal migration of site contaminants at that particular landfill. Ms. Becker now is going to go into--again, the site risks and the feasibility study leading to a recommended perferred alternative.

BECKER: This is basically the same as the other site. These are considered acceptable risk levels. And again, for ecological risks we have the three different levels of risks. For landfill 22, we had similar scenarios. There was the child trespasser and the future resident. This risk assessment indicates that the hazard index for the child--for a future resident is borderline. The hazard index is 1, which is considered acceptable. It's the same receptors were elevated for landfill 22 as for landfill 23, with similar results. Our risk assessment determined a few individuals may possibly have adverse effects, but there would be no population problems. And again, we go through the same process for landfill 22 and we did for landfill 23. In fact, all of our sites went through this process to go through the

BECKER: feasibility study process. The remedial response objective for this site was basically to minimize the exposure to pesticides in the surface soil at this site. And again, since most landfills of this nature are similar, we had the same remedial alternatives to evaluate. And again, we evaluated these using the three criteria of effectiveness, implementability, and cost. And not surprising, this screened down to the first three alternatives, the same as we did for landfill 22. After evaluating the three alternatives as in the criteria, that is also identifying in the proposed plan, we determined that alternative two for this landfill was appropriate, the vegetative establishment cover system. We determined this because it provides an overall protection of human health and the environment. It provides long-term effectiveness. It's the least costly of the cover system alternatives, and there are actually less adverse ecological impacts with this particular alternative, since alternatives using geomembranes prevent us from planting trees in the area. These--for the feasibility study process, we develop a feasibility study, and that's also--that's located on the table, if anybody wants to flip through it. It's just basically a detailed version of what I've just told you, and a condensed version of the proposed plan, which everyone is welcome to take. And that is actually what people are to comment on. And that concludes the landfill 22 briefing.

PURSUER: At this point, I'm going to turn it over to Mr. Von Bargen to moderate the question and answer period. Again, the public is invited to give inputs that will be used in the final decision, and comments can be made by either using a comment sheet, which are up here in front by the sign-in table, or they call the Public Affairs office directly. (inaudible)

VON BARGEN: Thank you. We are open to questions.

MEYERS: Can you clear up a little bit the difference between plan 2 and plan 3--alternative 2 and 3?

BEACH: For both sites?

MEYERS: Yeah. What is actually the difference between alternatives 2 and 3?

BECKER: The difference is alternative 2 is strictly a vegetation cover. Basically, it's a matter of placing about a foot of soil on top of the existing soil and establishing vegetation over that to enhance the amount of transporation. It essentially protects receptors from the surface soil itself. On the other hand, alternative 3, the low permeability cover system--in addition to having soil being placed on the surface, has a geomembrane, which is a impermeable--which is a low permeability membrane. It prevents approximately 70 percent of the percipitation from

[illegible]ER: infiltrating through the landfill waste. And in the case of landfill 23, [illegible] our [illegible] objectives to reduce the infiltration. That's why we chose the geomembrane alternative, as opposed to just the vegetative cover for protection of the surface soil.

[illegible]ERS: So, is this like a plastic coating or something like a covering that goes over the--

[illegible]CKER: It goes in between the soil layers. In fact, Tom Lawson could probably give you a little bit more detail on the actual components of the cap.

LAWSON: I'm Tom Lawson. Basically, what alternative 3 is, is a full NYS Part 360 cap. Without getting into all of the design details, this is basically what it does is it's a layered approached. First, what you do is you regrade the landfill so that it has a consistent drainage on the cap, and then what you do is you build up layers, okay. And what you're going to do is first is you're going to put down a varied layer. You want to be able to track (inaudible). And then what is put on top of that is an impermeable layer built up. And then you put a vegetative lawyer on top of that. And the rationale for alternative 3 as opposed to 2, as Rachel mentioned, is because you had concern for landfill 23 being a generator--a waste generator for ground water contamination, so you want to be able to track the source down, and based on that, the perculation rate down from about 13½ inches per year down to about 2½ inches per year based on probability. The necessity for that--alternative 2 for landfill 22 is not the driving force because the big concern of the risk assessment is what we call direct terminal contact, which is like touching your skin or ingestion things in the soil. So that a reason for that (inaudible), which solves the problem for the assessment and also allows (inaudible), which is always a concern when you have landfills that are closed. They weren't closed to state standards because they preclude most state regulations. So, what you want to do is you've got positive readings so you don't want pockets of percipitation laying there. So, that minimum soil grade is 4 percent, and the maximum (inaudible) percent and is generally accepted in New York State.

MEYERS: Did you mention that you won't be able to grow vegetation on level 3, or alternative 3?

VONBARGEN: You would be able to put a grass cover to stabilize the soil.

MEYERS: A grass cover, but you won't be able to plant trees (inaudible)?

VONBARGEN: Right. Because you don't want some--you don't want the root systems of the plant to go down and affect the geotextile membranes that created that lawyer barrier from that infiltration. We should kind of just point out that these two--and Tom did mention--that these two particular landfills were operational

WINBARGEN: and closed at a period of time at which there really wasn't much guidance in terms of how to close these landfills, and that has changed significantly in this day and age today. We're open to your questions.

(inaudible)

MYERS: I had another question regarding--you mentioned the ground water. There are other things that you're going to be doing with the ground water? Can you explain how you're going to be handling that? That's another program or how is that?

WINBARGEN: Well, we have conducted an investigation at that landfill 23 and it has included addressing the ground water as a medium. And we have found at that location that there is ground water contamination in some low levels that we at this time are trying to address the source and whether it is directly from the landfill or maybe perhaps from an outside source. We're trying to assess that situation and determine what might be directly contributed from the landfill itself, and what comes from some other source nearby. The ground water at that particular site moves in a direction towards the runway, in the south to southeasterly direction. The process will be now to look at the issues of what is there in the ground water, and to evaluate what perhaps may be driving--taking an action, whether it will be some state or EPA regulation, something that's driven by risk, and then developing the same process, this selection of remedies, and evaluating them and determining what would be an appropriate action at that site. So, that will be following in the very near future.

ELIAS: I'd like to thank you all for coming. And again, if you haven't signed in, by doing so, you'll be added to the mailing list. I appreciate you all coming out. Thank you very much.

(The meeting was terminated.)

RESPONSIVENESS SUMMARY

The purpose of this Responsiveness Summary is to address comments received during the 3 August 92 through 3 September 92 public comment period for Landfill LF-022. However, no comments from the public were received.