1741 0
File: 18F
M.S.

PLATTSBURGH AFB
NEW YORK

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 1741

682144

SITE FT-002
FIRE TRAINING AREA
SOURCE OPERABLE UNIT

RECORD OF DECISION

Plattsburgh Air Force Base
Installation Restoration Program

prepared for:

United States Department of The Air Force
Plattsburgh Air Force Base
Plattsburgh, New York

Final
March 2001

G3244

SITE FT-002 FIRE TRAINING AREA

SOURCE OPERABLE UNIT

FINAL

RECORD OF DECISION

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

UNITED STATES DEPARTMENT OF THE AIR FORCE
INSTALLATION RESTORATION PROGRAM

Prepared By:

URS CONSULTANTS, INC.

MARCH 2001

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLES

FIGURES

APPENDICES

DECLARATION FOR THE RECORD OF DECISION

Site Name and Location

Plattsburgh Air Force Base
Fire Training Area (FT-002) Source Operable Unit
Plattsburgh, Clinton County New York
EPA ID # NY4571924774

Statement of Basis and Purpose

This Record of Decision (ROD) presents the selected remedial alternative for the Fire Training Area (FT-002) Source Operable Unit at the Plattsburgh Air Force Base (AFB) in Plattsburgh, New York. It has been developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for this site, a copy of which is located at the Information Repository at the Feinburg Library on the campus of the State University of New York at Plattsburgh.

The remedy has been selected by the United States Air Force (USAF) in conjunction with the United States Environmental Protection Agency (USEPA) and with the concurrence of the New York State Department of Environmental Conservation (NYSDEC) pursuant to the Federal Facilities Agreement among the parties under Section 117(a) of CERCLA, dated July 10, 1991. A copy of the NYSDEC concurrence letter is included as Appendix C of this ROD.

Assessment of the Site

The FT-002 site has been divided into two components or operable units (OUs) to facilitate remedial activities. The first operable unit, the Source OU, focuses on product (chemical in pure form, floating on top of groundwater rather than dissolved within it) and contaminated soils at the site (i.e., soils that contain chemicals of concern at concentrations above remediation goals). Percolation of rainwater through

contaminated soils above the water table and dissolution of product has caused contamination of groundwater resources. In addition, product adhering to soil is located below the water table within the zone where the water table has historically fluctuated. Human health risks due to surface soil were found in the remedial investigation (RI) to be within the 10^{-4} to 10^{-6} risk range. It is believed that the general lack of elevated concentrations of volatile and semivolatile organic compounds (VOCs and SVOCs) is due to volatilization, biodegradation, and leaching. Elevated levels of lead and copper detected in surface soil during the RI were found to cause significant risks to ecological receptors in the Ecological Risk Assessment. However, seventy surface soil samples were collected and analyzed for copper and lead after the installation of the bioventing and SVE systems. There were no exceedances of EPA's screening level of 400 mg/kg for lead, and only one exceedance of NYSDEC's Soil TAGM for copper (100 mg/kg). Soil located at or near the surface of the site does not require remediation to protect human health and the environment. The remediation of subsurface soils and the recovery of product at FT-002 will lower the concentrations of contaminants in soil to the remediation goals and effectively mitigate the source of groundwater contamination. The clean up and control of groundwater contamination resulting from the FT-002 site is being addressed as part of a separate operable unit, the FT-002/Industrial Area Groundwater OU (Groundwater OU). This ROD addresses only the Source OU. A separate ROD will be executed for the Groundwater OU.

The remedial objectives for the Source OU are 1) to clean up contaminated soil and residual product located in the vadose zone and in the zone of water table fluctuation at the site to concentrations less than or equal to remediation goals set for the site (see Table3) and 2) to recover floating free (pumpable) product at the site to the extent practicable.

The USAF has initiated two separate removal actions at the Fire Training Area in an attempt to reduce the continuing contamination of the groundwater aquifer by attacking the sources of contamination. A Product Recovery Removal Action was implemented at the site in 1993 to remove product floating on top of the groundwater. The product is a mixture of jet fuel, waste oil, and solvents which was poured on the ground, then ignited during fire training exercises. This removal action involved constructing groundwater product recovery wells, installing a dual recovery pump system, and constructing a treatment plant to clean recovered groundwater prior to discharge. This system was upgraded in 1996 to include new recovery wells, new pumps, and improved systems in the treatment plant.

In 1996, a second removal action was implemented at the site to begin remediating the contaminated subsurface soils. Subsurface soil contamination is caused by product adhering to the soil (residual product). The residual product cannot be extracted by the product recovery wells. This second removal action included the use of bioventing to treat all soils exceeding remediation goals, soil vapor extraction (SVE) in areas contaminated by chlorinated compounds, a catalytic oxidizer to control emissions from the SVE system, and water table depression by groundwater extraction (and treatment) to expose residual product near or below the groundwater table.

The response action selected in this ROD is necessary to protect the public health and welfare from releases of hazardous substances into the environment.

Description of the Remedy

Site FT-002 is one of a number of sites administered under the Plattsburgh AFB Installation Restoration Program (IRP). RODs have been signed for twelve operable units at the base, and additional RODs are planned for other IRP sites.

The remedy involves a combination of soil vapor extraction and bioventing of the contaminated soil, free product collection, water table depression enabling remediation of residual product adhering to soil below the water table, hydraulic containment of the remaining source, institutional controls, progress monitoring and sampling, and five-year site reviews in accordance with Section 121(c) of CERCLA. The existing technological components of both ongoing removal actions, with upgrade and expansion, will be utilized by the USAF in the execution of the selected remedy.

Statutory Determinations

The selected remedy for the FT-002 Source OU is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action (ARARs), is cost-effective, and utilizes permanent solutions and resource recovery technologies to the extent practicable. Product removal, SVE with catalytic oxidation, and bioventing are elements of the remedy that will be used to reduce the toxicity, mobility, and volume of site contaminants, thereby satisfying the statutory preference for treatment as a principle element of the remedy. Until soil remediation goals and

groundwater ARARs are achieved (groundwater is to be addressed in a separate OU), contaminants will remain on site above levels that allow for unlimited use and unrestricted exposure. Therefore, a statutory review, according to Section 121 (c) of CERCLA, will be conducted within five years after initiation of the remedial action, and every five years thereafter, to ensure that the remedy is, or will be, protective of human health and the environment.

ROD Data Certification Checklist

The following information is included in this ROD. Additional information can be found in the Administrative Record file for this site.

- Chemicals of concern and their respective concentrations (Section 5.0)
- Baseline risk represented by the chemicals of concern (Section 7.0)
- Cleanup levels established for chemicals of concern and the basis for these levels (Table 3)
- How source materials constituting principal threats are addressed (Section 4.0)
- Current and reasonably anticipated future land use assumptions, and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Sections 6.0 and 7.0)
- Potential land and groundwater use that will be available at the site as a result of the Selected Remedy (Section 6.0)
- Estimated annual operation and maintenance (O&M) costs (Section 9.0)
- Key factors that led to selecting the remedy (Sections 9.0, 10.0, and 12.1)

Albert F. Lowas, Jr. 21 March 2001

Signature ALBERT F. LOWAS, JR. Date:
Director, Air Force Base Conversion Agency

3/30/01

Signature WILLIAM J. MUSZYNSKI, P.E. Date:
Acting Regional Administrator, USEPA Region 2

DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

Plattsburgh AFB, located in Clinton County in northeastern New York State, is bordered on the north by the City of Plattsburgh, the south by the Salmon River, on the west by Interstate 87, 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. Plattsburgh AFB was closed on September 30, 1995 as part of the (third round of) base closures mandated under the Defense Base Closure and Realignment Act of 1993, and its reuse is being administered by the Plattsburgh Airbase Redevelopment Corporation (PARC).

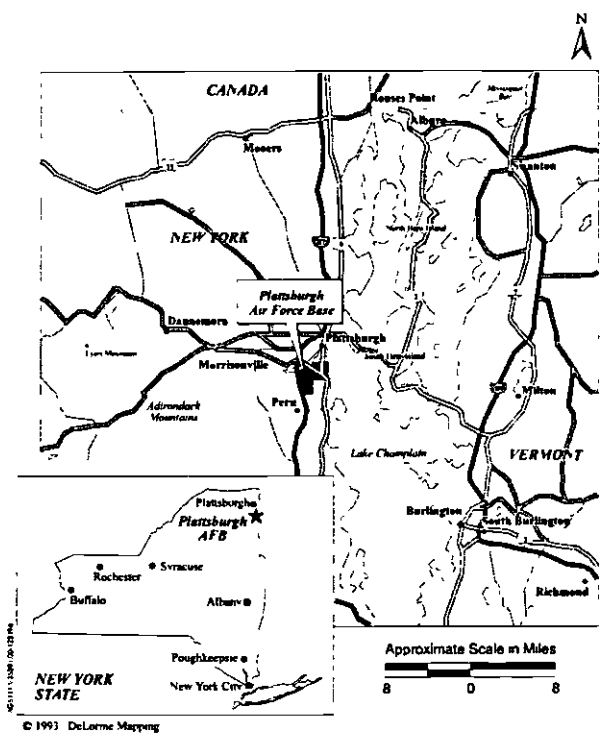


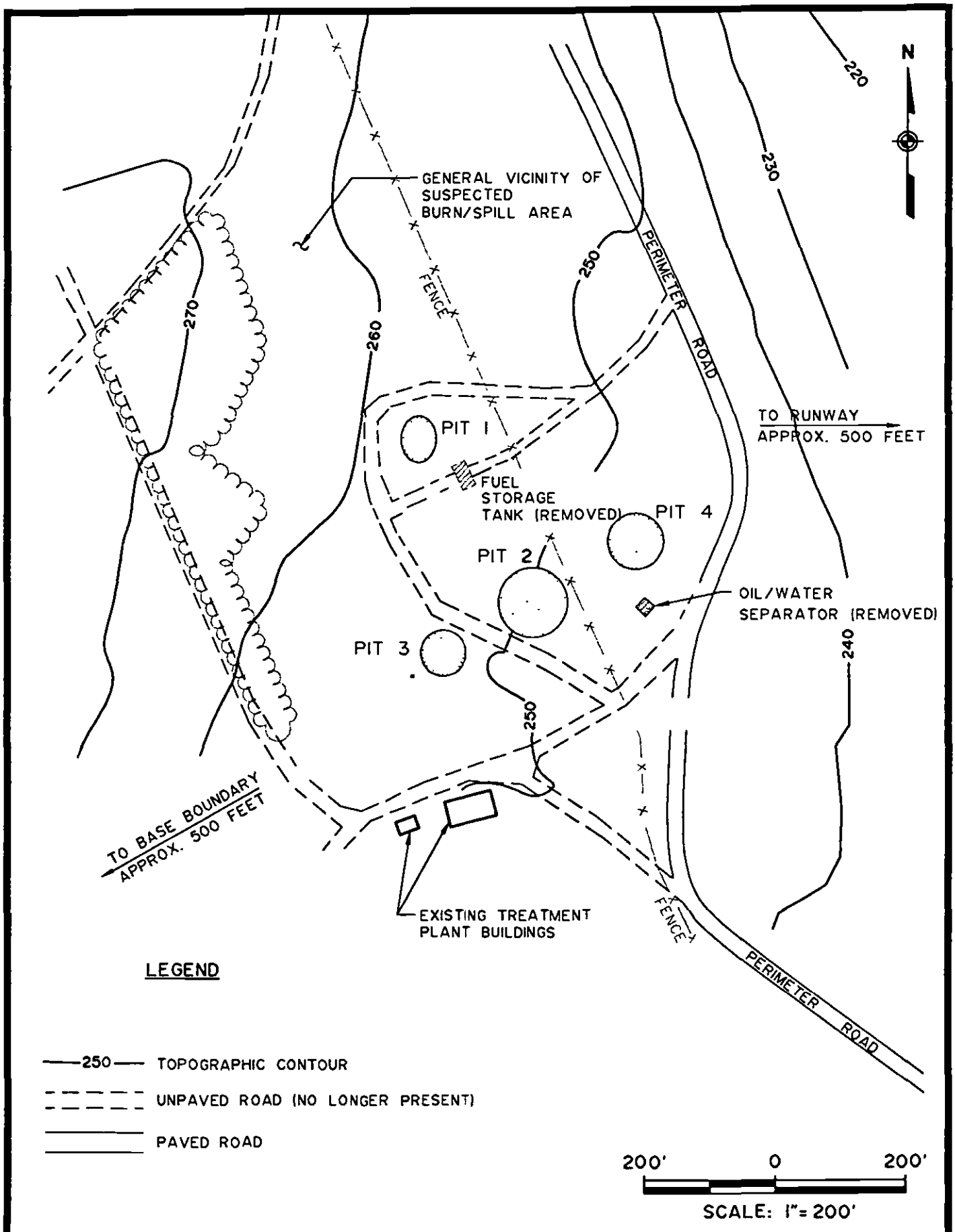
Figure 1: Vicinity Location Map

As part of the USAF's Installation Restoration Program (IRP) and Base Realignment and Closure (BRAC) Program, Plattsburgh AFB has initiated activities to identify, evaluate, and remediate identified hazardous material disposal sites. The IRP at Plattsburgh AFB is being implemented according to a Federal Facilities Agreement, Docket No.: II-CERCLA-FFA-10201, signed between the USAF, USEPA, and NYSDEC on July 10, 1991. Plattsburgh AFB was placed on the National Priorities List on November 21, 1989. Cleanup is being funded by the USAF.

The FT-002 site is located approximately 500 feet west of the runway and approximately 500 feet east of the Plattsburgh AFB boundary. The site formerly consisted of four fire training pits, each 50 to 100 feet in diameter, centered within an approximately 8-acre area as shown in Figure 2. The area has since been extensively regraded.

Fire training activities at Plattsburgh AFB began in the middle to late 1950s and continued until the site was closed permanently to operations on May 22, 1989, with the exception of limited emergency rescue

J:\35291 00\CAD 1=200 9/5/00-1 RAL



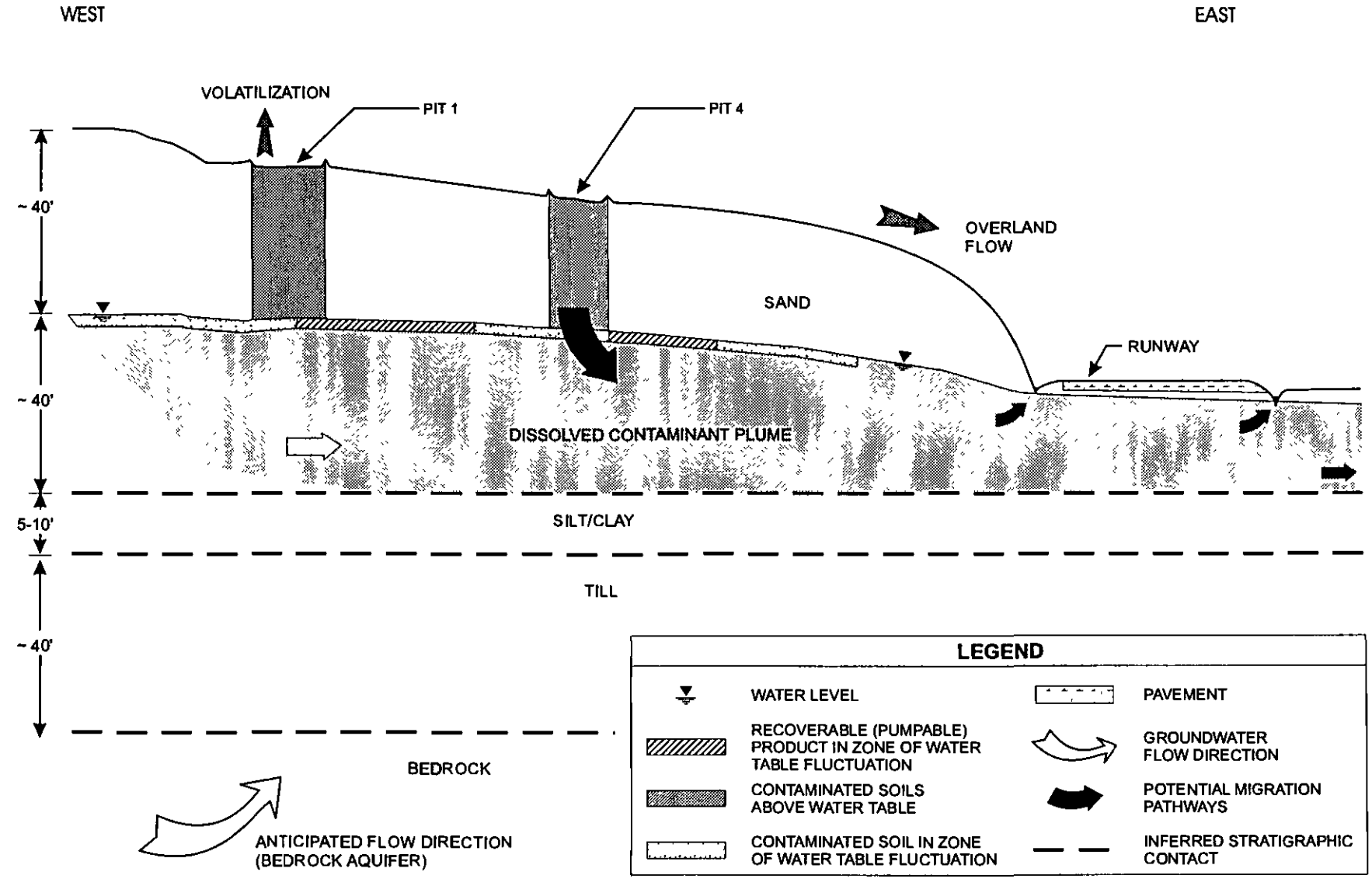
AC-10992B

URS CONSULTANTS, INC.	FT-002 SITE FEATURES	FIGURE 2

training. Prior to 1980, the four training pits found on the site were unlined sand and gravel depressions. During training exercises, base firefighters and local municipal firefighters saturated the pits with water, then poured in off-specification jet fuel mixed with waste oil, solvents, or other chemicals, and ignited the mixture. In 1980, Pits 2 and 3 were lined with cement-stabilized soil and Pits 1 and 4 were deactivated. Pits 2 and 3 were given a semi-permanent fuel supply via a storage tank with gravity feed. The storage tank, an underground oil/water separator, and associated underground piping have been removed from the site. The location of the effluent release from the oil water separator is unknown but was likely the ground within or near Pit 4.

Existing contamination at the site includes the following: 1) free product (primarily fuel) which is floating on groundwater below the ground surface; 2) soil contamination above the water table (i.e., in the vadose zone) which is mainly confined to the area of the four former pits; 3) residual product adhering to soil in the zone of water table fluctuation (i.e., smear zone) which has resulted from the horizontal and vertical movement of product in the subsurface; and 4) groundwater contamination which has resulted from product and soil contamination. The first three elements of contamination are the subject of the Source OU and this Record of Decision (ROD). The fourth element, contaminated groundwater, is being addressed under the Groundwater OU. Soil located at the surface of the site does not require remediation to protect human health and the environment. The site conceptual model, which depicts the contamination described above, is presented as Figure 3.

Human health risks due to surface soil were found in the remedial investigation (RI) to be within the 10^{-4} to 10^{-6} risk range. It is believed that the general lack of elevated concentrations of volatile and semivolatile organic compounds (VOCs and SVOCs) is due to volatilization, biodegradation, and leaching. Elevated levels of lead and copper detected, in surface soil during the RI were found to cause significant risks to ecological receptors in the Ecological Risk Assessment. However, seventy surface soil samples were collected and analyzed for copper and lead after the installation of the bioventing and SVE systems. There were no exceedances of EPA's screening level of 400 mg/kg for lead, and only one exceedance of NYSDEC's Soil TAGM for copper (100 mg/kg). The nature and extent of contamination are described further in Sections 2.0 and 5.0.



URS CONSULTANTS, INC

CONCEPTUAL CROSS SECTION
FT-002 SOURCE AREA

FIGURE 3

1741 12

2.0 HISTORY AND ENFORCEMENT ACTIVITIES

2.1 Preliminary Assessment/Site Inspection

In 1984-85, a preliminary assessment (PA) consisting primarily of a records search was conducted at FT-002. Based upon the results of the PA, a site inspection (SI) was conducted in 1987 (E.C. Jordan 1989). It included the advancement of three borings completed as monitoring wells, soil sampling, an active soil gas survey, and geophysical surveys. The study confirmed the presence of fuel-related compounds and solvents in the subsurface soil. In addition, free product was detected floating on the water table surface.

2.2 Remedial Investigation/Feasibility Study

From 1988 to 1993, a multi-phased remedial investigation (RI) was undertaken at the FT-002 site (ABB-ES & URS 1993). The comprehensive study determined the vertical and horizontal extent of soil contamination and identified an approximately 1-mile long groundwater plume trending east-southeastward from the site. The investigation included extensive soil sampling, monitoring well installation, and groundwater sampling. The study also included an evaluation of current and potential future human and ecological health risks posed by the contaminants attributed to FT-002.

In 1995, a feasibility study (FS) was conducted for the Source OU which included a detailed evaluation and comparison of nine alternatives based on USEPA criteria related to the effectiveness, implementability, and cost of the alternatives (URS 1995).

2.3 Product Removal Action

In 1990, an Engineering Evaluation/Cost Analysis (EE/CA) was prepared to evaluate alternatives for the recovery of free floating (pumpable) product from FT-002 (E.C. Jordan 1990). As a result of past practices, product migrated vertically from the ground surface to the water table and formed a floating layer above the water table. Based on EE/CA results, a removal action was implemented by the USAF which involved installation of four recovery wells, four dual product/groundwater extraction pumps, and treatment of recovered groundwater prior to discharge to a tributary of the Salmon River. System construction began in June 1992 and it went on-line in 1993. Approximately 19,986 gallons of product has been recovered as

of July 2000. It is estimated that a maximum of 10,580 gallons of free pumpable product remains at the site. In the summer of 1996, the system was upgraded to include nine new recovery wells, new separate product and groundwater pumps, and upgraded treatment equipment for the groundwater treatment plant.

2.4 Intrinsic Remediation Evaluation

An Intrinsic Remediation EE/CA was conducted in 1993 and 1994 (Parsons 1995). The purpose of the study was to determine whether naturally occurring attenuation processes for fuel hydrocarbons are occurring in groundwater at the site and to evaluate the impact of these processes on contaminant migration. The study concluded that significant natural attenuation of fuel hydrocarbons in groundwater from site FT-002 was occurring. The effort was part of a greater study by USAF to evaluate attenuation processes at bases across the country. This study included laser-induced fluorescence (LIF) data and soil analytical data which were used to further delineate the extent of the product and refine the delineation of soil contamination in the unsaturated (above the water table) zone. The estimated extent of product reported in this study is shown in Figure 4.

2.5 Action Memorandum

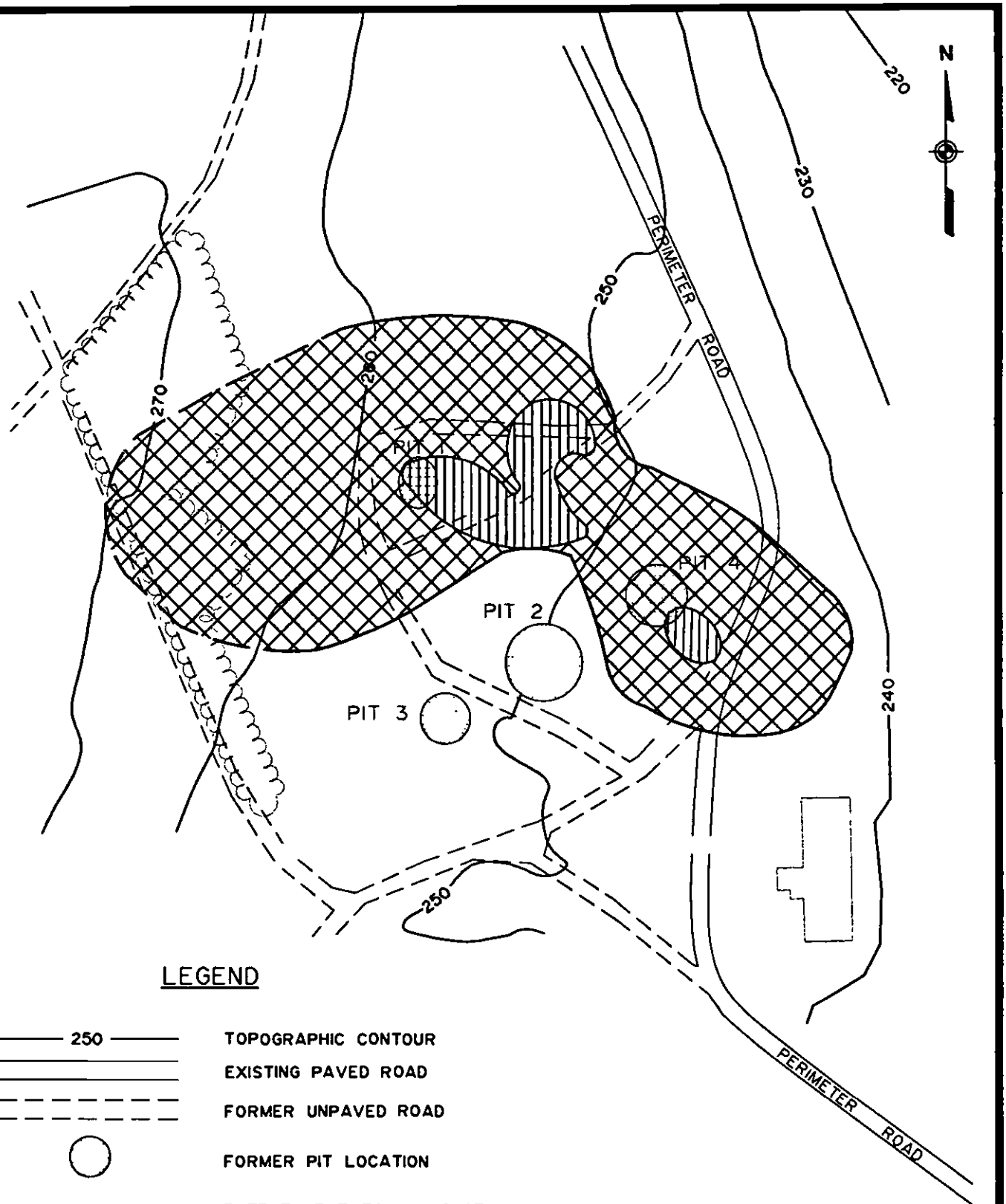
In 1996, an Action Memorandum was prepared which included a recommendation and conceptual design for a removal action to address contaminated soil (Parsons & OHM 1996). Components of the removal action are described below.

A. Implement a Soil Vapor Extraction (SVE) system in the vicinity of Pit 1 to remove chlorinated hydrocarbons from soils in that area, with a catalatic oxidizer to destroy vapors from the SVE system.

B. Biovent all contaminated soils to remove all other contaminants of concern.

C. Pump groundwater to depress the water table so soils and residual product in the zone of water table fluctuation are exposed and treatable by SVE and bioventing.

J:\053529100\CAD\ 1=200 12/29/00-1 RAL



LEGEND

250 — TOPOGRAPHIC CONTOUR

EXISTING PAVED ROAD

FORMER UNPAVED ROAD

FORMER PIT LOCATION

EXTENT OF TOTAL PRODUCT (FREE PRODUCT & PRODUCT ADHERING TO SOIL OR RESIDUAL PRODUCT) (PARSONS 1995)

EXTENT OF FREE (PUMPABLE) PRODUCT- BASED ON RECENT OBSERVATIONS OF PRODUCT IN WELLS.

200 0 200

SCALE IN FEET

AC-15895

URS CONSULTANTS, INC.

EXTENT OF PRODUCT

FIGURE 4

Several public meetings were held, both prior to the initiation of the soil removal action, to give the public an opportunity to comment on the action, and during the action, to inform the public of progress.

2.6 Informal Technical Information Report

Copper and lead were identified as contaminants of concern in the surface soil, in the RI report, because of potential effects on ecological receptors identified in the Ecological Risk Assessment (Section 7.2). Consequently, an additional sampling program (URS 1998) was implemented which included the collection of 52 surface and 18 near surface soil samples. Samples were analyzed for lead and copper. Results are discussed in Section 5.2.

2.7 October 1999 Letter Report

In August 1999, the USAF advanced three soil borings at the site, at the request of the NYSDEC, to evaluate the progress of bioventing in the easternmost portion of the contaminated area. Soil samples were collected from both above and below the water table and analyzed for contaminants of concern. Results were presented in a letter report in October 1999 (Hunt 1999). The analytical results showed that bioventing had been successful in remediating fuel-contaminated soil above and slightly below the water table in that area (preliminary remediation goals were achieved). However, fuel-related contamination associated with residual product still remained deeper below the water table. It was concluded that, to accomplish remediation of this soil by bioventing, it would be necessary to lower the water table by pumping in this area (also see Section 12.2).

3.0 COMMUNITY PARTICIPATION

The Air Force has kept the community informed regarding progress at site FT-002 during quarterly Restoration Advisory Board (RAB) meetings open to the public. This board consists of the BRAC Cleanup Team (BCT) members (key representatives from the USAF, USEPA, and NYSDEC) and representatives from municipalities, community organizations, and associations including community members with environmental/engineering expertise. The RAB, which was chartered in 1995, serves as a forum for the community to become familiar with the restoration activities ongoing at Plattsburgh AFB and to provide input to the BCT. In addition to the formal quarterly meetings, several "working group" meetings were held in 1999, on base or on site, specifically to discuss outstanding issues regarding the FT-002 site among RAB members.

The RI reports, the Proposed Plan (URS 2000b), and other site-related documents in the FT-002 Administrative Record have been made available to the public. The full-length reports have been available at the Information Repository located at the Feinberg Library on the Plattsburgh campus of the State University of New York. The notice of the availability of these documents was published in the Plattsburgh *Press Republican* Newspaper on December 7, 2000.

In addition, a 30-day public comment period was held from December 7, 2000 to January 5, 2001 to solicit public input. During this period, the public was invited to review the Administrative Record and comment on the preferred alternative being considered.

In addition, Plattsburgh AFB hosted a public meeting on December 14, 2000 at the Old Court House, Second Floor Meeting Room, 133 Margaret Street. The date and time of the meeting was published in the Plattsburgh *Press Republican* Newspaper. The meeting was divided into two segments. In the first segment, data gathered at the site, the preferred alternative, and the decision-making process were discussed. In the second segment, immediately after the informational presentation, Plattsburgh AFB held a formal public meeting to accept comments about the remedial alternative being considered for the FT-002 site. The meeting provided the opportunity for people to comment officially on the plan. Public comments have been recorded and transcribed, and a copy of the transcript has been added to the Administrative Record and Information Repository. This transcript is included as Appendix A of this Record of Decision. Public

comments on the Proposed Plan, and Air Force responses to those comments, are summarized in the responsiveness summary, which is included as Appendix B.

4.0 SCOPE AND ROLE OF OPERABLE UNIT

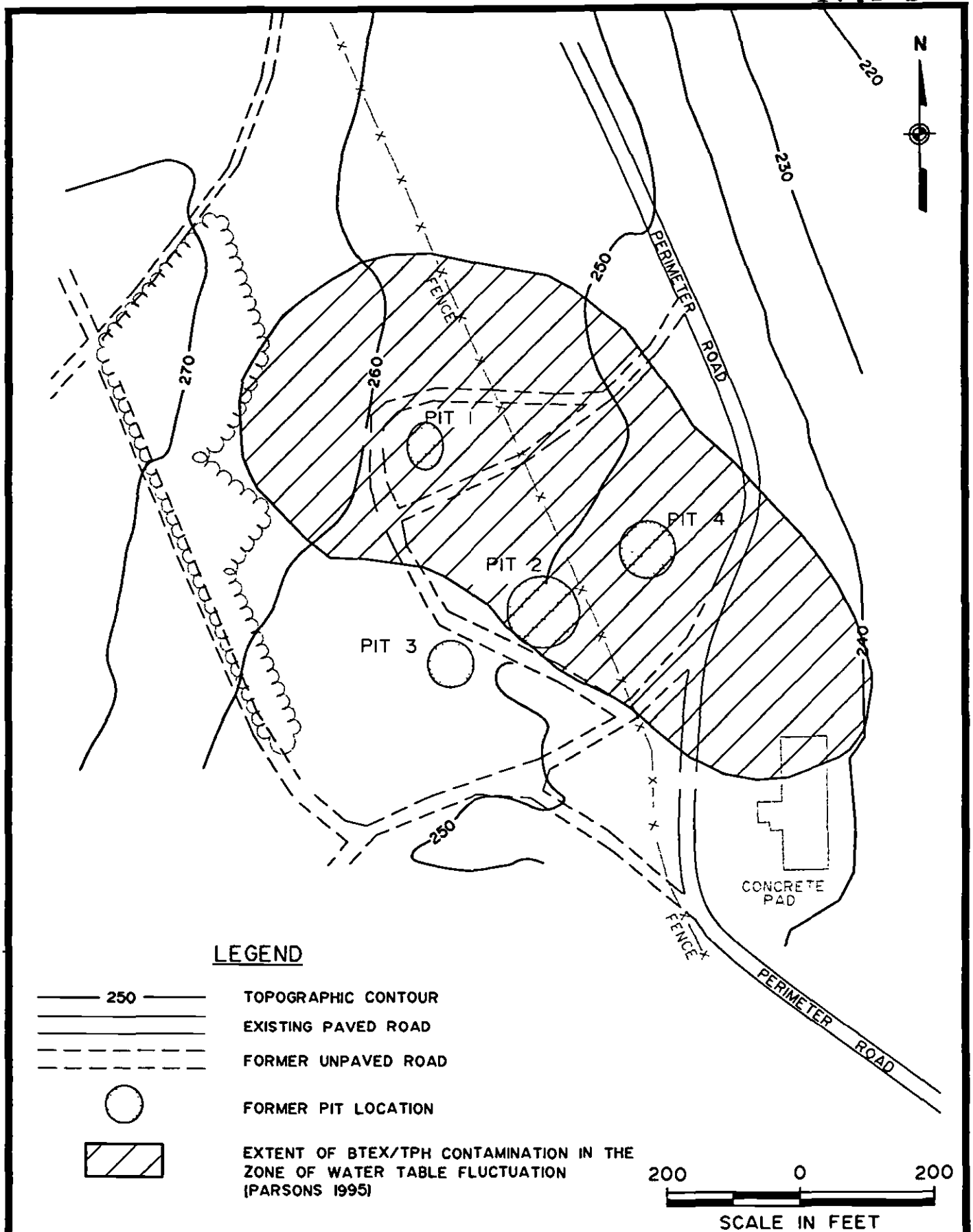
Site FT-002 is one of a number of sites administered under the Plattsburgh AFB IRP. Records of Decision (RODs) have previously been signed for twelve operable units at the base, and additional RODs are planned for other IRP sites. Because of the complex nature of the FT-002 site, site remediation has been divided into two separate components or OUs:

- Source OU
- Groundwater OU

The Source OU is the subject of this ROD. It addresses the entire source of VOC and SVOC contamination at the Fire Training Area including floating free (pumpable) product, contaminated soil in the vadose zone, and contaminated soil and residual product in the zone of water table fluctuation which has been caused by the horizontal and vertical movement of free product in the subsurface. The Source OU addresses contamination from the surface vertically downward only to the depth at which soil has been directly contaminated by free product at the lowest point of water table fluctuation. The horizontal extent of the source (based on LIF data) is shown on Figures 5 and 6 (note that this extent is conservative; the extent of soil contamination exceeding remediation goals is expected to be somewhat less than shown).

The principal threat of this contamination is its continuing impact on groundwater quality. The proposed action for the Source OU addresses this potential threat by mitigating the entire source (i.e., floating and residual product and contaminated soil) of groundwater contamination and by providing for source containment during remediation. It is intended that the selected action be the final action for the FT-002 Source OU.

Groundwater contamination is migrating away from the source southward and eastward (Figure 7). An RI/FS, including a groundwater transport model, currently is underway which evaluates potential impacts and remedies for the groundwater plume (URS 2000a). A Proposed Plan for the Groundwater OU is expected to be presented to the public in 2001.



J:\053529100\CAD\ 1:200 12/29/00-1 RAL

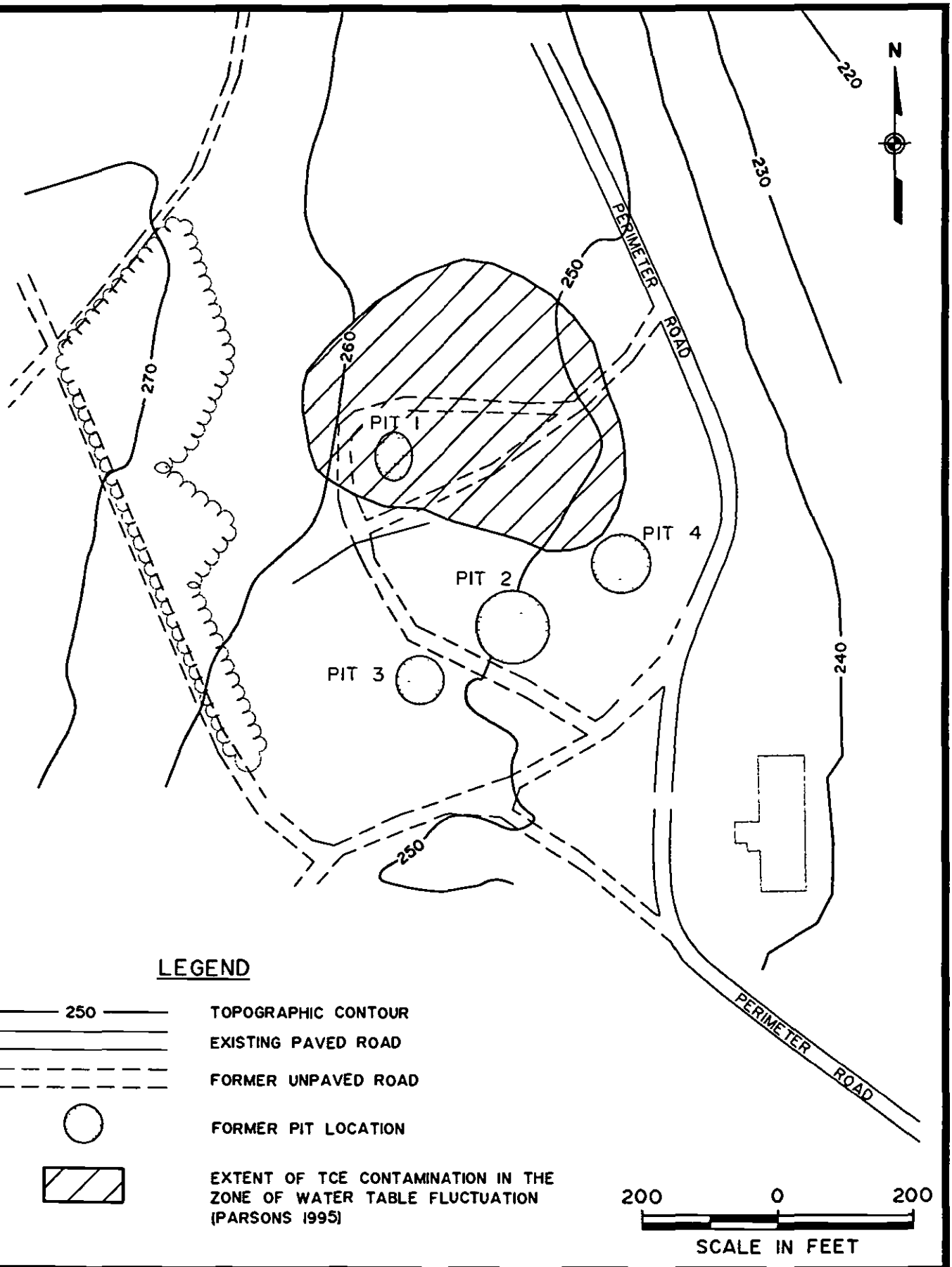
AC-15896

URS CONSULTANTS, INC.

EXTENT OF BTEX/TPH CONTAMINATION IN THE ZONE OF WATER TABLE FLUCTUATION (SMEAR ZONE)

FIGURE 5

J:\053529I O\CAD\ I=200 12/29/00-I RAL

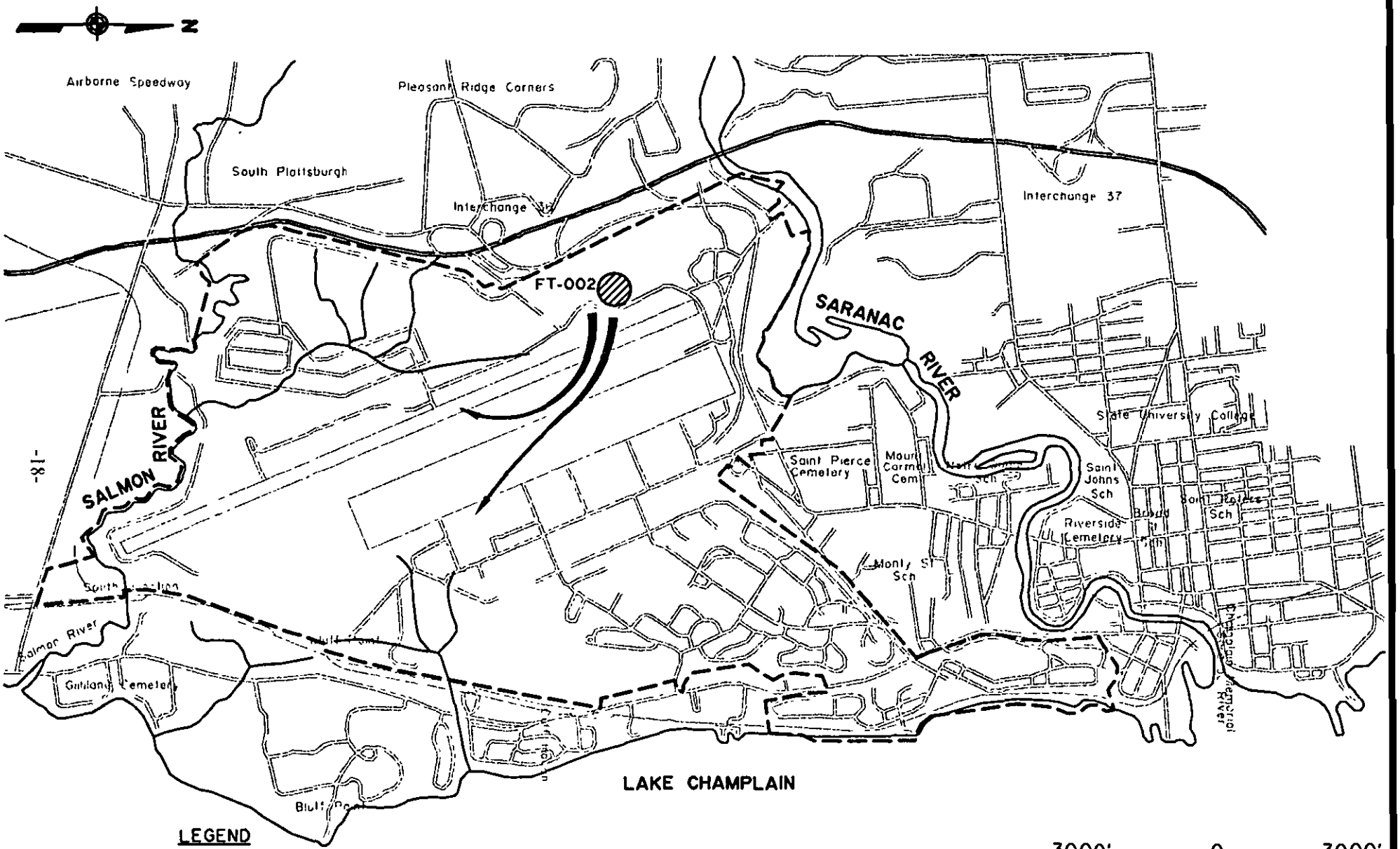


AC-15898

URS CONSULTANTS, INC.

EXTENT OF TCE SOIL CONTAMINATION IN THE ZONE OF WATER TABLE FLUCTUATION (SMEAR ZONE)

FIGURE 6



URS CONSULTANTS, INC.

GENERAL DIRECTION OF GROUNDWATER FLOW FROM FT-002

FIGURE 7

1741 22

5.0 SITE CHARACTERISTICS

5.1 Product

The estimated extent of product is shown in Figure 4. The limits of product reported in the EE/CA (Parsons 1995) represents the maximum extent of all product including free (pumpable) product and residual product adhering to soil in the zone of water table fluctuation. URS used recent monitoring data from the well network at the Fire Training Area to define the extent of pumpable free product at the site under current conditions (URS 1999). The estimated extent of pumpable free product based on the detection of measurable quantities of product in these wells is also shown in Figure 4. Based on these data, it is conservatively estimated that there are approximately 10,580 gallons of free product remaining at the site. Product adhering to soil in the zone of water table fluctuation must be addressed by methods other than pumping.

5.2 Surface Soil

Surface soil (0 to 2 feet deep) sampling results from the RI (ABB-ES & URS 1993) are presented in Table 1. These results show that the top 2 feet of soil are less contaminated by organic chemicals than deeper soils. Lesser contamination in surface soil is believed to have resulted from volatilization, leaching, and biodegradation in the oxygen-rich environment. Metals were more concentrated in surface soils. Lead and copper were identified as chemicals of potential concern in surface soil in the RI report, since these two metals were detected at levels that represented a potential ecological risk.

The site was resampled in 1997 (URS 1998) after the construction of an underground piping network as part of the removal action, to further evaluate levels of copper and lead in surface soil (Table 2). Results showed that none of the 70 samples exceeded the screening level for lead [400 milligrams per kilogram (mg/kg)] and only one of the 70 samples exceeded the screening level for copper (100 mg/kg). On the basis of this sampling, the USEPA and NYSDEC have agreed that remediation of surface soil to address lead and copper is not required.

TABLE 1
PLATTSBURGH AFB FT-002 SITE
SUMMARY OF ANALYTES DETECTED IN SOIL

ANALYTE	SURFACE SOIL (0 - 2 FEET)		SUBSURFACE SOIL (2 - 46 FEET)	
	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations
Acetone	ND	ND	2/72	190 - 2,500
Methylene Chloride	3/23	8 - 23	ND	ND
1,2-Dichloroethene (total)	NA	NA	11/72	7 - 47,000
cis-1,2-Dichloroethene	7/47	2 7 - 56 5	45/87	0 9 - 151,000
trans-1,2-Dichloroethene	1/46	16 3	NA	NA
2-Butanone	ND	ND	3/72	11 - 34
Trichloroethene	7/70	2 1 - 149	51/130	1 2 - 500,000
Benzene	1/70	73	11/130	270 - 28,100
4-Methyl-2-pentanone	ND	ND	3/72	18,000 - 32,000
2-Hexanone	ND	ND	3/72	7,500 - 7,800
Tetrachloroethene	1/70	4 6	2/130	2 4 - 1,200
Toluene	3/70	30 - 230	46/130	5 5 - 230,000
Ethylbenzene	3/70	23 - 3,400	54/130	6 4 - 100,000
Styrene	ND	ND	1/72	26
Xylene (total)	NA	NA	36/72	5 - 670,000
m,p Xylene	5/47	18 - 730	29/88	33 - 350,000
Phenol	ND	ND	1/21	460
1,2-Dichlorobenzene	ND	ND	21/155	3 7 - 163 000
1,3-Dichlorobenzene	1/68	149	16/155	2 3 - 15,300
1,4-Dichlorobenzene	1/68	71 9	21/155	2 1 - 41,700
1,2,4-Trichlorobenzene	ND	ND	1/67	460
Naphthalene	8/68	20 - 26,000	50/155	28 - 111,000
4-Chloroaniline	ND	ND	1/67	2,800
2-Methylnaphthalene	ND	ND	26/67	370 - 55 000
Phenanthrene	1/23	1,100	2/67	890 - 1 300
Fluoranthene	1/23	1,300	ND	ND
Pyrene	1/23	1,300	ND	ND
Benzo(a)anthracene	1/23	740	ND	ND
Di-n-octylphthalate	1/23	680	ND	ND
bis(2-Ethylhexyl)phthalate	ND	ND	9/67	390 - 2,100
Benzo(b)fluoranthene	2/23	830 - 860	1/67	660
Benzo(k)fluoranthene	1/23	1,100	1/67	660
Benzo(a)pyrene	1/23	680	ND	ND
Indeno(1.2,3-cd)pyrene	1/23	570	ND	ND
Benzo(g,h,i)perylene	1/23	450	ND	ND
Heptachlor Epoxide	1/13	140	1/3	8 2
4,4' - DDD	2/13	18 - 24	1/3	310
Endosulfan Sulfate	2/13	20 - 22	ND	ND
Aluminum (mg/kg)	13/13	1,430 - 21,850	5/5	1,240 - 4,200
Barium (mg/kg)	1/13	69	1/5	1
Cadmium (mg/kg)	1/13	32	ND	ND
Calcium (mg/kg)	8/13	1,010 - 9,980	3/5	3,060 - 6 520
Chromium (mg/kg)	7/13	2 1 - 11	4/5	2 4 - 4 5
Copper (mg/kg)	4/13	5 - 1,300	4/5	5 2 - 7 3
Iron (mg/kg)	13/13	2,850 - 5,230	5/5	3,030 - 5,200
Lead (mg/kg)	13/13	1 9 - 1,610	4/5	1 1 - 2 6
Magnesium (mg/kg)	7/13	946 - 4,000	3/5	1,120 - 2,460
Manganese (mg/kg)	13/13	25 - 250	5/5	30 9 - 116
Vanadium (mg/kg)	1/13	12 9	ND	ND
Zinc (mg/kg)	13/13	7 1 - 191	1/5	10 4
PHC (mg/kg)	74/248	85 - 19,789	71/213	63 - 46,296
PAH (mg/kg)	131/340	22 - 11,000	60/182	36 - 39,506

Results reported in µg/kg (ppb) unless otherwise indicated
NA - Not Analyzed
ND - Not Detected
PHC - Petroleum Hydrocarbons
PAH - Polycyclic Aromatic Hydrocarbons
Includes samples collected during both phases of the RI which occurred in 1988 and 1991, respectively

TABLE 2
PLATTSBURGH AFB FT-002 SITE
SUMMARY OF OCTOBER 1997 SAMPLING

ANALYTE	SURFACE SOIL (0 - 0.5 FEET)		SURFACE SOIL (1 - 1.5 FEET)	
	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations
Lead (mg/kg)	52/52	3.1 - 290	18/18	0 9 - 137
Copper (mg/kg)	52/52	1.7 - 71.8	18/18	1.6 - 200

Note: Although one detection of copper (200 mg/kg) occurred at a level above its screening level of 100 mg/kg, the duplicate sample at that same location contained less than 100 mg/kg of copper. Lead was not detected above its screening level of 400 mg/kg in any sample collected.

Data from the RI show that benzene, toluene, ethylbenzene, and xylene (BTEX) compounds were detected in surface soil in a small number of samples in the pit areas. These compounds, along with all other detected organic and inorganic chemicals, were identified as chemicals of potential concern for the human health risk evaluation. This BTEX contamination, which tends to migrate with infiltrating precipitation to groundwater, was evaluated along with other soil contamination above the water table. The extent of contaminated soil above the water table is discussed below.

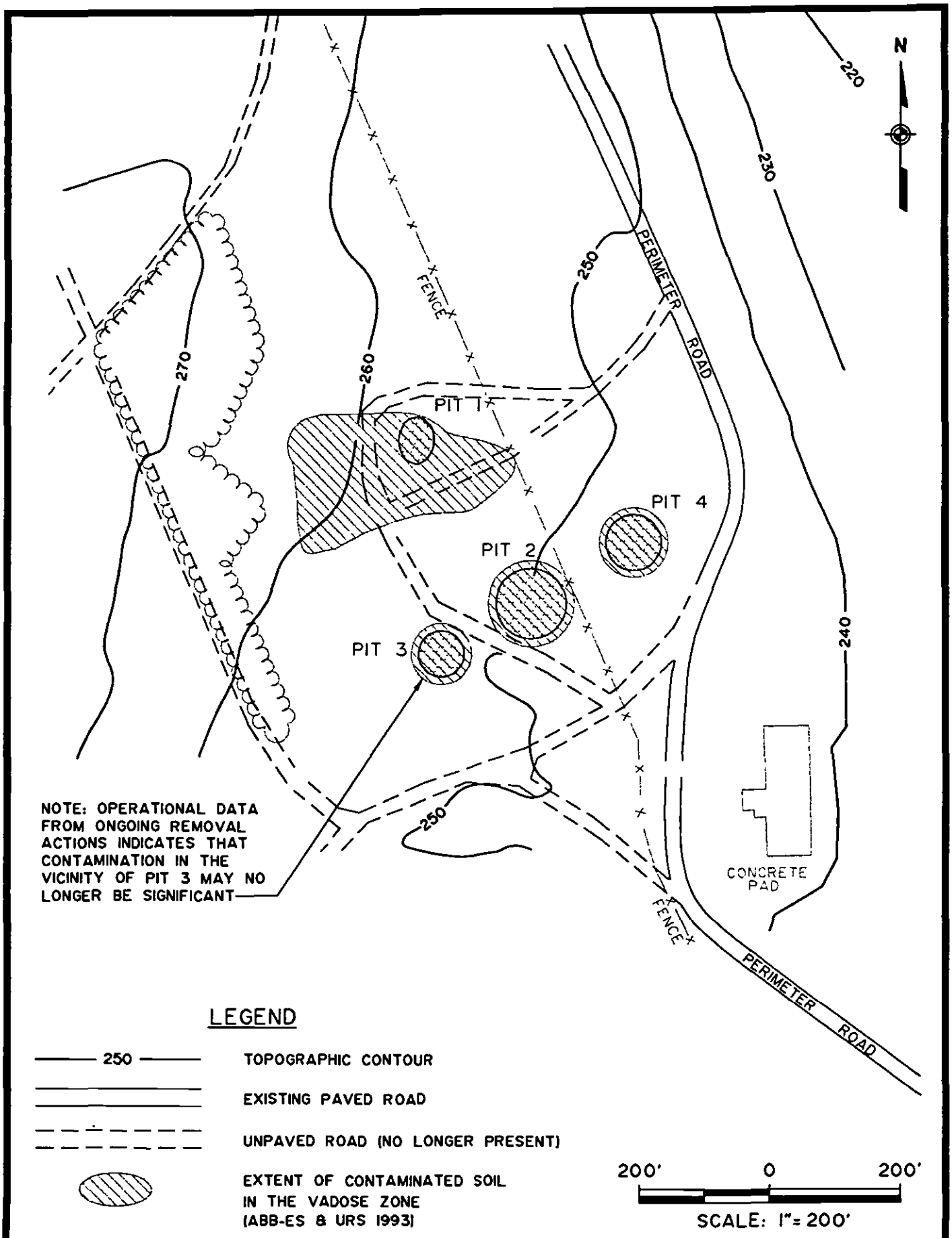
5.3 Subsurface Soil

Subsurface soil (2 ft. below ground surface to the top of the water table) sampling results are shown in Table 1. Compounds detected in subsurface soils at the highest levels include 1,2-dichloroethene [47,000 micrograms per kilogram (μg/kg) maximum], cis-1,2-dichloroethene [151,000 μg/kg maximum], trichloroethene [500,000 μg/kg maximum], toluene [230,000 μg/kg maximum], ethylbenzene [100,000 μg/kg maximum], total xylenes [670,000 μg/kg maximum], m&p xylenes [350,000 μg/kg maximum], 1,2-dichlorobenzene [163,000 μg/kg maximum], and naphthalene [111,000 μg/kg maximum].

Contamination has occurred by repeated infiltration of fuel and solvents to the water table during fire training exercises. Soil is contaminated vertically downward in the vicinity of each fire training pit. Soil contamination above the water table (in the vadose zone) is limited to the pit areas and an area adjacent to Pit 1 (Figure 8). Contaminated soil (impacted by residual product) also exists at depth within the zone of water table fluctuation. Water table fluctuation has been measured to range from a minimum of 2 feet to a maximum of 7 feet between historical highs and lows in various wells at the FT-002 site. It is estimated that 215,000 cubic yards of soil is contaminated with chemicals at concentrations above the remedial goals listed in Table 3 (URS 1995). The areal extent of soil contamination in the zone of water table fluctuation is much greater than above the water table because floating product migrated away from the pits after reaching the water table. In addition, some contamination appears to have migrated upgradient and side-gradient from the pits, possibly as a result of dispersion during periods of significant contaminant release.

The extent of fuel-related organic chemicals [i.e., total petroleum hydrocarbons (TPH) and BTEX] estimated by LIF and reported in the EE/CA (Parsons 1995) is shown in Figure 5. The estimated extent of contamination based on analytical data from soil borings was also included in the FS. However, the extent of contamination reported in the FS, although in a similar location, is somewhat smaller than that shown in

J:\35291.00\CAD 1=200 12/29/00-1 RAL



AC-15897

URS CONSULTANTS, INC.

EXTENT OF CONTAMINATED SOIL IN THE VADOSE ZONE

FIGURE 8

TABLE 3
PLATTSBURGH AFB FT-002 SITE
SOIL REMEDIATION GOALS

MEDIA	ANALYTE	GOAL
SUBSURFACE SOIL	Acetone	0.198 mg/kg
	Benzene	0.036 mg/kg
	1,2-Dichloroethene	0.18 mg/kg
	1,2-Dichlorobenzene	4.74 mg/kg
	1,3-Dichlorobenzene	0.9 mg/kg
	1,4-Dichlorobenzene	5.1 mg/kg
	2-Methylnaphthalene	18.2 mg/kg
	4-Methyl-2-Pentanone	0.6 mg/kg
	Ethylbenzene	3.3 mg/kg
	bis(2-ethylhexyl)phthalate	217.5 mg/kg
	Naphthalene	6.5 mg/kg
	Tetrachloroethene	0.84 mg/kg
	Toluene	0.9 mg/kg
	Trichloroethene	0.42 mg/kg
	Xylenes	0.72 mg/kg

Goals developed by NYSDEC Technology Section, Bureau of Program Management for the protection of groundwater resources.

Figure 5. Figure 5 is a conservative estimate of the extent of contamination, since it represents area where soil contaminants were detected. The extent of contaminated soil exceeding remedial goals is expected to be somewhat less than shown.

LIF data also were used to delineate the extent of trichloroethene (TCE) contamination in the zone of water table fluctuation (Parsons 1995). TCE is the major solvent of concern in soil and is present in the vicinity of Pit 1. The extent of TCE contamination as shown in Figure 6 is much smaller than the extent of fuel contamination. Moreover, the extent of TCE soil contamination is conservative, since it represents the limits of TCE detection. The extent of soil contamination exceeding the remedial goal for TCE (and other chlorinated hydrocarbons) is expected to be somewhat less than shown.

6.0 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

PARC is responsible for maintaining base property, marketing and controlling base reuse, leasing and managing property, and developing base facilities, as necessary, to promote advantageous reuse. According to land use plans (PARC 1995), the identified use of FT-002 and its surrounding area will be commercial/industrial. The base land use plans developed by PARC were incorporated into the Air Force's Environmental Impact Statement (Tetra Tech 1995). Currently, groundwater in the affected aquifer at the site is not being utilized as a resource. Although use is unlikely, New York State considers all groundwater (Class GA) in the State as having the potential for use as a future potable resource.

7.0 SUMMARY OF SITE RISKS

Based on the results of the RI, a baseline risk assessment (RA) was conducted to estimate the risks associated with current and future site conditions. Currently, the site is only used by operations personnel for whom exposure is limited; therefore, trespasser exposure was evaluated to assess current conditions. Future use was conservatively assumed to be residential; therefore, long term residential exposure and short term (construction worker) exposure were evaluated. The baseline risk assessment estimates the human health and ecological risk which could result from the contamination at the site if no remedial action was taken.

7.1 Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification* - identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well water) by which humans are potentially exposed. *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

The human health risk assessment follows federal guidelines to estimate the potential carcinogenic (i.e., cancer-causing) and adverse non-carcinogenic health effects due to potential exposure to site contaminants of concern from assumed exposure scenarios and pathways. These guidelines consider an excess upper bound lifetime cancer risk to an individual to be acceptable if it is calculated to be less than one-in-one million (10^{-6}), and risks in the range of one-in-ten thousand (10^{-4}) to one-in-one million are evaluated on a case-by-case basis. The guidance also specifies a maximum health hazard index (which reflects noncarcinogenic effects for a human receptor) less than or equal to 1.0. The Hazard Index (HI) is a representation of risk based on a quotient or ratio of chronic daily intake to a reference (safe) dose. An HI greater than 1.0 indicates a potential for adverse noncarcinogenic health effects.

All chemicals detected in surface and subsurface soil (Table 1) were considered potential chemicals of concern and were utilized in the risk assessment. Data from the RI were used to develop exposure concentrations for the chemicals detected.

Two human exposure scenarios were evaluated as part of the risk assessment. The first of these scenarios evaluated human health effects based on possible exposure under current conditions (current conditions were based on base conditions before closure). The pathway evaluated was the following:

- Dermal contact with and incidental ingestion of surface soil

The second scenario evaluated human health effects based on projected future site conditions (assuming that residential development would occur on or near the FT-002 site). The following exposure pathways were evaluated under those assumed future conditions:

- Incidental ingestion of and dermal contact with surface soil by a future resident
- Inhalation of volatile vapor emissions from shallow subsurface soil by a future resident
- Ingestion of contaminated groundwater (derived from leaching of deep soils) by a future resident
- Incidental ingestion of and dermal contact with shallow subsurface soil by a temporary worker during construction activities
- Inhalation of volatile vapor emissions and fugitive dust derived from shallow subsurface soil by a temporary worker during construction activities

The calculated risks are given in Table 4.

Based upon the results of the risk assessment, the estimated cancer risk associated with exposure to contaminants under the current scenario (2×10^{-7}) is less than the range of risk that may be considered

TABLE 4
PLATTSBURGH AFB FT-002 SITE
SUMMARY OF RISKS

HUMAN HEALTH RISKS

SCENARIO	PATHWAY	RECEPTOR	CANCER RISK	NONCANCER RISK
Current Site Conditions	Dermal Contact and Incidental Ingestion of Surface Soil	Child Trespasser	2×10^{-7}	0.04
Future Site Conditions	Dermal Contact and Incidental Ingestion of Surface Soil	Child Resident	2×10^{-5}	0.1
		Adult Resident	7×10^{-6}	0.11
	Inhalation of Volatile Vapor Emissions	Adult Resident	6×10^{-6}	0.02
	Ingestion of Groundwater	Adult Resident	6×10^{-4}	10.0
	Dermal Contact and Incidental Ingestion of Subsurface Soil	Temporary Worker	9×10^{-8}	0.009
	Inhalation of Volatile Vapor Emissions and Fugitive Dust	Temporary Worker	1×10^{-8}	0.0003

ECOLOGICAL RISKS

INDICATOR SPECIES	ACUTE RISK	CHRONIC RISK
White-footed Mouse	1.9	3.4
Wood Thrush	9.9	3.3
Garter Snake	15.0	2.2
Red Fox	21.0	0.2
Red Tailed Hawk	48.0	0.1

acceptable on a case-by-case basis (i.e., 10^{-6} to 10^{-4} excess cancer risk) by current USEPA guidelines. The noncancer HI for the current scenario is below the acceptable USEPA specified HI of 1.

Cancer and noncancer risk estimates associated with future worker exposure during construction activities were also less than the USEPA's target risk values, indicating that there is limited potential human health risk from construction activities.

The estimated cancer risk for future residents (6×10^{-4}) is greater than the range of risk that may be considered acceptable on a case-by-case basis by current USEPA guidelines. This means that if no cleanup action is taken, six persons in ten thousand would develop cancer if they are exposed to contamination by drinking groundwater under the assumptions used in the risk assessment. Benzene and TCE are the contaminants primarily responsible for the cancer risk. The total cancer risk derived from the pathways other than ingestion of groundwater is within the range of risk (10^{-6} to 10^{-4}) that may be considered acceptable on a case-by-case basis by current USEPA guidelines.

The total noncancer HI for future residents is also greater than the acceptable USEPA-specified HI of 1. This means that there may be concern for potential noncancer health effects. This risk is almost entirely attributable to ingesting groundwater impacted by contaminants released (dissolved) from product or soil. Contaminants responsible for the elevated risk include: cis-1,2-dichloroethene, acetone, 4-methyl-2-pentanone, and toluene.

A summary of estimates of cancer (carcinogenic) and noncancer (noncarcinogenic) risks for each exposure pathway is presented in Table 4. The risk levels shown indicate that ingestion of groundwater is the only exposure pathway of significant concern. Exposure to soil contamination by direct contact is not a significant human health hazard. Soil contamination represents a potential health hazard because it is a source of groundwater contamination. By cleaning up the contaminated soil to the soil remediation goals (Table 3), the risks attributable to soil contamination will be reduced to acceptable levels. The soil remediation goals presented are site-specific goals developed by the NYSDEC which were developed to protect groundwater.

7.2 Ecological Risk Assessment

A four-step process is utilized for assessing site-related ecological risks for a reasonable maximum exposure scenario: *Problem Formulation* - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. *Exposure Assessment* - a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. *Ecological Effects Assessment* - literature reviews, field studies, and toxicity tests linking contaminant concentrations to effects on ecological receptors. *Risk Characterization* - measurement or estimation of current adverse effects.

A screening level ecological risk assessment was performed to assess the potential impact on terrestrial organisms from exposure to contaminated surface soil. Risk posed to five representative species (white-footed mouse, wood thrush, garter snake, red fox, and red-tailed hawk) was examined. The results of the assessment are expressed as hazard indices. A hazard index of 1.0 or greater indicates potential adverse ecological effects. A summary of hazard indices for both acute and chronic ecological effects is presented in Table 4.

The summary of hazard indices presented in Table 4 indicate that ecological risk effects above acceptable threshold values are possible for most of the species evaluated. These potential effects to individuals were attributable to the presence of lead and copper in surface soil. The results of field investigations undertaken subsequent to the FS showed that remediation of lead and copper in surface soils is no longer required.

8.0 REMEDIAL ACTION OBJECTIVES

The remedial objectives for the Source OU are: 1) to cleanup contaminated soil and residual product located in the vadose zone and in the zone of water table fluctuation (smear zone) at the site to concentrations less than or equal to remediation goals set for the site to address the impact of this contamination on groundwater (see Table 3) and 2) to recover floating free (pumpable) product at the site to the extent practicable.

9.0 DESCRIPTION OF ALTERNATIVES

Remedial alternatives for the Source OU were originally evaluated in the FS report. The alternatives evaluated included the following:

- No Action
- Institutional Action
- Low-Permeability Cap and Bioventing of Subsurface Soils
- Low-Permeability Cap and Soil Vapor Extraction of Subsurface Soils
- Stabilization/Solidification of Surface Soils and Bioventing of Subsurface Soils
- Stabilization/Solidification of Surface Soils and Soil Vapor Extraction of Subsurface Soils
- Soil Cover and Bioventing of Subsurface Soils
- Soil Cover and Soil Vapor Extraction of Subsurface Soils
- Excavation and Onsite Treatment

Four of the nine alternatives evaluated in the FS included measures (soil cover and stabilization/solidification) exclusively to address the remediation of copper and lead in surface soils. However, as discussed in Section 5.2, the results of field investigations undertaken subsequent to the FS showed that remediation of lead and copper in surface soils is no longer required. Consequently, these four alternatives are no longer relevant as presented in the FS.

Two other alternatives address the remediation of surface soil using a low-permeability cap. Such a cap would prevent contact with contaminated surface soil and would have an added benefit of reducing infiltration of precipitation through contaminated subsurface soils in the vadose (unsaturated) zone, thus reducing leaching of contaminants to groundwater. However, the reduction of infiltration would not prevent leaching from contaminated subsurface soil located near or below the water table. Recent borings advanced to assess the interim progress of the current removal action indicated that considerable progress has been made since the FS was finalized in reducing contaminant levels in the vadose zone, but that considerable contamination remains below the water table (see Section 2.7). Thus, reducing infiltration by capping would have an overall minimal effect on preventing leaching to groundwater. Consequently, these two alternatives also are no longer relevant as presented in the FS.

The technical elements to address subsurface soils common to the above six alternatives are SVE and bioventing. Three additional alternatives can be formulated from the above two common technological elements including:

- Bioventing of All Contaminated Soils
- Soil Vapor Extraction of All Contaminated Soils
- Soil Vapor Extraction of Soils Combined with Bioventing of Contaminated Soils

Bioventing of All Contaminated Soils by itself is not considered further because bioventing has not been demonstrated to be effective in remediating chlorinated compounds [e.g., TCE and dichloroethene (DCE)]. Chlorinated compounds are present in the vicinity of Pit 1 (Figure 6) and are a major contributor to groundwater contamination.

Two of the additional alternatives including, Soil Vapor Extraction of Soils Combined with Bioventing of Contaminated Soils and Soil Vapor Extraction of All Contaminated Soils, are considered further. The first of these alternatives would combine soil vapor extraction in the vicinity of Pit 1, where chlorinated hydrocarbons are present, with bioventing of fuel related compounds, which are present across the site and can effectively be treated by bioventing. Both alternatives are effective in that they will reduce toxicity, mobility, and volume of all contaminants of concern. They are implementable in that they include technologies that are proven and have a successful track record.

Thus, there are five alternatives that are considered further including three of the nine from the FS and two additional alternatives formulated from the common elements of the other six alternatives from the FS. These are:

- No Action
- Institutional Action
- Excavation and Onsite Treatment
- Soil Vapor Extraction of All Contaminated Soils
- Soil Vapor Extraction of Soils in the Vicinity of Pit 1 with Bioventing of All Contaminated Soils

These alternatives are described in greater detail below. Capital and operations and maintenance (O&M) costs for the alternatives and anticipated time frames for remediation by various technological components are detailed in the Proposed Plan (URS 2000b).

Alternative 1: No Action

Capital Cost: $0
Present Worth O&M Costs: $0
Total Present Worth: $0
Years of Active Remediation: 0
Years of Monitoring: 0

The Superfund program requires that the "No Action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, Plattsburgh AFB would take no further action at the site to prevent exposure to the soil contamination. It is assumed that the product and soil removal actions would be discontinued.

Alternative 2: Institutional Action

Capital Cost: $30,000
Present Worth O&M Cost: $224,500
Total Present Worth: $254,500
Years of Active Remediation: 0
Years of Monitoring: 100 or more

The purpose of Alternative 2 is to implement actions that will eliminate human exposure and health risks by restricting public access and future development activities, rather than by cleaning up or containing the contamination. This alternative relies upon natural processes (biodegradation, volatilization, and leaching) to reduce contaminant concentrations in the soil slowly over time. Alternative 2 includes deed restrictions to control future development on site and groundwater use restrictions prohibiting withdrawal of groundwater for drinking water or other potable uses. This alternative also includes monitoring of groundwater to track the natural reduction in the strength of the contaminant leaching to

groundwater—although the leaching would continue for an extended period of time (many decades). It is assumed that the free product and soil removal actions would be discontinued. The alternative also includes site reviews, every five years, in accordance with Section 121(c) of CERCLA to ensure that human health and the environment are protected.

Alternative 3: Excavation and Onsite Treatment

Capital Cost: $65,771,500
Present Worth O&M Cost: $250,000
Total Present Worth: $66,021,500
Years of Active Remediation: 2
Years of Monitoring: 10 (assumed)

In Alternative 3, approximately 444,000 cubic yards (cy) of surface and subsurface soil would be excavated and segregated based on the level of contamination. Soil that does not meet remediation goals (an estimated 215,000 cy) would be treated on site. The remaining 229,000 cy of clean soils would be stockpiled and subsequently used to backfill the excavated area. Approximately 215,000 cy of subsurface soils would be treated by solvent extraction. The excavation would be backfilled with treated and untreated soils, capped with 6 inches of topsoil, and seeded with grass. The excavation would be dewatered by groundwater extraction wells and the contaminated water collected would be treated at the existing FT-002 groundwater treatment facility before disposal. The alternative includes deed and groundwater restrictions (as described under Alternative 2), groundwater monitoring, and five-year site reviews until the site has been remediated.

Alternative 4: Soil Vapor Extraction of All Contaminated Soils

Capital Cost: $1,647,000
Present Worth O&M Cost: $3,206,500
Total Present Worth: $4,853,500
Years of Active Remediation: approximately 10
Years of Monitoring: 15

Alternative 4 includes soil vapor extraction of contaminated soil, free product collection, water table depression, and hydraulic containment of the source. Alternative 4 would be implemented using the technologies of the two removal actions that already have been implemented at the site with upgrade and expansion. It includes the continuation of product removal (Section 2.3) and treatment of contaminated soils (Section 2.5), although the bioventing system components would be modified to enable SVE over the entire site. All air emissions would be treated by catalytic oxidation. Pumping wells discharging to the existing treatment facility would be utilized to lower the groundwater table to enable SVE of soils below the water table.

A comprehensive soil boring and sampling program would be undertaken to optimize these systems and expand them as necessary. It is expected that additional recovery and water table pumping wells would be necessary to effect complete remediation of all residual product below the water table and to recover all pumpable product at the site. The alternative also includes source containment by groundwater pumping, at a minimum, until remediation goals are achieved. Under this alternative, an estimated 10,580 additional gallons of pumpable product would be removed by the product recovery system and approximately 215,000 cy of contaminated soil would be remediated by SVE. This alternative also includes deed and groundwater restrictions (as described under Alternative 2), progress soil monitoring, groundwater monitoring, and five-year site reviews until the site is remediated.

Alternative 5: Soil Vapor Extraction of Soils in the Vicinity of Pit 1 And Bioventing of All Contaminated Soils

Capital Cost: $539,500
Present Worth O&M Cost: $2,882,000
Total Present Worth: $3,421,500
Years of Active Remediation: approximately 10
Years of Monitoring: 15

Alternative 5 includes a combination of soil vapor extraction and bioventing of contaminated soil, free product collection, water table depression, and hydraulic containment of the source. Alternative 5 would be implemented using the technologies of the two removal actions that already have been implemented at the site with upgrade and expansion. It includes continuation of product removal (Section 2.3) and

SVE/bioventing of contaminated soils (Section 2.5). Pumping wells discharging to the existing treatment facility would be utilized to lower the groundwater table to enable SVE and bioventing below the water table. A comprehensive soil boring and sampling program would be undertaken to optimize these systems and expand them as necessary. It is expected that additional product recovery and water table pumping wells would be necessary to complete remediation of all residual product adhering to soils below the water table and to recover all pumpable product at the site. The alternative also includes source containment by groundwater pumping, at a minimum, until remediation goals are achieved. The containment would be discontinued when soil remediation goals are achieved but some groundwater extraction may continue after that time (see Section 12.0). Under this alternative, an estimated 10,580 additional gallons of pumpable product would be removed by the product recovery system and approximately 215,000 cy of contaminated soils would be remediated by SVE and bioventing. This alternative also includes deed and groundwater restrictions (as described under Alternative 2), progress soil monitoring, groundwater monitoring, and five-year site reviews until the site is remediated.

10.0 SUMMARY OF COMPARATIVE ANALYSIS

The alternatives for the Source OU were analyzed with respect to nine criteria specified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) which directs remediation of inactive hazardous waste sites. A brief description of each criteria and evaluation of alternatives based on these criteria is presented below.

The USEPA has categorized the evaluation criteria into three principal groups:

Threshold Criteria - The recommended alternative must meet these requirements.

1. Overall protection of human health and the environment.
2. Compliance with ARARs

Primary Balancing Criteria - The most favorable and cost effective alternative is determined using these criteria (a remedy is cost effective if its costs are proportional to its overall effectiveness).

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria - The recommended alternative may be modified by public input before it is finalized and presented in the ROD.

- State Acceptance
- Community Acceptance

A detailed discussion and comparative analysis is contained in the FS.

Analysis

- **Overall Protection of Human Health and the Environment** addresses whether a remedy provides adequate protection to potential human and ecological receptors.

Alternatives 1 (No Action) and 2 (Institutional Action) are not expected to provide adequate protection of human health and the environment. Alternatives 3 (Excavation and Onsite Treatment), 4 (SVE), and 5 (SVE and Bioventing) are expected to be protective of human health and the environment.

- **Compliance with ARARs** addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes, and/or provide grounds for invoking a waiver.

No federal or state ARARs specify concentration limits for contaminants in soil. Chemical-specific NYSDEC guidance documents (NYSDEC 1994) are considered TBC (To Be Considered) for the FT-002 site and were used to develop remediation goals for soil cleanup (Table 3). NYSDEC TBCs were developed to prevent groundwater contamination by soil contaminants. Alternatives 1 and 2 do not achieve these TBCs. Alternatives 3 through 5 are expected to meet chemical-specific TBCs for soil through treatment.

- **Long-Term Effectiveness and Permanence** refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Alternatives 1 and 2 do not offer long-term effectiveness or permanence. Although institutional controls, such as deed restrictions, lower the risk from ingesting contaminated groundwater by preventing exposure, these controls do not reduce contaminant levels.

Alternatives 3 through 5 provide long-term effectiveness because they include permanent treatment of subsurface soils. Alternative 3 offers the highest degree of long-term effectiveness and permanence because the alternative includes more complete treatment than Alternatives 4 and 5 (see Reduction of Toxicity, Mobility or Volume below).

- **Reduction of Toxicity, Mobility, or Volume** addresses the anticipated performance of treatment technologies employed in the remedy.

Alternatives 1 and 2 do not include treatment and will not reduce the toxicity, mobility, or volume of contaminated soil at the site. The toxicity of contaminants present in the soil would be reduced over an extended period through natural processes.

Alternative 3 (Excavation and Onsite Treatment of All Contaminated Soil) would most effectively reduce the toxicity, mobility, and volume of soil contaminants at the site. Alternative 3 likely would remove 90 percent or more of the contaminants from soil. Alternatives 4 and 5 include in situ technologies which may not be as reliable as the ex situ technologies (excavation and solvent extraction) included in Alternative 3. Alternatives 4 and 5 would achieve comparatively less removal of contaminants from soil than Alternative 3. However, these alternatives are expected to be able to achieve the remediation goals for soil (Table 3) which are considered protective of groundwater resources.

- **Short-Term Effectiveness** refers to the speed with which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health or the environment during its implementation.

Alternatives 1 and 2 include no treatment and reduce contaminant levels by natural processes. Remediation goals would be achieved only after an extended period (likely over 100 years).

It is estimated that Alternative 3 will achieve remediation goals after two years. Alternatives 4 and 5 include in situ technologies which will require longer to achieve remediation goals. The estimated time to achieve remediation goals is approximately 10 years for both these alternatives. The estimated time to achieve remediation goals for Alternative 5 is discussed further in Section 12.0.

Alternatives 1 and 2 will have little, if any, impact on the community, workers, or the environment during implementation. Potential impacts are the greatest for Alternative 3. Potential exposure pathways include: 1) direct exposure of workers to soil and groundwater contamination; and 2) potential exposure of workers, caretaker personnel, the community, or the environment to contaminated dust or vapors resulting from excavation. Potential exposures for Alternatives 4 and 5 are less than Alternative 3 since no excavation

of contaminated material is required. Air emissions from the SVE system would be controlled by catalytic oxidation for Alternatives 4 and 5.

- **Implementability** addresses aspects of implementation of the remedial alternatives, such as the ability to construct and operate technologies, reliability, ability to monitor effectiveness, availability of materials and services, permitting, and coordination with other agencies.

Alternative 1 (No Action) does not require implementation of a remedy.

Alternative 2 includes monitoring and deed restrictions, which are relatively easy to implement.

Alternative 3 would be the most difficult to implement because it requires deep excavation and removal, sampling, and staging of large quantities of contaminated soil. Furthermore, excavation would require extensive worker health and safety measures and other environmental controls. Associated administrative difficulties could delay implementation.

Alternatives 4 and 5 are less difficult to implement because extensive excavation is not required. These alternatives include a period of O&M for treatment that is not included in Alternative 3. Similar remedial systems have been on-line at the site since 1993 as part of the two ongoing removal actions.

- **Cost** includes the capital and O&M cost of each alternative, as well as its present worth.

The present worth costs of the alternatives range from $0.0 million to $66.0 million. In order of increasing cost, they are as follows: Alternative 1 ($0.0 million), Alternative 2 ($0.3 million), Alternative 5 ($3.4 million), Alternative 4 ($4.8 million), and Alternative 3 ($66.0 million). Capital cost is the greatest for Alternative 3. O&M cost is the greatest for Alternative 4.

- **State acceptance** addresses technical and administrative concerns of the State with regard to remediation.

The NYSDEC has provided input during the preparation of the Proposed Plan and ROD and their concurrence with the selected remedy is given in Appendix C.

- **Community acceptance** addresses public comments received on the Administrative Record and the Proposed Plan.

Community comments to the selected remedy were evaluated following the public comment period and are discussed in the Responsiveness Summary (Appendix B). As indicated in the Responsiveness Summary, no significant concerns were identified by the community.

11.0 PRINCIPLE THREAT WASTES

The NCP establishes an expectation that treatment that reduces the toxicity, mobility, or volume of the principle threat wastes will be utilized by a remedy to the extent practicable. The principle threat wastes at the site include soil contaminated with fuel and solvent-derived VOCs and SVOCs, and free product floating on the groundwater table. The principle threat addressed by the FT-002 Source OU is the continuing impact on groundwater quality posed by source contaminants in floating product, in soil in the vadose zone, and in soil and residual product in the zone of water table fluctuation at the site. The selected remedy uses catalytic oxidation, in conjunction with SVE, and bioremediation to destroy contamination. In addition, the recovered product will be properly disposed of (the recovered product from ongoing operations has been incinerated in the past).

12.0 SELECTED REMEDY

The USAF has selected Soil Vapor Extraction of Soils in the Vicinity of Pit 1 and Bioventing of All Contaminated Soils (Alternative 5) as the selected remedy for the FT-002 Source OU. The remedy also includes: free product recovery; water table depression to enhance the SVE, bioventing, and product recovery; and source containment by groundwater pumping, at a minimum, until soil remediation goals, which were established in coordination with the NYSDEC and USEPA, are achieved. After the remedial objectives for the Source OU have been achieved, operation of the extraction wells used for containment may be extended if significant contaminant mass continues to be present in extracted groundwater. This continued operation would assist in achieving the remedial objectives for the FT-002/Industrial Area Groundwater OU. In addition, institutional controls will be used to restrict land use or development which interferes with remedial operations and the installation of wells for any use of the underlying groundwater while the remediation is underway. Monitoring will be conducted at the site to evaluate the progress of remediation. There also will be five-year reviews of the selected remedy in accordance with Section 121(c) of CERCLA.

It is anticipated that the infrastructure currently in place at the site, present as components of the two removal actions (including an 80 gpm capacity water treatment facility, a product and groundwater recovery system, a soil bioventing system, and an SVE/catalytic oxidation system), will be used, with possible upgrade and likely expansion to achieve remediation of the contaminated source, to collect the remaining recoverable product, and to provide source containment.

12.1 Basis

The remedy described above has been selected by the USAF, in conjunction with the USEPA and NYSDEC, because it is technically efficient and cost effective. The selected remedy addresses the remedial objectives to clean up contaminated soil and residual product in the vadose zone and the zone of water table fluctuation at the site to concentrations less than or equal to established remediation goals and to recover floating (free) pumpable product at the site to the extent practicable. The potential of the technological components of the selected remedy to effectively remediate the source and to achieve remedial objectives has been demonstrated by the progress of remediation under the two removal actions underway at the site (URS 1997). Further, human health will be protected during the period of time necessary to achieve source

remediation, currently estimated to be 10 years, by implementing institutional controls to prevent human exposure, and by pumping and treating groundwater to prevent contaminant migration from the source.

12.2 Identification of Remedy

The selected remedy for remediation of the FT-002 Source OU includes the following components:

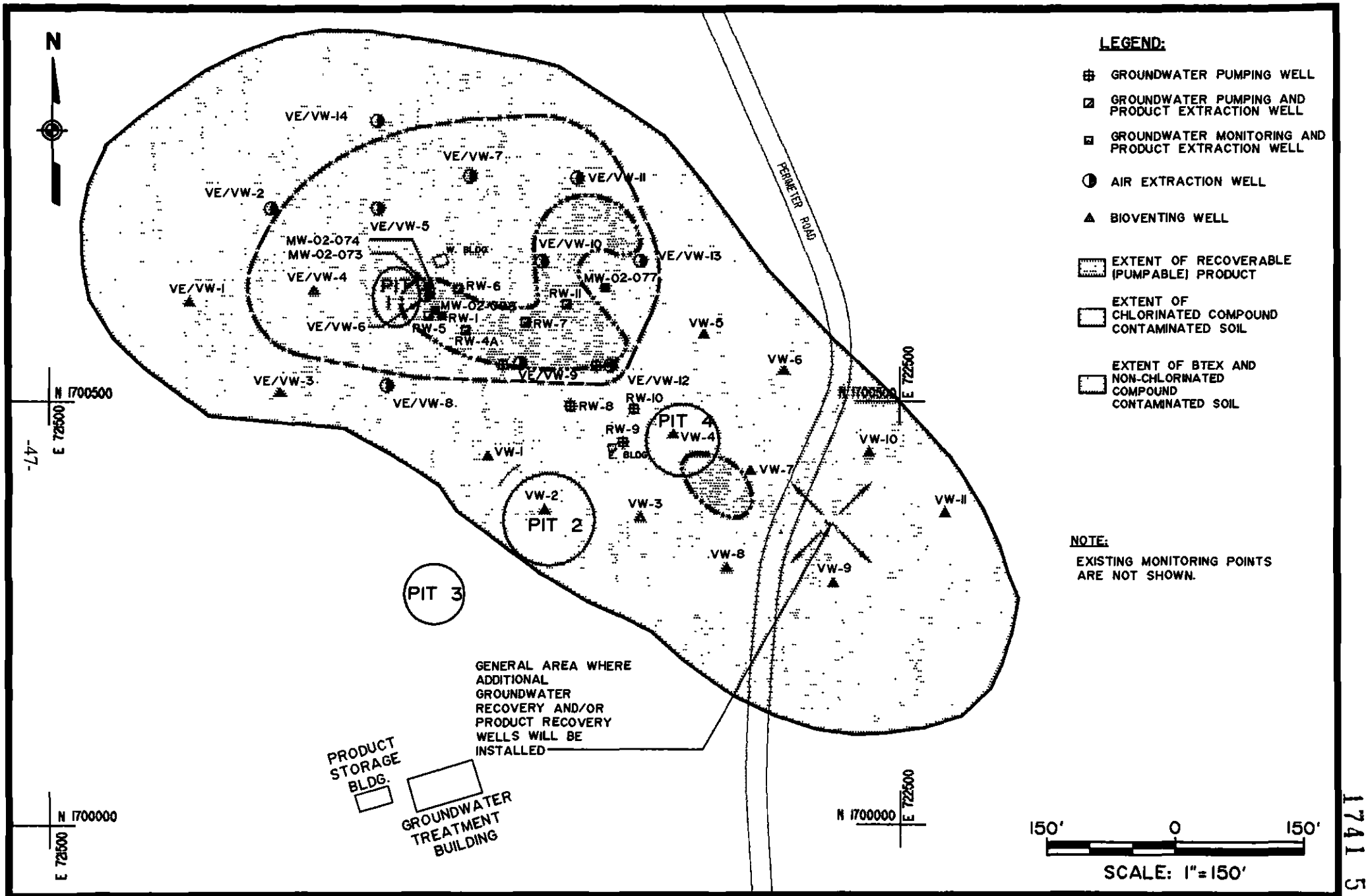
- Product Removal
- Soil Vapor Extraction (Pit 1)
- Bioventing (All Soils)
- Water Table Depression
- Source Containment
- Institutional Controls (Land Use and Groundwater Well Installation Restrictions)
- Progress Soil Monitoring
- Five-Year Site Reviews

These components are discussed individually below.

Product Removal

The product removal system is a dual pump system. Groundwater is pumped to lower the water table which induces product to move toward extraction (recovery) wells by gravity. Product that accumulates in the wells is pumped to a product storage tank and disposed of at a permitted waste oil recycling and disposal facility. Groundwater is treated in the existing site groundwater treatment system before being discharged to a nearby surface stream according to NYSDEC effluent criteria. Currently, an air stripper is utilized with carbon polishing to remove volatile organics from recovered groundwater. Stripped chemicals are emitted to the atmosphere without treatment. The need for treatment of the air stripper emissions will be re-evaluated as necessary when a change in remedial system operating conditions occurs basewide, or when changes in reuse at the base significantly shifts receptor proximity. The current system includes ten groundwater extraction wells and ten product recovery wells. The recovery wells and the estimated extent of pumpable free product are shown in Figure 9. Because some pumpable product lies downgradient from the influence of the most downgradient product recovery well, one or more additional product recovery wells will need

J:\35291.00\CAD 1=150 8/28/00-3 BJG (COLOR)



-47-

URS CONSULTANTS, INC.

SVE, BIOVENTING, AND GROUNDWATER AND PRODUCT RECOVERY SYSTEM COMPONENTS

FIGURE 9

1741 51

to be installed to effect complete capture of the remaining recoverable product. Expansion of the product recovery network will be evaluated following a comprehensive soil boring and sampling event that will be completed following the signing of the ROD (See Section 12.3).

Soil Vapor Extraction

SVE will be used to remove chlorinated compounds (primarily TCE and DCE) from contaminated soil in the vicinity of Pit 1. Currently, the major SVE system components include 14 vapor extraction wells, a 20-horsepower blower to extract soil gas from the wells, and a catalytic oxidizer which destroys volatile organic compounds (VOCs) before they are released to the atmosphere. The current SVE components and their relationship to chlorinated compound contamination are shown in Figure 9.

Bioventing

Bioventing will be used to remove nonchlorinated, petroleum-related compounds from contaminated soil. Bioventing is used to promote the growth of biological organisms (by supplying oxygen), which consume petroleum-related contamination. Bioventing is ineffective in remediating chlorinated compounds, therefore, it is used in areas where chlorinated compounds are not present at significant levels. The current bioventing system consists of 11 air injection wells and a 7.5-horsepower blower (located in the east equipment building shown in Figure 9) and 14 air injection wells and a 7.5-horsepower blower (located in the west equipment building). The wells that can be used to remediate soil by bioventing in the vicinity of Pit 1 (west building) are the same wells currently being used for SVE. Three of the 14 wells currently are being employed in bioventing mode, since these wells were not extracting appreciable quantities of chlorinated compounds in SVE mode. Similarly, the other 11 wells at Pit 1 could be switched to bioventing mode, from SVE mode, when chlorinated compounds are no longer being remediated. This will enable the complete remediation of petroleum-related compounds in the vicinity of Pit 1. Note that it is believed, based upon operational data (URS 2000c), that contamination near Pit 3 has been remediated. However, this will be confirmed by the comprehensive soil boring and sampling event, and additional remediation will be undertaken by modification of the existing site systems, if necessary.

Water Table Depression

The water table elevation at the FT-002 site has fluctuated several feet as a result of seasonal changes. This fluctuation has caused floating product to smear onto subsurface soil, thereby creating a deep zone of contamination below the water table. Ten existing extraction wells (Figure 9) currently are used to extract groundwater to lower the water table in the contaminated zone, enabling remediation of the soil below the water table by SVE or bioventing. Recent borings have shown that contamination (petroleum related) is present below the water table in areas that are outside the influence of the ten existing extraction wells. Thus, it will be necessary to install additional extraction wells to complete remediation of all onsite soil contamination. An evaluation of the pumping network relative to the locations where soil contamination is found below the water table will be completed following the comprehensive soil boring and sampling event.

Source Containment

Further migration of contamination dissolving into groundwater in the source area will be prevented by pumping in the source area. Currently, most of the source, including the area contaminated by chlorinated compounds, is being contained by the existing groundwater recovery system. An evaluation of the containment capture zone will be performed using existing pumping and piezometric data, and analytical methods following ROD signing. To accomplish containment over the entire source area, additional recovery wells will need to be installed. Routine piezometric monitoring will be undertaken to ensure that the entire soil source is adequately contained. Additional piezometric monitoring points will be constructed if necessary to reliably measure or monitor the capture zone.

Source containment will continue, at a minimum, until the Source OU remedial objectives are achieved. After the remedial objectives for the Source OU have been achieved, operation of the extraction wells used for containment may be extended if significant contaminant mass continues to be present in extracted groundwater. This continued operation would assist in achieving the remedial objectives for the Groundwater OU, which addresses the contaminated groundwater from the FT-002 source area. A decision to continue or terminate operation of each component of the preferred alternative would be made in cooperation and concurrence between the USAF, USEPA, and NYSDEC.

It is anticipated that treatment of contaminated water collected for water table depression (for both SVE/bioventing and product removal) and source containment will be accomplished using the existing onsite water treatment facility. It is expected that the 80-gpm capacity of the facility will be adequate to treat all recovered groundwater necessary for both depression and containment. Improvements to the facility capacity will be implemented should a larger capacity be needed to achieve remedial objectives. Once all pumpable product has been recovered, it may be possible to discontinue some treatment elements at the existing facility or to discharge collected groundwater to an alternate facility that may be constructed as part of the Groundwater OU.

Institutional Controls

Institutional controls are included in the selected remedy. These are:

- Prohibition of the installation of any wells for drinking water or any other purposes which could result in the use of the underlying groundwater.

- Prohibition of development or land use which interferes with remedial operations.

The prohibition of the installation of wells addresses contaminants in groundwater beneath the site, which are present at levels above New York State groundwater standards and may pose a threat to human health if groundwater is used for drinking water. According to land use plans (PARC 1995), the identified use of FT-002 and its surrounding area will be commercial/industrial. At site FT-002, there is no unacceptable health risk associated with the planned land use or any other land use, with the exception of the risk posed by contaminated groundwater noted above.

The USAF will incorporate language implementing the institutional controls outlined in this ROD, in deeds/property transfer documents and leases/lease documents with any grantees, successors, transferees, or lessees upon property transfer or lease of any or all of the areas subject to restriction. Because the USAF is the owner of the subject parcels, it is legally able to implement the restrictions via deeds/property transfer documents and leases/lease documents. Further, language will be included in the instruments binding the grantee, successor, transferee or lessee to include the language implementing the institutional controls in all future deeds/transfer documents and leases/lease documents. Review of the effectiveness of the institutional

controls will be undertaken, at a minimum, every five years by the USEPA and USAF according to Section 121(c) of CERCLA. Deeds/property transfer documents will be recorded with the Clinton County Clerk's Office, currently located at 137 Margaret Street, in Plattsburgh, New York.

After the ROD is signed, the USAF will incorporate the areal limits (including map coordinates) of the institutional controls for the FT-002 Source OU onto a basewide map that denotes the extent of all controls that have been agreed upon to date for this and other IRP sites at the former Plattsburgh AFB. This map has been submitted to the NYSDEC, USEPA, and local agencies, and will continue to be updated and distributed as new controls are agreed upon. The areal extent (including coordinates) of the controls specific to the FT-002 Source OU are shown on Figure 10.

Progress Monitoring

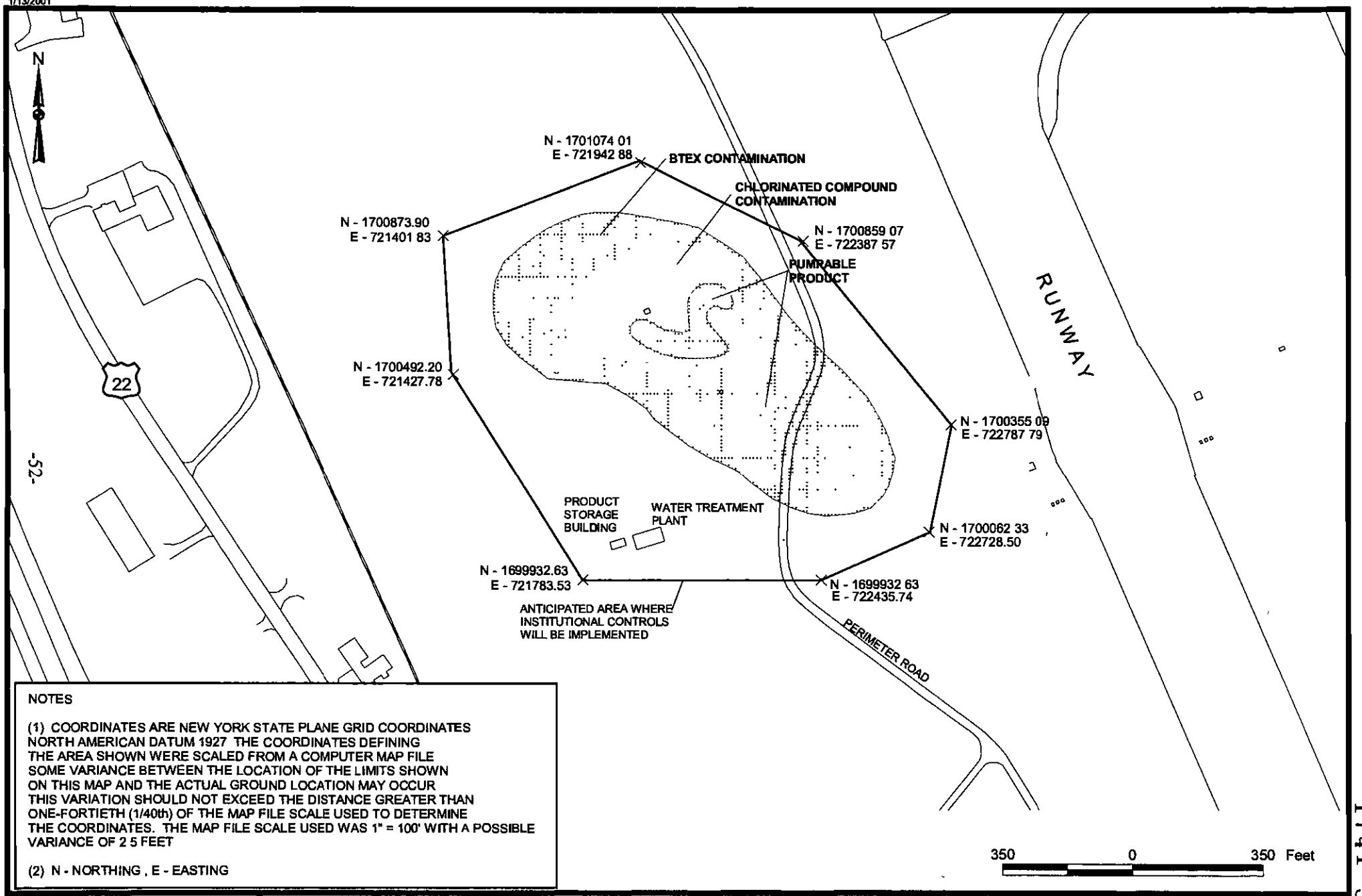
Soil monitoring activities will be conducted at the site to evaluate the progress of remediation. These activities include the following:

- Periodic sampling of soil gas monitoring locations for oxygen, carbon dioxide, and methane will be conducted to evaluate the progress of soil remediation by bioventing.

- Periodic sampling of extracted soil gas for VOCs will be conducted to assess the progress of soil remediation by SVE.

- Periodic soil sampling for site contaminants both above and below the water table will be conducted at least every five years to evaluate the progress of source remediation until remediation goals are achieved. Samples will be analyzed for at least the parameters listed in Table 3. An initial comprehensive soil sampling event will be conducted as soon as practicable following ROD signing. This initial event will be used to target areas of the site that may require expansion of remedial components. An additional soil sampling event will be undertaken when other monitoring methods (noted above) indicate that remediation of soil may be completed.

J \0100013\DB\GIS\1999\ft-002 apr AREA OF INSTITUTIONAL CONTROLS
1/13/2001



NOTES

(1) COORDINATES ARE NEW YORK STATE PLANE GRID COORDINATES NORTH AMERICAN DATUM 1927 THE COORDINATES DEFINING THE AREA SHOWN WERE SCALED FROM A COMPUTER MAP FILE SOME VARIANCE BETWEEN THE LOCATION OF THE LIMITS SHOWN ON THIS MAP AND THE ACTUAL GROUND LOCATION MAY OCCUR THIS VARIATION SHOULD NOT EXCEED THE DISTANCE GREATER THAN ONE-FORTIETH (1/40th) OF THE MAP FILE SCALE USED TO DETERMINE THE COORDINATES. THE MAP FILE SCALE USED WAS 1" = 100' WITH A POSSIBLE VARIANCE OF 2 5 FEET

(2) N - NORTHING , E - EASTING

URS Consultants, Inc.	FT-002 SOURCE OPERABLE UNIT ANTICIPATED AREA OF INSTITUTIONAL CONTROLS	FIGURE 10

1741 56

- Periodic groundwater monitoring at several monitoring well locations will be conducted to evaluate the impact of the source remediation on groundwater within the area of groundwater use restriction specified for this Operable Unit. This monitoring will be used to determine when the groundwater use restriction can be rescinded as well as when groundwater pumping for source containment can be discontinued.

Five-Year Site Review

Every five years (at minimum), a review of the selected remedy will be undertaken by the USAF and USEPA in accordance with Section 121(c) of CERCLA. Remedial progress and the need to continue institutional controls to protect human health and the environment will be evaluated as part of the review.

12.3 Coordination and Design

The NYSDEC and USEPA will be involved in the coordination and design of the expansion of remediation through the review process described in the Federal Facilities Agreement. The NYSDEC and USEPA were provided with design documents for the remedial systems currently in place on site. The following design documents will be prepared in sequence:

- *Remediation Progress Soil Boring and Sampling Event Work Plan*
- *Report on the Initial Remediation Progress Soil Boring and Sampling Event*
- *Remedial System Upgrade and Expansion Plan*
- *Remedial Action Work Plan*
- *Operation and Monitoring Plan*

The *Remediation Progress Soil Boring and Sampling Event Work Plan* will describe the locations and depths of samples, and the sampling and analytical procedures that will be used in initial and subsequent soil boring and sampling events. The initial event will be used to target areas of the site that require expansion of the existing site remedial components and to provide a baseline for future analysis of the remedy's effectiveness toward achieving remediation goals. These areas will be identified in the *Report on the Initial Remediation Progress Soil Boring and Sampling Event.* Subsequent comprehensive events will

be used to evaluate the progress of the remediation, and to determine when remediation goals have been achieved and the remediation can be discontinued. The *Remedial System Upgrade and Expansion Plan* will utilize the data gathered in the initial sampling event to propose specific modifications and upgrades to the existing remediation systems necessary to affect complete mitigation of onsite contamination present at concentrations above remediation goals. The adequacy of the monitoring systems at the site, both remedial and hydraulic, will be evaluated and modifications and upgrades to these systems will be recommended, if necessary. The *Remedial Action Work Plan* will detail the procedures for implementation of the recommendations of the *Remedial System Upgrade and Expansion Plan.* The *Operation and Monitoring Plan* will describe procedures and frequencies of air, soil, and groundwater sampling, and propose a reporting schedule for progress monitoring events. Also, the *Operation and Monitoring Plan* will provide a procedure for evaluating the effectiveness of institutional controls. The *Remedial System Upgrade and Expansion Plan* and the *Remedial Action Work Plan* will meet the requirements of remedial design and remedial action work plan preparation specified in Part IX, Items G and H, respectively, of the Federal Facilities Agreement.

12.4 Comparison of the Selected Remedy to Nine USEPA Criteria

The USEPA has developed nine evaluation criteria, which are specified in the NCP, that are used to assess remedial alternatives. These criteria are listed in Table 5 and compared to USAF's selected remedy.

TABLE 5
PLATTSBURGH AFB FT-002 SITE
COMPARISON OF SELECTED REMEDY TO USEPA EVALUATION CRITERIA

CRITERION	DESCRIPTION OF CRITERION	COMPARISON OF REMEDY TO CRITERION
Overall Protection of Human Health and the Environment	Addresses whether a remedy provides adequate protection to human and ecological receptors.	The selected remedy is protective of human health and the environment. Onsite contamination will be remediated to levels that no longer pose a threat. Institutional controls will be used to provide protection during remediation.
Compliance with ARARs	Addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of all state and federal environmental statutes.	It is anticipated that the selected remedy will achieve site specific remediation goals (Table 3), developed in coordination with NYSDEC for the protection of groundwater resources, over the course of the next 10 years. The remedial action will continue until the site specific remediation goals are achieved.
Long-Term Effectiveness and Permanence	Refers to the magnitude of residual risk and the ability of the remedy to maintain reliable protection of human health and the environment once cleanup goals have been met.	After remediation goals have been met, little or no threat to human health and the environment due to residual contamination is anticipated.
Reduction of Toxicity, Mobility, or Volume	Addresses the anticipated performance of treatment technologies employed in the remedy.	The selected remedy uses catalytic oxidation in conjunction with SVE and bioremediation to destroy contamination. It is anticipated that remediation goals will be achieved in 10 years. During that time, contaminants will be prevented from leaving the source by pumping.

TABLE 5 (Continued)

CRITERION	DESCRIPTION OF CRITERION	COMPARISON OF REMEDY TO CRITERION
Short-Term Effectiveness	Refers to the speed with which the remedy achieves protection, as well as the remedy's potential to create adverse impacts during its implementation.	Because many elements of the selected remedy are already in place as part of the two removal actions underway, the remedy can be implemented relatively quickly. There are no adverse impacts expected due to the implementation of the remedy.
Implementability	Address aspects of implementing the remedy such as the ability to construct and operate technologies, reliability, ability to monitor effectiveness, availability of materials, permitting, and coordination with other agencies.	The selected remedy incorporates technological components of two removal actions already implemented. The performance of these systems to date validates the implementability of the selected remedy.
Cost	Refers to the capital and O&M cost of a remedy and its present worth.	In addition to the costs already incurred to implement the two removal actions underway, it is expected that about $550,000 will be required to implement the necessary capital improvements to the onsite remedial components and about $400,000 will be needed annually for O&M.
State Acceptance	Addresses the technical and administrative concerns of the State with regard to remediation.	The NYSDEC has provided input during the preparation of the Proposed Plan and ROD and its concurrence is given in Appendix C.
Community Acceptance	Addresses public comments received on the Administrative Record and the Proposed Plan.	Community comments to the selected remedy are discussed in the Responsiveness Summary of this ROD.

13.0 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and resource recovery technologies to the extent practicable. Product removal, SVE with catalytic oxidation, and bioventing are elements of the remedy that will be used to reduce the toxicity, mobility, or volume of site contaminants, thereby satisfying the statutory preference for treatment as a principle element of the remedy (see Section 11.0). As demonstrated in Table 6, the selected remedy is the least costly of the three alternatives that are protective of human health and the environment, achieve reduction of toxicity, mobility, or volume through treatment, and afford permanent solutions.

Until soil remediation goals and groundwater ARARs are achieved, contaminants will remain on site above levels that allow for unlimited use and unrestricted exposure. Therefore, a statutory review, according to Section 121 (c) of CERCLA, will be conducted within five years after initiation of the remedial action, and every five years thereafter, to ensure that the remedy is, or will be, protective of human health and the environment.

TABLE 6
PLATTSBURGH AFB FT-002 SITE
MATRIX OF COST AND EFFECTIVENESS DATA

Alternative No.	Description	Present Worth Cost	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
1	No Action	$0	• Does not offer Long-Term Effectiveness and Permanence	• Does not Reduce TMV by Treatment	Achieves Goals in 100 or More Years
2	Institutional Action	$0.3 million	• Does not offer Long-Term Effectiveness and Permanence	• Does not Reduce TMV by Treatment	Achieves Goals in 100 or More Years
3	Excavation and Onsite Treatment of All Contaminated Soils	$66.0 million	• Includes Permanent Treatment of Soils	• Reduces TMV by Excavation and Ex-situ Treatment	Achieves Goals in ~2 Years
4	Soil Vapor Extraction of All Contaminated Soils	$4.8 million	• Includes Permanent Treatment of Soils	• Reduces TMV by In-situ Treatment and Product Disposal	Achieves Goals in ~10 Years
5 (Selected Remedy)	Soil Vapor Extraction of Soils in the Vicinity of Pit 1 and Bioventing of All Contaminated Soils	$3.4 million	• Includes Permanent Treatment of Soils	• Reduces TMV by In-situ Treatment and Product Disposal	Achieves Goals in ~ 10 Years

TMV = Toxicity, Mobility, or Volume

14.0 DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes between the preferred alternative presented in the Proposed Plan and the selected remedy presented in this Record of Decision.

REFERENCES

ABB Environmental Services, Inc. and URS Consultants, Inc. (ABB-ES & URS). 1993. *Final FT-002 Soil Remedial Investigation Report, Plattsburgh Air Force Base.* Buffalo, NY and Portland, ME. March.

E.C. Jordan. 1989. *Installation Restoration Program, Site Inspection Report.* July. Portland, ME.

E.C. Jordan. 1990. *Installation Restoration Program at Plattsburgh Air Force Base, New York. Engineering Evaluation/Cost Analysis, Site FT-002 Free-Product Removal Action.* Portland, ME. July.

Hunt, Donald D. 1999. Letter from Donald D. Hunt, URS Greiner Woodward Clyde to Kevin Thomas, AFCEE/ERB regarding FT-002 Bioventing Soil Sampling Results, 13 October.

New York State Department of Environmental Conservation (NYSDEC). 1994. *Determination of Soil Cleanup Objectives and Cleanup Levels,* TAGM #4046. Albany: Division of Hazardous Waste Remediation (currently known as the Division of Environmental Remediation).

Parsons Engineering Science, Inc. (Parsons). 1995. *Intrinsic Remediation Engineering Evaluation/Cost Analysis for Site FT-002, Plattsburgh Air Force Base, Plattsburgh, New York.* Denver, CO April.

Parsons Engineering Science, Inc. and OHM Remediation Services Corp. (Parsons & OHM). 1996. *Installation Restoration Program, Action Memorandum, Fire Training Area 2 (Site FT-002).* April. Parsons Engineering Science, Inc, Liverpool, NY and OHM Remediation Services, Corp, Austin, TX.

Plattsburgh Airbase Redevelopment Corporation (PARC). 1995. *Comprehensive Reuse Plan for Plattsburgh Air Force Base.* 15 September.

Tetra Tech. 1995. *Final Environmental Impact Statement, Disposal and Reuse of Plattsburgh Air Force Base, New York.* Prepared for the Plattsburgh Air Base Redevelopment Corporation.

URS Consultants, Inc. (URS) 1995. *Draft Final Site FT-002 Source Control (Soil) Operable Unit Feasibility Study Report.* May. Buffalo, New York.

_____. 1997 (ongoing). Monthly operations report for soil vapor extraction, bioventing, and groundwater and product recovery system for the Fire Training Area (FT-002) at Plattsburgh Air Force Base, Plattsburgh, New York. 10 March. Buffalo, New York.

_____. 1998. *Draft Informal Technical Information Report Fire Training Area (FT-002) October 1997 Copper and Lead Sampling Event.* Buffalo, New York.

_____. 1999. AFBCA Response to Comments from NYSDEC, dated August 7, 1998 on the March 1998 Draft Final Proposed Plan for the Fire Training (Site FT-002) Soil/Source Operation Unit. 22 April. Buffalo, NY.

_____. 2000a. *Draft Final Fire Training Area (FT-002)/Industrial Area Groundwater Operable Unit Remedial Investigation/Feasibility Study.* Buffalo, New York. February

_____. 2000b. *Second Revision to the Draft Final FT-002 Source Operable Unit Proposed Plan.* Buffalo, New York. August.

_____. 2000c. Summary of FT-002 Operations During September 1999. 24 July.

GLOSSARY

AFBCA: Air Force Base Conversion Agency

Administrative Record: A file established and maintained in compliance with Section 113(K) of CERCLA, consisting of information upon which the lead agency bases its final decisions on the selection of remedial method(s) for a Superfund site. The Administrative Record is available to the public.

Adsorption: The adhesion of molecules (as of gases, liquids) to the surfaces of solid bodies or liquids with which they are in contact.

Air Stripping: A technology used to remove VOCs from water. In an enclosed vessel air passing through the contaminated water removes and carries volatiles to a collection point.

Alternative: Combination of technologies used for remediation of the site.

Ambient: Around, surrounding.

Applicable or Relevant and Appropriate Requirements (ARARs): ARARs include any state or federal statute or regulation that pertains to protection of public health and the environment in addressing certain site conditions or using a particular remedial technology at a Superfund site. A state law to preserve wetland areas is an example of an ARAR. USEPA must consider whether a remedial alternative meets ARARs as part of the process for selecting a remedial alternative for a Superfund site.

Aquifer: A water-bearing formation or group of formations.

BTEX: Volatile Organic Compounds (benzene, toluene, ethylbenzene, xylene) typically associated with gasoline and other fuel product contamination.

Carcinogenic: Chemicals which, when exposure occurs at a particular level, may produce cancer.

Chlorinated Compounds: An organic compound that contains chlorine such as trichloroethene (TCE) and dichloroethene (DCE). Also referred to as chlorinated hydrocarbons or chlorinated solvents.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act requires federal agencies to investigate and remediate abandoned or uncontrolled hazardous waste sites.

Contaminant Plume: A volume of contaminated groundwater with measurable horizontal and vertical dimensions. Plume contaminants are dissolved in and move with groundwater.

Ecological Receptors: Fauna or flora (plant and animals) in a given area that could be affected by contaminants in surface soils, surface water, and/or sediment.

EE/CA: Engineering Evaluation / Cost Analysis

FS: Feasibility Study

Floating Product: A chemical or mixture of chemicals in pure form (non-aqueous or not dissolved in water) that is of lighter density than water and therefore floats on the top of the water table.

Free Product: A chemical or mixture of chemicals in pure form (non-aqueous or not dissolved in water). The substance is free if it can be recovered by pumping.

Groundwater: Water found beneath the earth's surface that fills pores within materials such as sand, soil, gravel, and cracks in bedrock, and often serves as a source of drinking water if found in an adequate quantity.

Heavy Metals: Toxic metallic contaminants such as cadmium, lead, copper, and mercury.

Inorganic Compounds: A class of naturally occurring compounds that includes metals, cyanide, nitrates, sulfates, chlorides, carbonate, bicarbonate, and other oxide complexes.

In-situ Treatment: Physical, chemical, or biological treatment that is applied without extracting or excavating the contaminated medium (soil or groundwater) from its natural location.

Installation Restoration Program (IRP): The U.S. Air Force subcomponent of the Defense Environment Restoration Program (DERP) that specifically deals with investigating and remediating sites associated with suspected releases of toxic and hazardous materials from past activities. The DERP was established to cleanup hazardous waste disposal and spill sites at Department of Defense facilities nationwide.

Interim Remedial Measure (IRM): An IRM is an immediate action to eliminate or mitigate a release or threatened release of hazardous wastes. An IRM can be carried out without extensive investigation.

Leachate: Solution produced by percolating liquid in contact with contaminated matter.

LIF: Laser-Induced Fluorescence

Low-Permeability: Permeability is a measure of the capacity of a liquid to pass through a given material. A low-permeability soil would therefore allow only a small amount of water to pass through.

Monitoring: Ongoing collection of information about the environment that helps gauge the effectiveness of a cleanup action. Information gathering may include groundwater well sampling, surface water sampling, soil sampling, air sampling, and physical inspections.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The NCP provides the organization, structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants. The NCP is required under CERCLA and the Clean Water Act, and USEPA has been delegated the responsibility for preparing and implementing the NCP. The NCP is applicable to response actions taken pursuant to the authorities under CERCLA and the Clean Water Act.

National Priorities List: USEPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program.

Natural Attenuation. Processes by which contaminant levels are reduced in nature. Contaminants in soil or groundwater are reduced by aerobic (oxygen-using) bacteria, other biological activity, volatilization, and dilution/dispersion.

New York State Registry of Inactive Hazardous Waste Sites: The state's compilation of all known hazardous waste sites, comprising nine volumes with site descriptions and locations. (Copies available for review in NYSDEC offices).

Noncarcinogenic: Chemicals that may produce adverse health effects that are not related to cancer.

NYSDEC: The New York State Department of Environmental Conservation.

Operation and Maintenance. (O&M): A step in the remedial program. While a site is being remediated it is overseen to make sure that the remedy is working as planned and that the construction remains intact.

Operable Unit (OU):. A separate and distinct remedial project that is part of a large, complex hazardous waste site. Each OU has its own ROD, RI/FS, design and construction.

Organic Compounds: Any chemical compounds built on the carbon atom, i.e., methane, propane, phenol, etc.

Polynuclear Aromatic Hydrocarbons (PAHs): Compounds often associated with combustion process and distillation tars.

Polychlorinated Biphenyls (PCBs): Formerly used as a lubricant and transformer coolant.

Petroleum Hydrocarbons (PHCs): The mixture of hydrocarbons (hydrogen and carbon molecules) and small amounts of other substances that make up petroleum. Hydrocarbons are chemical compounds consisting of carbon and hydrogen, and are found in gasoline, naphtha, and other products produced by refining processes.

Proposed Plan· A public document that solicits public input on a recommended remedial alternative to be used at a National Priorities List (NPL) site. The Proposed Plan is based on information and technical analysis generated during the RI/FS. The recommended remedial action could be modified or changed based on public comments and community concerns.

Product: A chemical or mixture of chemicals in pure form (non-aqueous or not dissolved in water).

Preliminary Site Assessment (PSA): The first stage investigation of a site to determine if disposal of hazardous waste poses a significant threat to public health and the environment. The PSA combines the former Phase I and Phase II investigations.

Pumpable Product: A chemical or mixture of chemicals in pure form (non-aqueous or not-dissolved in water) that can be recovered by pumping (a.k.a. free product).
Pump and Treat: Pumping and treating groundwater to remove contamination. Treatment is usually by air stripping; cleaned water is returned to the ground or discharged to nearby surface water.

Site Investigation (SI): An investigation that determines the nature and composition of contamination at a hazardous waste site. Not as in-depth as a remedial investigation

Record of Decision (ROD): A public document that explains the remedial alternative to be used at a National Priorities List (NPL) site. The ROD is based on information and technical analysis generated during the Remedial Investigation, and on consideration of the public comments and community concerns received on the Proposed Plan. The ROD includes a Responsiveness Summary of public comments.

Remedial Action: An action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to human health or the environment.

Remedial Alternatives: Options evaluated to address the source and/or migration of contaminants to meet health-based or ecology-based remediation goals.

Remedial Investigation (RI): The Remedial Investigation determines the nature and extent and composition of contamination at a hazardous waste site, and is used to assess the types of remedial options that are developed in the Feasibility Study.

Residual Product: A chemical or mixture of chemical in pure form (non-aqueous or not dissolved in water). The substance is considered residual if it is predominantly found adhering between soil particles, and cannot be recovered by pumping.

SARA: The Superfund Amendments and Reauthorization Act of 1986 amended the 1980 CERCLA environmental statues. The amendments re-authorized the federal Superfund which had expired in 1985 and established the preference for remedies that permanently reduces toxicity, volume or mobility of hazardous constituents.

Semivolatile Organic Compounds (SVOCs): Organic constituents which are generally insoluble in water and are not readily transported in groundwater.

Standards, Criteria and Guidance Values (SCGs): Values set by regulatory agencies (e.g. NYSDEC, NYSDOH) that are used to evaluate the relative amount of contamination.

Solidification: Process by which materials are added to soil or sediments to reduce the release of contaminants.

Solvents: Organic liquids used to dissolve grease and other oil-based materials. Many solvents are toxic at high concentrations.

Source: Area at a hazardous waste site from which contamination originates.

Source Control: A remedy that addresses contamination problems at their source, rather than at some other more distant point along the chain of exposure.

Smear Zone: The area below the ground surface where the water table rises and falls with the seasons over a period of years. Also known as the zone of water table fluctuation. Residual product is found in this area if floating product has historically been present on the water table.

SVE: Soil vapor extraction.

Superfund: The trust fund, created by CERCLA out of special taxes, used to investigate and clean up abandoned or uncontrolled hazardous waste sites. Out of this fund USEPA either: (1) pays for site remediation when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work or (2) takes legal action to force parties responsible for site contamination to cleanup the site or pay back the federal government for the cost of the remediation. Federal facilities are not eligible for Superfund monies.

Terrestrial Wildlife: Animals living on land (e.g., reptiles, small mammals, small birds, predatory mammals, predatory birds).

To Be Considered (TBC): Federal and state policies, advisories, and other non-promulgated health and environment criteria, including numerical guidance values, that are not legally binding. TBCs are used for the protection of public health and the environment if no specific ARARs for a chemical or other site conditions exist, or if ARARs are not deemed sufficiently protective.

USEPA: United States Environmental Protection Agency

Vadose Zone: The volume located between the ground surface and the water table. Also known as the unsaturated zone.

Volatile Organic Compounds (VOCs): Organic constituents which tend to volatilize or to change from a liquid to a gas form when exposed to the atmosphere. Many VOCs are readily transported in groundwater.

Zone of Water Table Fluctuation: The area below the ground where the water table rises and falls with the seasons over a period of years. Also known as the smear zone. Residual product is found in this area if product has historically been present floating on the water table.

TAB

APPENDIX A: TRANSCRIPT OF PUBLIC MEETING

STATE OF NEW YORK

PROPOSED PLAN FOR SITE FT-002

FIRE TRAINING AREA SOURCE OPERABLE UNIT

P U B L I C M E E T I N G

Taken on Thursday, December 14,
2000 at 7:00 p.m. at
The Old Courthouse Conference Room
Plattsburgh, New York.

APPEARANCES:

MICHAEL SOREL, CHAIRMAN
BRUCE PRZYBYL, U.R.S. GREINER, INC.
DAVID FARNSWORTH, AFBCA
JOSEPH SZOT, AIR FOR CENTER FOR ENVIRONMENTAL EXCELLENCE.

COURT REPORTERS ASSOCIATES
117 Bank Street, Burlington, Vermont 05401
1-800-439-4593

DECEMBER 14, 2000

MR. SOREL: I'd like to begin the public meeting for this site, Site FT-002, the Fire Training Area Source Operable Unit. For those that don't know me, I'm Mike Sorel, the BRAC Environmental Coordinator working for the Air Force Base Conversion Agency at Plattsburgh. I will be presiding over this meeting, the main purpose of which is to allow the public the opportunity to comment on the Air Force's actions for this site.

Assisting me in tonight's presentation is Bruce Przybyl, the project manager at Plattsburgh for URS Greiner, Dave Farnsworth with the Air Force Base Conversions Agency, and Joe Szot with the Air Force Center for Environmental Excellence. We are here to provide answers to technical questions that you may have about the remedial alternative being considered by the Air Force.

Tonight's agenda will consist of a summary of data gathered at the site and a description of the preferred remedial action. After that, we will move to the most important part of this meeting -- the part where you provide your comments on the remedial action.

First, however, I need to take care of several

administrative details.

As you can see, everything being said tonight is being taken down word-for-word by a professional court reporter. The transcript will become part of the Administrative Record for the site.

We would like everyone to complete the Sign-in sheet at the door. We will use the sheet to review our mailing list for the site.

At the conclusion of the presentation, we will open the floor to comments and questions. We request that all questions be held to the end of the presentation. If you have a prepared statement, you may read it out loud or turn it in without reading it. In any case, your comments will become part of the record.

We have cards at the front table for your use for written comments. If you turn in any written comments, please write your name and address on them. If you later decide to make a comment you may send additional comments to us at this address. We will accept comments until January 5, 2001. I will show the address slide again at the end of the meeting.

The final point is that our primary purpose tonight is to listen to you. We want to hear your

comments on any issues you are concerned about, and we will try to answer any questions you may have. We want you to be satisfied that the action we take will properly and fully address the problems at this site.

Now I would like to turn the meeting over to Bruce Przybyl.

MR. PRZYBYL: Good evening. We'd like to talk to you about the Air Force's recommended alternative for one of the two parts of the Fire Training Area or FT-002 site. The investigation and decision-making has been separated into two parts, or operable units for the Fire Training Area in order to simplify and accelerate remedial action at the site. The operable units are the Source Operable Unit and the Groundwater Operable Unit.

Today we are focusing on the Source Operable Unit. A public meeting regarding the proposed remedial action for the Groundwater Operable Unit will likely occur early in 2001.

The Fire Training Area is approximately an 8-acre site located in the northwestern portion of the base between the runaway and the base's western boundary. Fire training activity occurred at the

site from the mid to late 1950's through 1989.

During fire training exercises one or more of four pits on site were filled with off-spec fuel mixed with waste oil or solvents and ignited. Over repeated exercises over a 35-year period of operation the soil underneath the pits became contaminated. In addition, a floating product layer -- this layer right here -- formed on top of the water table and spread laterally.

This product layer is a pure fuel-based mixture of chemicals that is lighter than water and therefore floats on top of it. As the water table rose and fell seasonally, the product rose and fell with it, smearing the soil in what we refer to as the "zone of water table fluctuation."

Contamination also has dissolved from the contaminated soil and product into the underlying groundwater here. Contaminants in groundwater move with the groundwater which flows toward the east and southeast in the upper sand aquifer. A vertical migration of contamination in groundwater is limited by a low permeability clay layer which underlies the sand aquifer. Let's make a mark on here. The contamination of soil product consists of -- well it consists primarily of fuel-related chemicals

and volatile chlorinated hydrocarbons. The fuel-related chemicals which are present across the site, are biodegradable. The chlorinated hydrocarbons are primarily present in the vicinity of Pit 1, and biodegrade, but only at a slow rate.

Now the Source Operable Unit addresses the contaminated soil and product above the lowest limit of water table fluctuation, so the Source Operable Unit is this area above this line; the Groundwater Operable Unit starts here.

Considerable work has been accomplished at the site up to this point shown by the timeline. Investigation at the FT-002 site began in 1984 with a record search. In 1987 a few groundwater and soil samples were collected as a part of the investigation and as a result of the findings, further investigation was recommended.

Action at the site was broken up into the Source and Groundwater Applicable Units at that time and an effort was initiated to begin to recover floating product that had accumulated on the water table. This timeline only shows the source OU.

From 1988 to 1993, in that period a multi-phased Remedial Investigation was conducted that consisted of the advancement of many borings in

the source area, a collection of hundreds of soil samples that were chemically analyzed and the evaluation of potential human and ecological health risk. As mentioned before, the recovery of product was expedited by a remedial action. The selected system consisted of four dual-phase product recovery wells and a treatment plant that treats the water separated from the product before discharge to a tributary of the Salmon River. That system was constructed in 1992 and began operation in 1993.

Two additional studies were initiated in 1994, including an operational field test of a bioventing system to promote biological degradation of soil contaminants and a feasibility study. These are these two elements right here. The feasibility study evaluated several possible further actions for remediation of contamination at the site. In 1995, based on the studies conducted at the site at that time, the Air Force, in conjunction with New York State and the USEPA decided that remediation for the source operable unit should be expedited as a removal action until a long-term remedy could be finalized.

In 1996, the treatment plant capacity was expanded, soil vapor extraction with treatment of

extracted gasses by catalytic oxidation was installed at Pit 1 and a bioventing system was installed across the site. Those systems went online in 1997, and since the initiation of the two removal actions, the SE bioventing action and the original product recovery action, over 20,000 gallons of product have been recovered.

Formalization of a long-term remedy for the Source OU will be accomplished through the process that we are undergoing right now, the proposed plan and record decision process. The Air Force, New York State and USEPA have been working together in evaluating remedial options with the resultant recommendation presented in the Proposed Plan. The Plan builds upon the evaluation accomplished in the FS and also on the operational data that was collected since the FS was finalized. The design of the preferred action is expected to be undertaken this upcoming year.

An assessment of risk to human health was conducted for the FT-002 site soils portion during the remedial investigation. Risks were evaluated given current site use and given future hypothetical residential development. The assessment concluded that no unacceptable carcinogenic and

non-carcinogenic risk is present from direct contact with, inhalation of dust generated from, or inhalation of vapor emissions from contaminated site soil. However, unacceptable carcinogenic and non-carcinogenic risks are possible given ingestion of groundwater that has become contaminated by leaching through this contaminated soil, so the risk from this site is primarily because the soils are contaminated at the point where they are a source for groundwater contamination. There is no health risk for people that are on the site or there is no health risk for any development that would turn up some other than installation of groundwater wells for drinking.

Ecological risks were also evaluated and a potential threat appeared present to ecological receptors from lead and copper in surface soil. In coordination with New York State, additional samples for copper and lead were collected and it was determined that remediation to address lead and copper was not required.

Now remedial action objectives were established to focus remediation on the principle threat at the site which is a contaminated soil product to serve as sources from which contaminates are leaching into

the groundwater at potentially hazardous concentrations. These remedial action objectives are to clean up the contaminated soil and residual product located in the Vadose Zone, which is the unsaturated zone and the zone of water table fluctuation at the site to concentrations less than or equal to applicable standards or remediation goals. The second objective is to recover floating free product at the site to the extent practical.

Now there are some terms I just used that might require some explanation. Free product is product that can will be recovered by pumping. It flows on top of the groundwater table and we can pump it into wells and collect it directly. Residual product, on the other hand, is product that adheres to the soil and cannot be simply pumped out of the soil; therefore, it must be recovered by other means like soil vapor extraction and bioventing.

Remediation goals, we have another overhead to explain that. Remediation goals are a chemical specific, target concentrations that address the remedial action objective. Once these goals are met then the overall objective, which is to mitigate site contaminates in soil to the point where they no longer serve as a source for groundwater

contamination.

Once the remediation goals are met, then that objective is also met. These goals were developed in coordination with New York State.

Now the Air Force looked at a range of remedial alternatives designed to achieve remedial action objectives. The first alternative one is no action which you have heard before. It's required by the guidance to serve as a base line to compare other alternatives.

The second alternative is institutional action which would include mitigating the risks associated with the site, using deed restrictions. Deed restrictions would be to prevent groundwater ingestion.

The third alternative is excavation and on site treatment of contaminated soils. Essentially it's to create a large excavation all the way down to the water table or below it, dig all the soil up, treat it on site, and then put it back into the excavation.

The fourth alternative is to employ soil vapor extraction to the soils on the site and to recover product at the same time.

The fifth alternative which is the selected

remedy is to employ soil vapor extraction to treat contaminated soils in the vicinity of Pit 1 which are contaminated with chlorinated hydrocarbons and also to biovent the soils all over the site which are contaminated with fuel-related contamination at the same time we are recovering free product.

Now in comparing these alternatives, the first two alternatives no action is no institutional action; you are not really providing long-term effectiveness or permanence. The source continues to contaminate groundwater and they don't achieve the remediation objective in a reasonable time frame.

The third one would achieve goals in two years or less, about two years, but it's very expensive. The fourth and fifth alternatives also achieve the goals, are considered less expensive, would achieve these goals in less than ten years.

The fourth and fifth alternatives compare very well but the time frame in which they would accomplish achieving the objectives are similar and therefore alternative five is more efficient, so we selected alternative 5 as the preferred alternative for source operable units. This alternative provides the best balance between cost and

effectiveness of all the alternatives.

I'll just briefly go through the elements of the alternative which is product removal, bioventing, soil vapor extraction in Pit 1 where there are chlorinated hydrocarbons present, water table depression, exposes that zone of water table fluctuation so that we can attack that with soil vapor extraction or bioventing. Also source containment would be employed so that there would be no migration of these from the source beyond the area of the source during, until remedial goals were achieved, but it would also be institutional controls which are void until the remediation has been achieved over about ten years; land use restrictions and groundwater well installation restrictions.

There would also be progress soil monitoring to evaluate how the remediation was progressing and five-year site reviews as required by statute.

This alternative builds upon the infrastructure developed as part of the two remedial actions. Additional wells and other system additions would be evaluated following the initial comprehensive boring and soil sampling event.

I will go through these technologies in a little

bit greater detail. Now product removal is simply is accomplished by drawing down the water table near the well. Floating products floats on top of that water table downhill into the well where it's separated by a dual pump system in the well, it's pumped by separate lines to the treatment plant, the product line is simply collected and sent off-site for recycling or disposal, depending on the sampling results. The water is then treated at the treatment plant using vapor extraction, carbon metals pretreatment before it's discharged to the weapons storage area tributary in the Salmon River and it meets the discharge criteria developed by New York State.

Bioventing is a technology that enhances the natural biodegration ability of biological organisms in the soil. These organisms consume fuel; however, they need oxygen also. There is generally an oxygen deficiency for this organisms to feed optimally and at an optimal rate, so by pumping the oxygen into the ground we increase the importance of these organisms and the consumption of the fuel remaining contamination.

This process doesn't work well on the chlorinated hydrocarbons. They don't consume these

compounds and in some cases if the concentrations are high enough, the chlorinated hydrocarbons will actually kill these organisms so that they won't be able to do their job on the fuel. So that is why. That is illustrated by these points here where we are pushing oxygen, we are pushing air into the ground. The soil vapor extraction is the reverse process where we are actually applying a vacuum to bring in these contaminates in the air just physically drawing them into the well by a vacuum and then those vapors are treated at the surface by catalytic oxidation, and the oxidation and the chemicals are destroyed. The reason why again we have to employ soil vapor extraction in Pit 1 is because of the chlorinated hydrocarbons.

Now water table depression kind of occurs as we are doing these other things. As we are pumping product and drawing down the water table for the product, we are also drawing down the water table to expose this layer of contaminated soil and residual product for the water table fluctuation so we have enough wells out there to be able to draw the water table down to accomplish this and product removal at the same time. And source containment is also accomplished by pumping with these same wells.

Now this diagram shows the source area in a little different scale. It shows where the institutional controls would be employed. These institutional controls are prohibitionally installation of wells for drinking water. Also prohibitional development for land use, development or land use which interfers with remedial operations. There will be no restrictions on the type of development other than that the development cannot interfere with what we are doing at the site since there is a lot of equipment or a lot of lines, underground lines, and a lot of activity we want to make sure that any development that occurs does not interfere with this activity.

This diagram shows the existing infrastructure. It shows the existing infrastructure on the site right now. The first element of this is to go out and do a comprehensive soil boring program all the way down through the contaminated zones and then to refocus our effort to install, for example, to the red areas are areas where product is found, free product can be recovered by pumping. Our product recovery network is shown by the red points or squares and you can see there is no red points or squares in that area where that product is found

near the floor so we have no means right now to be able to recover that small amount of product near Pit 4. So one obvious thing that will come out of this will be to install or expand the systems would be to install or expand that product pumping network to include Pit 4 so we can recover that product. There may be additional bioventing installed or additional soil vapor extraction points installed, and we'll wait and see what the results are from the boring program that was focused on expansion. We realize that some expansion is needed and some improvements are needed and that that would be accomplished.

That is the end of the presentation.

MR. SOREL: We'll open it up for questions and we only ask you that state your name for the record if you have any questions. Any questions?

MR. LIST: I'm Charles List. I'm looking at this diagram of the matrix of cost effectiveness data, and I guess the question I have is if there are clear and obvious differences between the costs of these various alternatives and you said that you decided that remedy 5 is the best remedy.

MR. PRZYBYL: Right.

MR. LIST: And you said I think that it provides the best combination of cost and benefits.

MR. PRZYBYL: Balance between cost and benefits.

MR. LIST: To what extent did the cost influence your choice? I mean, how constrained were you by the upper limits of the cost in choosing an alternative?

MR. PRZYBYL: Um, well, what is not shown here are some other comparative means required by EPA to evaluate alternatives. These are the most important shown here that kind of make the more expensive dig it up and put it back alternatives less palatable. Those are low implementability. As you can imagine this hole would be extremely big, would require shoring and it would be a large operation. It might entail some short-term health risks, exposing this stuff to the atmosphere and stuff.

So the cost is not necessarily the main thing. Effectiveness is ultimately the main criteria and when we compare the other alternatives relative to the effectiveness. All three of the alternatives,

3, 4, and 5 are effective, they are equally effective. Alternative 3 accomplish it more quickly; however, the impact on the groundwater is the same even though it takes longer for Alternatives 4 and 5 because we are employing source containment at the same time, so we are not allowing any of that contamination to escape into the groundwater which is the objective, the remedial action objective for this site.

MR. FARNSWORTH: There are also short-term concerns. For example, during the soil removal, construction workers would be exposed during the removal to contaminated product more so than with these systems. I think there is something in the matrix on that in the evaluation. You also have short-term effect on people doing the remediation, and the movement of the waste and disposal of the waste.

MR. PRZYBYL: The cost is a concern obviously. There is a large difference in cost between 3 and ultimate 5 which was ultimately selected.

MR. LIST: Can I follow up on this? Suppose you had been given $6 million.

MR. PRZYBYL: Oh, okay. Well --

MR. LIST: Then what -- in other words you were given a set amount; then what approach would you take? Would you take the same approach or a different one or what?

MR. PRZYBYL: Well we do have $6 million available to do this, not right in my pocket but the Air Force, if need be, would come up with $6 million.

MR. SOREL: I think you'd still look at the same technology.

MR. PRZYBYL: Basically what your looking at in these interim alternatives between 3 and 4 and 5, and really there are no -- it's a difference between treating it in situ and leaving it there and taking it out, treating it, and putting it back. There is really no technology, there are other technologies that are not -- not really proven technologies, this is a large site and we wouldn't want to necessarily try those technologies, these experimental technologies on a site so large and they might prove to cost more money and take as long as what we selected anyways.

So the state of the technology is such that we are employing really the state of the art technology, bioventing and SE, it's also tried and

tested, it's effective, we have operational data from what we have done already. For example, I think off the top of my head about three tons of contamination have been recovered since 1993, and if you think about that, that is quite a bit of contamination that has been recovered so considerable progress has been made. There might be two another two tons to go, off the top of my head, but we know that this technology has an excellent chance of doing the job so that we are confident it's the right thing to do.

MR. FARNSWORTH: If you look remedies 4 and 5, and although it says short-term effect to achieve goal in ten years, actually the soil vapor extraction relies on stripping the gasses off the soil and actually I believe petroleum and hydrocarbons don't strip as easily off the soil, so in that respect it's a lot more effective to blow oxygen over the petroleum hydrocarbon contaminated areas, but actually bioventing is a more applicable application, I guess, in controlling hydrocarbons introduction there.

MR. PRZYBYL: What it gets down to is getting down to our remediation goals which is lower levels of contamination and bioventing is kind of a

good polisher to get down to the goals for at least the fuel-related get a lot of contamination quickly from that kind of flat hose and bioventing continues to work as you scrub the soil.

MR. FARNSWORTH: You are actually not so much you are stripping the gas as you are pulling air over it, and it would actually be more effective just to run bioventing or push the air as opposed to pulling the air over it.

MR. SOREL: Just one comment for clarification. Maybe it's a little nit-picky but you used a word that "we have selected." The selection has not been made; this is our recommended alternative just for clarification. We'll make the final decision at a later date and part of that is your input.

MR. BROWN: Gib Brown. Obviously you have been using models for your goals in terms of years. What are your competence values?

MR. PRZYBYL: It's raw calculations and those calculations -- it's a good practice to bracket them based on assumptions and the upper end of this ten years is based on those conservative assumptions. It could actually be done in less than that and we have seen some substantial progress.

One of the things when we do with this bioventing is we make a lot of progress at the beginning and then it kind of tilts off and we may be working four or five years just to get down to those remediation goals which are a little tougher to achieve, so it might be substantially complete in five years and we'll be going for the last two percent the last five years.

MR. SOREL: Other questions?

Okay. If you should later decide to make an additional comments on the proposed plan or alternatives, please mail them to this address by January 5th.

Also I'd like to add that the proposed plan is available for review at the information repository located at the Special Collections of the Feinberg Library, SUNY, Plattsburgh, and this concludes the public meeting. Okay.

(Public meeting concluded at 7:45 p.m.)

C E R T I F I C A T E

I, Carol A. Boone, Court Reporter and Notary Public, do hereby certify that the foregoing pages, numbered 2 through 22, inclusive, are a true and accurate transcription to the best of my ability of the PUBLIC MEETING BRIEFING FOR THE PROPOSED PLANS FOR SITE FT-002, FIRE TRAINING AREA SOURCE OPERABLE UNIT, taken on Thursday, December 14, 2000 at the Old Courthouse Building Conference Room, Plattsburgh, New York.

I further certify that I am not related to any of the parties to the case nor do I have any interest in the outcome of the investigation.

Carol A. Boone

Carol A. Boone, Court Reporter

Case: Public Meeting Proposed Plan Site FT-002 Fire Training Area Source OU
Deponent: U.S. Air Force Base Conversion Agency December 14, 2000

Errata Sheet

Please return this sheet with the original deposition as per instructions in the enclosed letter within two weeks. Please make any changes, corrections or additions to your transcript that you have on the lines below and sign the signature and date line.

Page No. 8 Line No. 5 Reason for Change: Typo

Change SE
To SVE

Page No. 20 Line No. 25 Reason for Change: Typo

Change SE
To SVE

Page No. _____ Line No. _____ Reason for Change: _____

Change _____
To _____

Page No. _____ Line No. _____ Reason for Change: _____

Change _____
To _____

Page No. _____ Line No. _____ Reason for Change: _____

Change _____
To _____

Date: 1/12/01 Signed: Marcia Wolosz

January 12, 2001

Marcia Wolosz
T N & Associates, Inc.

SIGN-IN SHEET

NAME	ORGANIZATION	PHONE NUMBER
Michael Ludlam	TN & Associates	566-8329
Rick Fedigan	NYS DOH	402 7890
[illegible]	Cliff Haven	563-7847
Richard Wild	NYS-DEC	897-1234
Chuck Smith	RAB	
David E. Comfort	NY SEG	506-9896 Ext. 864
Bob Morse	USEPA	212-637-4331
Dave Powell	City of Ratisbarch	563-7172

1741 97

TAB

APPENDIX B: RESPONSIVENESS SUMMARY

DEPARTMENT OF THE AIR FORCE
AIR FORCE BASE CONVERSION AGENCY

January 12, 2000

MEMO FOR RECORD

SUBJECT: Responsiveness Summary: Public Comment Period for the Proposed Plan for Remedial Action at Installation Restoration Program (IRP) Site FT-002, Fire Training Area Source Operable Unit

A. OVERVIEW

The Fire Training Area is an approximately 8-acre area located in the northwestern portion of the former Plattsburgh AFB between the runway and the base's western boundary. The Air Force is proposing a plan to address product and contaminated soil that are present as a result of fire training activities conducted at the site from the mid to late 1950s through 1989.

The FT-002 site has been divided into two operable units (OUs) to facilitate remedial activities. The first operable unit, the Source OU, focuses on soils that contain chemicals of concern at concentrations above remediation goals. Percolation of rainwater through soils above the water table and dissolution of product has caused contamination of groundwater resources. In addition, product adhering to soil is located below the water table within the zone where the water table has historically fluctuated. Soil located at or near the surface of the site does not require remediation to protect human health and the environment. The cleanup and control of groundwater contamination resulting from the FT-002 site is being addressed as part of a separate operable unit, the FT-002/Industrial Area Groundwater OU.

The remedial objectives for the Source OU are (1) to cleanup contaminated soil and residual product located in the vadose zone and in the zone of water table fluctuation at the site to concentrations less than or equal to applicable standards and (2) to recover floating free (pumpable) product at the site to the extent practicable.

The Air Force has initiated two separate removal actions at the Fire Training Area in an attempt to reduce the continuing contamination of the groundwater aquifer by attacking the sources of contamination. A Product Recovery Removal Action was implemented at the site in 1993 to remove free product floating on top of the groundwater aquifer. The product is a mixture of jet fuel, waste oil, and solvents which was poured on the ground, then ignited during fire training exercises. This removal action involved constructing four groundwater product recovery wells, installing a dual recovery pump

system, and constructing a treatment plant to clean recovered groundwater prior to discharge. This system was upgraded in 1996 to include nine new recovery wells. Ten wells are currently operational including one well from the original four locations. The upgrade also included new pumps, and improvements to the treatment systems.

In 1996, a second removal action was implemented at the site to begin remediating the contaminated subsurface soils. Subsurface soil contamination is caused by product adhering to the soil (residual product). The residual product cannot be extracted by the product recovery wells. This second removal action included the use of bioventing to treat all soils exceeding remediation goals, soil vapor extraction (SVE) in areas contaminated by chlorinated compounds, a catalytic oxidizer to control emissions from the SVE system, and water table depression to expose residual product near or below the groundwater table.

The preferred remedial alternative for addressing the source of groundwater contamination presented in this Proposed Plan is a combination of SVE and bioventing of the contaminated soil, free product collection, water table depression enabling remediation of residual product adhering to soil below the water table, hydraulic containment of the remaining source, institutional controls, progress monitoring and sampling, and five-year site reviews. The existing infrastructure of both ongoing removal actions, with upgrade and expansion, would be utilized by the Air Force in the execution of the alternative. The preferred remedial alternative is detailed in the "Site FT-002 Fire Training Area Source Operable Unit Proposed Plan" dated December 2000.

B. PUBLIC MEETING & PUBLIC COMMENT PERIOD

A Public Meeting was held on the recommended alternative for the FT-002 Source Operable Unit on December 14, 2000, at 7:00 p.m. It was held at the Old Court House in the City of Plattsburgh, County of Clinton, NY. A prepared statement was read by Mr. Michael D. Sorel, PE, the Site Manager/Base Realignment and Closure (BRAC) Environmental Coordinator for the Air Force Base Conversion Agency (AFBCA). Mr. Bruce Przybyl of URS Greiner detailed the proposed plans for the audience. The floor was then opened to the public for questions and comments. Concluding the meeting was a statement by Mr. Sorel that additional comments could be sent to the Air Force. As advertised in the Plattsburgh *Press-Republican*, the public comment period ran from December 7, 2000, to January 5, 2001. The Public Meeting was recorded by Ms. Carol Boone, a court reporter of Court Reporters Associates, Burlington, Vermont.

C. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

Mr. Charles List wanted to know how the cost of each alternative factors into the Air Force's selection of a preferred alternative.

The Air Force responded that while cost is an important consideration, it is not the main criteria used to select a remedy. Other factors, such as how feasible it will be to implement the alternative, how it could affect the groundwater, and/or any potential risks to health and safety, and the environment, also need to be considered. The Air Force looks to balance the effectiveness of the remedy against the costs.

Mr. List wanted to know if the Air Force would select a remedy that used more technology if it were given an unlimited amount of money to cleanup the FT-002 site.

The Air Force answered that more technology is not necessarily a benefit. Many cleanup methods are still in the experimental stage and can end up costing more money if they aren't effective, as well as lengthen the time needed to accomplish the remediation goals. In the case of FT-002, the state-of-the art bioventing and SVE have already recovered a significant amount of contamination. Based on the results, the Air Force is confident that these technologies will continue to have a positive effect on the FT-002 Source O/U.

Mr. Gib Brown asked about the role of computer models in determining the number of years required to meet the Air Force's goals. He wanted to know what competence values were used.

The Air Force said that raw calculations were used, and that assumptions were made conservatively. The remediation could actually take less time, since substantial progress has already been made. The difficulty is that most of the contaminants are removed when the systems first begin operating, but then it levels off, and it may take another four or five years to get the last two percent.

No other questions were asked regarding the recommended alternative for the FT-002 Source Operable Unit during the Public Meeting on December 14, 2000. Additionally, there were no other comments from any members of the audience regarding the recommended alternative chosen for this site. From the time of the Public Meeting until the deadline of January 5, 2001, no further questions or comments were received by the Air Force regarding this subject.

MICHAEL D. SOREL, PE
Site Manager/
BRAC Environmental Coordinator

TAB

APPENDIX C: N4SDEC CONCURRENCE LETTER

1741103

New York State Department of Environmental Conservation
Division of Environmental Remediation, Room 260B
50 Wolf Road, Albany, New York 12233-7010
Phone: (518) 457-5861 • **FAX:** (518) 485-8404
Website: www.dec.state.ny us

John P Cahill
Commissioner

MAR 16 2001

Mr. Richard L. Caspe
Director
Emergency & Remedial Response Division
U.S. Environmental Protection Agency
Floor 19 - #E38
290 Broadway
New York, NY 10007-1866

Dear Mr. Caspe:

RE: Record of Decision; FT-002 Source Operable Unit
Plattsburgh Air Force Base - ID No. 510003

In response to the Draft-Final Record of Decision for Site FT-002 (Fire Training Area) Source Operable Unit, submitted by the United States Air Force, I wish to concur with the remedial action plan as put forth in the document. The remedy for this site will include:

- Soil Vapor Extraction (SVE) and bioventing of contaminated soil;
- Groundwater extraction to enhance free product collection, ensure source containment, and to increase the volume of soil available to SVE and bioventing treatment;
- Institutional controls to restrict on site development of facilities that may interfere with remedial operations; and
- Institutional controls to prohibit the installation of any wells for the use or extraction of site groundwater.

Please be advised that this concurrence is conditioned upon the United States Department of Defense taking the necessary steps to implement proper and effective deed restrictions as well as a deed restriction enforcement plan prior to the transfer of these properties to any party other than the Federal government.

I understand the adequacy of this remedy to protect human health and the environment will be reviewed at a minimum of once every five years in accordance with Section 121(c) of CERCLA.

Sincerely,

Michael J. O'Toole, Jr.
Director
Division of Environmental Remediation

c: G. Anders Carlson, NYSDOH
R. Wagner, NYSDEC-Region 5
M. Sorel, AFBCA
R. Wing/R. Morse, USEPA-Region II

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE