SITE SS-033
OLD SMALL ARMS RANGE

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.

FINAL

MARCH 2001

TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

DECLARATION FOR THE RECORD OF DECISION

Site Name and Location

Plattsburgh Air Force Base
Site SS-033, Old Small Arms Range
Plattsburgh, New York

Statement of Basis and Purpose

This Record of Decision (ROD) presents the selected remedy for soil and groundwater at site SS-033 on 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

Soil at site SS-033 has been contaminated as a result of past use of the SS-033 site as a small caliber firearms practice range. In 1993, lead projectiles and lead contaminated soil from the firing range backstop embankment were removed from the site by the USAF. In 1994, a site investigation (SI) was undertaken to evaluate the effectiveness of the removal effort. The evaluation concluded that a potential human health risk was posed by the remaining onsite lead levels in soils north of the target line that were not remediated during the initial removal action. In addition, elevated metals, primarily arsenic, were identified in the soil fill material used to

backfill the backstop area excavated during the 1993 removal action. These metals were not expected to pose a risk to human health given the land use at that time (the base was still open) or given future industrial development. From 1996 to 1997, additional soil lead delineation and soil removal activities were undertaken by the USAF during which 647 tons of lead contaminated soil, located in separate areas of the site, were excavated and disposed of. In 2000, the SI was updated to incorporate all data collected at the site and to evaluate risks posed to human health given both the planned commercial/industrial reuse of the site and a hypothetical residential reuse scenario. A potential risk was identified through exposure to arsenic in the soil located in the backstop area, given residential reuse. Lead contamination has been successfully mitigated at the site and does not pose a risk to human health.

Based on the assessment undertaken in the SI, the remedial action objective for site SS-033 is *to prevent exposure to soil containing arsenic at concentrations that would cause a noncancer risk above the USEPA target hazard index of 1*.

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 SS-033 is one of a number of sites (or operable units) 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. It is intended that the selected action be the final action for site SS-033.

The remedy consists of excavation of arsenic contaminated soil containing arsenic greater than 7.5 mg/kg and disposal of arsenic contaminated soil off base.

Statutory Determinations

The selected remedy for the SS-033 site 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 to the extent practicable. A five-year review will not be required for this remedy according to Section 121(c) of CERCLA

because no hazardous substances, pollutants, or contaminants will remain at the site above levels that would allow for unlimited use and unrestricted exposure after the remedy is implemented.

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, Table 1)
- Baseline risk represented by the chemicals of concern (Section 7.0)
- Cleanup levels established for chemicals of concern and the basis for these levels (Section 8.0)
- How source materials constituting principal threats are addressed (Sections 11.0 and 12.0)
- Current and reasonable anticipated future land use assumptions, and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 6.0)
- 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 – Alternative 3)
- Key factors that led to selecting the remedy (Sections 12.1)

Signature ALBERT F. LOWAS, JR. Date:

Director, Air Force Base Conversion Agency

Signature WILLIAM J. MUSZYNSKI, P.E. Date:

Acting Regional Administrator, USEPA Region 2

DECISION SUMMARY (Sections 1.0 through 14.0)

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. 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 (BRAC) Act of 1993, and its reuse is being administered by the Plattsburgh Airbase Redevelopment Corporation (PARC).

As part of the USAF's Installation Restoration Program (IRP), Plattsburgh AFB has initiated activities to identify, evaluate, and restore identified hazardous material disposal areas. 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.

Site SS-033, the Old Small Arms Range, is located at the northwest end of the base, west of the runway overrun (Figure 1). From 1960 through November 1989, the site was used as a practice range for small caliber firearms (up to 0.45 caliber). Operations at the old range ceased when operations began at the more recently constructed Combat Arms Training Complex, which is located to the southwest of SS-033. This newer facility also has been taken out of service and has been partially dismantled.

The range consisted of 20 firing stalls on a concrete pad (firing line) facing an approximately 120-foot wide by 35-foot high backstop embankment used to stop fired rounds (Figure 2). The target line was at the base of the embankment approximately 25 yards from the firing line. Targets were also set up for 7 and 15 yard firing courses. A trailer (former Building 3425) for range personnel was located immediately north of the firing line concrete pad. The trailer and concrete pad reportedly were installed in 1970 and removed in the fall of 1994 (URS 2000).

Figure 1

Figure 2

The large open area to the north of the former trailer and an accumulation of wasted 0.30 carbine ammo cans, stripper clips, and cartridge brass (which has since been removed) in the woods approximately 360 feet north of the former target line suggest that the range may have extended farther north prior to 1970. This area is referred to on Figure 2 as the waste ammo can area. Some older maps and drawings also portray a longer rifle range (up to 200 yards in length).

The range is surrounded by woods to the west, north, and east. A 30- to 40-foot high embankment rises along the south and west sides of the site. Areas to the north and east are relatively flat.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 1992 Soil Sampling and 1993 Lead Removal Action

Based on site history, the primary chemical of concern at the site was lead, resulting from past firearm discharges and bullet remnants. In May 1992, three soil samples were collected from the range by Plattsburgh AFB personnel for Toxicity Characteristic Leaching Procedure (TCLP) metals analyses in order to determine if any RCRA hazardous waste was present. Two of the three samples were found to contain levels of lead exceeding the TCLP concentration criteria established in 40 CFR 261 (5.0 mg/l). The Preliminary Assessment Report recommended an Interim Removal Action (IRA) to address the lead levels in the range soils (Malcolm Pirnie 1992).

An Action Memorandum was issued in September 1992 which identified the components of a planned IRA. The IRA commenced in mid-1993 and consisted of: excavating soils from the backstop embankment (south of the target line); sifting the soils to recover bullets and bullet fragments for recycling; mixing contaminated soils with a concrete slurry for disposal at LF-023 (a former landfill); and replacing excavated material with clean fill. A pile of recovered bullets and bullet fragments was stockpiled at the site until its removal in February 1995. The material, which consisted of bullets, bullet fragments, and gravel, was transported to Michigan and disposed of at the Envotech Management Services facility in Belleville.

In June 1993, a second round of surface soil sampling was performed in the area of excavation prior to backfilling. Plattsburgh AFB personnel collected twelve samples, three of which were split with NYSDEC personnel. Lead was detected in some soil samples at concentrations that exceeded 40 CFR 261 TCLP criteria, prompting the initiation of a Site Investigation (SI).

2.2 Site Investigation

An SI was initiated in 1994 and included the collection and chemical analysis of 68 surface and near surface soil samples at 32 locations (shown on Figure 3), the installation and sampling of 2 groundwater monitoring wells, and observations of the site's physical conditions. These data were compiled in the *Draft Old Small Arms Range (SS-033) Site Investigation Report*

Figure 3

(URS 1995) and were used to assess whether potential risk was posed by onsite levels of lead in soil. The Draft SI report recommended that a soil removal action be undertaken at SS-033 to mitigate lead concentrations in excess of 400 milligrams per kilogram (mg/kg) in site soils. Further sampling, to determine the exact extent of soil requiring remediation and to confirm that remedial activities were successful, was also recommended.

2.3 1997 Lead Removal Action

In June 1996 and May 1997, OHM Remediation Services Corporation (OHM) collected 74 soil samples at 61 locations to delineate the extent of lead contaminated soil requiring removal (OHM 1999). The locations are shown on Figure 3. In November 1997, OHM removed 590 tons of lead contaminated soil from the site and collected confirmatory soil samples to verify that remedial activities had been successful. Based on the confirmatory soil sample results, an additional 57 tons of lead contaminated soil, were excavated and disposed of. The waste ammo cans in the woods in the northwestern portion of the site were also removed and soil samples were collected at the bottom of the excavation. The ammo cans were disposed of at Chemical Waste Management's disposal facility located in Model City, New York. The removal action was documented in a closure report (OHM 1999).

2.4 Supplemental Sampling Event

In response to regulatory agency comments on the Draft SS-033 SI Report and SS-033 sampling and removal action reports, the USAF performed a supplemental sampling event in March 2000. Twelve additional soil samples were collected at six locations in the waste ammo can removal area at the site location where lead was detected above 400 mg/kg in confirmatory sampling. Three groundwater samples (2 onsite; 1 upgradient) were also collected and analyzed (URS 2000). The SI was updated to incorporate the newly collected data, human health risks were reanalyzed, and the results presented in the Draft Final SI Report (URS 2000).

3.0 COMMUNITY PARTICIPATION

The Air Force has kept the community informed regarding progress at site SS-033 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.

The SI report, the Proposed Plan (URS 2001), and other site-related documents in the SS-033 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 January 13, 2001.

In addition, a 30-day public comment period was held from January 12, 2001 to February 12, 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 January 22, 2001 at the Old Court House, Second Floor Meeting Room, 133 Margaret Street. The date and time of he 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 SS-033 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 SS-033 is one of several sites (or operable units) 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 sites. The site SS-033 operable unit includes both soil and groundwater. Two removal actions resulted in the removal of lead projectiles and lead contaminated soil at the site; lead is no longer considered a principal threat waste. This ROD addresses arsenic contaminated soil, which is the remaining principal threat waste at the site. It is intended that the selected action (described in Section 12.0) be the final action for site SS-033.

5.0 SITE CHARACTERISTICS

The geologic stratigraphy in the area of SS-033 generally consists of the following, from top to bottom: 1) 40 to 50 feet of unconsolidated sand; 2) a 5 to 10 foot thick silt and clay layer; 3) 20 to 40 feet of glacial till; and 4) dolostone bedrock. The water table lies within the sand, about ten feet below the ground surface. The silt and clay layer acts as a confining unit separating the unconfined sand aquifer above from the confined till water bearing zone and bedrock aquifer below. Groundwater at the site flows east-northeastward, as shown on Figure 3. No surface water drainage paths were observed at the site, probably due to the very permeable sand/gravelly surface soils. If surface water runoff does occur, flow is probably toward lower-lying marshy areas to the west and east.

The chemical condition of the site soil and groundwater is discussed below.

5.1 Soil Contamination

Soil sampling undertaken at site SS-033 was extensive. Sampling locations used to delineate contamination are depicted on Figure 3. Since the past use of the site as a firing range is associated with contamination related to fired projectiles, the samples were analyzed primarily for lead. In addition, some of the samples were analyzed for the 8 RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) or the comprehensive target analyte list (TAL) of 23 metals; these analyses were performed on the 1994 SI samples (south of the firing line) and on 1997 confirmatory samples from the waste ammo can area (Figure 2). Soil samples were collected from the surface (0 to 0.3 feet) at all locations; selected samples were taken at 1 to 1.5 feet and 2 to 2.5 feet.

The soil contamination found at the site can be evaluated by comparing the results of sampling and analysis to established requirements and guidelines. Federal and state laws and regulations have not promulgated standards for soil contaminants other than for hazardous waste characterization. However, NYSDEC has established soil cleanup objectives in its document entitled *Determination of Soil Cleanup Objectives and Cleanup Levels* (NYSDEC 1994). NYSDEC cleanup objectives for metals are based upon published average concentrations detected in Eastern U.S. soils. NYSDEC permits the use of "site background" data for metals, if this data is available. A base-wide background surface soil and groundwater survey was

performed in late 1994, primarily to establish background inorganic constituent concentrations in Plattsburgh AFB soils (URS 1996). The 95 percent Upper Tolerance Limits calculated for each inorganic constituent detected in the background soil samples are considered as "site background" metals concentrations and appropriate for use as soil guidelines, referred to as To Be Considered (TBC) values. The USEPA's 400 mg/kg lead guidance value was adopted as the TBC for lead in soil (USEPA 1994). This guidance value was developed using blood lead level modelling. It is health risk based and is protective of children in a residential setting.

At the initiation of IRP activities at site SS-033, lead was the primary contaminant of concern due to the site's past use as a small caliber firearms practice range. The sources of lead contamination from ammunition are the projectile itself and the primer (NBS 1977). Up-range lead contamination results from airborne lead projectile fragments due to mechanical effects in the weapon barrel and erosive effects from the propellant gases. It also results from the primer compound, generally a composition containing lead styphnate, which produces lead-containing decomposition products. Down-range lead contamination results from lead projectiles and projectile fragments caused by down-range impacts.

Lead contaminated soil in the backstop embankment was removed during the 1993 IRA; lead above 400 mg/kg (TBC based on USEPA guidance) was not detected in that area following the IRA (URS 2000). Subsequent investigations undertaken over a greater area of the site during the 1994 SI field investigation (URS 2000) and the 1996/1997 delineation (OHM 1999) revealed lead at concentrations above 400 mg/kg occurring in five separate areas (Figure 4).

Lead contaminated soil between the former firing line and target line (Area 1) and in two areas north of the firing line (Areas 2 and 3) was excavated and removed in 1997. The removal of lead contaminated soil from these areas was confirmed by post-excavation sampling from the bottoms and sides of the excavations. Excavation continued until the confirmatory sampling showed that all lead contaminated soil had been removed.

Lead was also detected at OSAR-C1 at 971 mg/kg (OHM 1999). In May 1997, two additional samples (OSAR-C1-A and OSAR-C1-B) were collected at essentially the same location as OSAR-C1. Lead was detected in the later two samples at concentrations of 62.5 mg/kg and 10.2 mg/kg. Therefore, it was concluded that no removal action was necessary at location OSAR-C1 (OHM 1999).

Figure 4

In November 1997, the pile of empty ammunition cans was removed from the woods in the northwestern portion of the site (Figure 4). The cans were embedded 1 to 2 feet into the ground. Five soil samples were collected from the excavation. One of the samples (ACA-3) contained a high concentration of lead (2,420 mg/kg) (OHM 1999). USEPA requested additional soil sampling in the vicinity of ACA-3 to confirm this result. In March 2000, 12 additional samples were collected; six at 0 to 0.5 feet below the surface and six from 0.5 to 1.0 feet below the surface (Figure 3). None of the soil samples contained lead at a concentration in excess of 400 mg/kg (URS 2000). Therefore, no further excavation was undertaken.

A larger suite of metals was analyzed for in soil samples taken from the target area (URS 2000) and in the waste ammunition can area (OHM 1999). Most metals were detected at concentrations below their respective TBC concentrations. These TBCs are based upon background metals concentrations. In surface soil samples that were not excavated in the 1997 removal action, 6 metals were detected above the TBCs in soils on the backstop embankment including arsenic, chromium, magnesium, manganese, mercury and potassium and 3 metals (non-lead) were detected above TBCs in the waste ammunition can area including antimony, copper, and zinc. Arsenic was the only metal detected at a concentration above its TBC in subsurface soil; it was detected at 24.4 mg/kg (the arsenic TBC is 7.5 mg/kg) at location SS-33-25 at a depth of 1 to 1.5 feet. The elevated metals concentrations in the backstop embankment area appear to be associated with the imported fill material used for grading following the 1993 IRM.

5.2 Groundwater Contamination

Groundwater samples were collected from two wells installed at SS-033 (Figure 3). Samples of groundwater from the wells were analyzed for TCL (target compound list) volatile organic compounds, TCL semi-volatile organic compounds, and TAL metals in the 1994 SI sampling event. The wells were sampled again in 2000, but the samples were analyzed only for lead and copper.

For groundwater, contaminant levels were compared to the site groundwater applicable or relevant and appropriate requirements (ARARs), which are derived from the NYSDEC water quality standards and guidance values specified in NYSDEC *Technical and Operational Guidance Series* (TOGS) 1.1.1 (NYSDEC 1998), New York State water standards (Title 6 of

New York Code of Rules and Regulations, Part 703), USEPA drinking water standards (Title 40 of the Code of Federal Regulations, Part 141), and site background TBCs (for metals only).

No organic compounds were detected in the groundwater samples collected at site SS-033. Twenty of the 23 metals analyzed for were detected; only antimony, mercury, and silver were not detected. Seven metals (aluminum, copper, iron, lead, manganese, sodium, and thallium) were detected in the groundwater samples at concentrations that exceeded ARAR values. However, aluminum, iron, manganese, and sodium were detected at concentrations below that of background groundwater (URS 1996). Thallium was detected (ND to 3.9 μg/l) slightly above its ARAR (2 μg/l) in groundwater and was not present in background groundwater. Thallium does not appear to be site related since it was not detected in any site soil sample. It is possible that the presence of thallium may be associated with sample filtering apparatus since, in one well, thallium was detected in the dissolved (filtered) sample but was not detected in the total (unfiltered) sample. Although detected above ARARs in 1994 groundwater samples, lead and copper were detected at concentrations below their respective ARARs in the most recent sampling event in 2000.

6.0 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

PARC is responsible for maintaining the 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 likely reuse at SS-033 and its surrounding area will be commercial/industrial. The base land use plans developed by PARC were incorporated into the Environmental Impact Statement (Tetra Tech 1995). Currently, groundwater in the upper sand aquifer at the site is not being utilized as a resource; a public supply of potable water is available. However, New York State considers all "Class GA" waters (groundwater) in the State as having the potential for use as a future potable resource and this resource will not be limited at SS-033.

Following implementation of the selected remedy, levels of contamination at the site will allow for unlimited land use. Thus, the ROD does not specify any restriction on reuse of the site.

7.0 SUMMARY OF SITE RISKS

Based on the results of the SI, a baseline human health risk assessment (HRA) was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the human health risk which could result from the contamination at the site if no remedial action was taken.

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 assessments of site-related risks.

The human health risk assessment (HRA) follows federal (USEPA) 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 (10^{-6}) 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. The hazard index is a representation of risk, based on a quotient or ratio of chronic daily intake to a reference (safe) dose. A hazard index greater than 1 indicates a potential for adverse noncarcinogenic health effects.

The HRA was conducted in the Draft Final SI (URS 2000) using sample data points that were not excavated during the removal actions. Previously, in the Draft SI (URS 1995), a potential risk was identified from exposure to lead; however, lead contamination has since been remediated. Contaminants of potential concern identified in the updated HRA (URS 2000) are

listed in Table 1. Several exposure pathways were assessed in the HRA to evaluate potential risk given a variety of possible future land uses. These were:

- Dermal contact with and ingestion of contaminated soils and inhalation of wind borne dust particles from contaminated site soils by adult and teenage **trespassers** (current use)

- Dermal contact with and ingestion of contaminated soils and inhalation of wind borne dust particles from contaminated site soils by **construction workers** performing regrading or excavation (future use)

- Dermal contact with and ingestion of contaminated soils and ingestion of site ground-water by future **commercial workers** (future use)

- Dermal contact with and ingestion of contaminated soils and ingestion of site ground-water by future adult and child **residents** (future use)

Calculated cancer and noncancer risks are summarized on Table 2. Under the current land use scenario, exposure to chemicals at SS-033 produces a hazard index of 0.01 for an adult and for a teenage trespasser. This value is well below the maximum acceptable hazard index value of 1, indicating that noncarcinogenic effects are not a significant concern at this site under current land use conditions. The calculated cancer risks to teenage and adult trespassers at SS-033 are 4×10^{-7} and 2×10^{-6}, respectively. The cancer risks for teenagers are below the target risk level and the cancer risk for adults falls at the low end of the range of risk considered acceptable by USEPA on a case-by-case basis and are, therefore, not a significant concern.

Under the expected future land use scenario (commercial/industrial development), exposure to chemicals at SS-033 produces a hazard index of 0.4 for the construction worker and 0.3 for the commercial workers. Because these hazard indices are below the acceptable value of one, noncarcinogenic effects are not considered to be significant at the site under the expected future land use scenario. The cancer risk is approximately 7×10^{-7} for construction workers and 4×10^{-5} for commercial/industrial workers at the site. The first value is below the target cancer risk level of 1×10^{-6}, indicating that relatively short-term exposures to site contaminants during a construction project do not pose a significant cancer risk to onsite workers. The second value is

TABLE 1
SS-033 HRA --- CONTAMINANTS OF POTENTIAL CONCERN

Groundwater	**Soil**
Arsenic	Arsenic
Beryllium	Chromium
Cadmium	Copper
Cobalt	
Lead	
Selenium	
Thallium	

TABLE 2
CANCER RISKS AND HAZARD INDICES FOR MULTIPLE PATHWAYS

EXPOSURE PATHWAY	**CURRENT USE**			
	TRESPASSER			
	ADULT		**TEENAGER**	
	Cancer Risk	**Hazard Index**	**Cancer Risk**	**Hazard Index**
Dermal Contact With Soil	1×10^{-6}	0.007	3×10^{-7}	0.003
Ingestion of Soil	6×10^{-7}	0.003	1×10^{-7}	0.004
Inhalation of Fugitive Dust	6×10^{-9}	0.000002	1×10^{-9}	0.000002
TOTAL EXPOSURE CANCER RISK	2×10^{-6}		4×10^{-7}	
TOTAL EXPOSURE HAZARD INDEX		0.01		0.01

EXPOSURE PATHWAY	**FUTURE USE**					
	Construction Worker		**Commercial Worker**		**Resident***	
	Cancer Risk	**Hazard Index**	**Cancer Risk**	**Hazard Index**	**Cancer Risk**	**Hazard Index**
Dermal Contact With Soil	1×10^{-7}	0.06	5×10^{-6}	0.03	5×10^{-5}	0.6
Ingestion of Soil	5×10^{-7}	0.3	3×10^{-6}	0.02	4×10^{-5}	0.9
Inhalation of Fugitive Dust	1×10^{-7}	0.006	NA	NA	NA	NA
Ingestion of Groundwater	NA	NA	3×10^{-5}	0.2	1×10^{-4}	0.6
TOTAL EXPOSURE CANCER RISK	7×10^{-7}		4×10^{-5}		2×10^{-4}	
TOTAL EXPOSURE HAZARD INDEX		0.4		0.3		2.1

NA = Not Applicable

* Cancer risk and hazard risk indices for child and adult residents have been added together in accordance with USEPA guidance (USEPA 1991)

within the range considered acceptable to USEPA on a case-by-case basis (10^{-6} to 10^{-4}) but is above the target cancer risk level of 1×10^{-6}.

Under the hypothetical residential scenario, the hazard index and the cancer risk are 2.1 and 2×10^{-4}, respectively, if exposure pathways for soil and groundwater are combined. Both of these values exceed the USEPA criteria. Exceedances result primarily from the presence of arsenic in soil and groundwater. Examination of the residential scenario on a media specific basis shows the following:

- The cancer risk for groundwater alone is <u>within</u> the range considered acceptable by USEPA on a case-by-case basis

- The cancer risk for soil alone also is <u>within</u> the range considered acceptable by USEPA on a case-by-case basis

- The hazard index for groundwater alone is <u>below</u> the acceptable value of 1

- The hazard index for soil alone is **<u>above</u>** the acceptable value of 1

It should also be noted that the groundwater ingestion risks calculated in the HRA are based on the presence of arsenic in two onsite groundwater samples. In these two samples, arsenic was detected at concentrations of 6.0 µg/L and 5.4 µg/L. These concentrations are well below the respective New York State groundwater standard of 25 µg/L for arsenic.

Based on the results of the HRA, unacceptable noncarcinogenic effects are possible given exposure to arsenic in soil in a residential reuse scenario; this is the only unacceptable risk associated with contamination in soil and groundwater remaining at site SS-033.

8.0 REMEDIAL ACTION OBJECTIVES

Two separate removal actions conducted at site SS-033, in 1993 and 1997, resulted in the removal of lead contaminated soil. Other than a 7,000-square foot area of arsenic contaminated soil, no unacceptable risk is associated with exposure to contaminated soils at site SS-033, nor is unacceptable risk associated with exposure to groundwater, given any potential future land use. Therefore, the remedial action objective for site SS-033 is to *prevent exposure to soil containing arsenic at concentrations that would cause a noncancer risk above the USEPA target hazard index of 1*.

The remediation goal for arsenic is 7.5 mg/kg, which is the cleanup level recommended by NYSDEC in TAGM HWR-94-4046 (NYSDEC 1994).

9.0 DESCRIPTION OF ALTERNATIVES

The SI (URS 2000) suggests that institutional controls be implemented over the area where arsenic was found, limiting future development to non-residential use. Thus, by limiting the frequency of exposure to the contaminated soil, the potential noncancer hazard index would be less than 1. To remove the need for institutional controls, the contaminated soil could be removed and properly disposed of. These two alternatives, along with an alternative specifying no action, are described below.

Alternative 1:
NO ACTION

Capital Cost:	$0
O&M Costs:	$0
Total Present Worth:	$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.

Alternative 2:
INSTITUTIONAL CONTROLS

Capital Cost:	$30,000
O&M Costs:	$ 1,000*
Total Present Worth:	$43,765*

* Present worth O&M calculated at 6% for 30 years.

The purpose of Alternative 2 is to implement actions that will eliminate human exposure and health risks by restricting future development activities, rather than by cleaning up the contamination. This alternative includes deed restrictions to prohibit future residential development onsite and site reviews, every five years, in accordance with Section 121(c) of CERCLA to ensure that human health and the environment are protected. The deed restrictions

could be lifted if a future property owner seeking to develop the area for residential use were to properly remove and dispose of the soil containing elevated arsenic, in conjunction with the NYSDEC and USEPA. Arsenic is non-biodegradable and would persist in the soil at the site indefinitely. Thus, the institutional controls and site reviews would continue indefinitely unless the arsenic contamination in soil was actively mitigated.

Alternative 3:
EXCAVATION AND OFFSITE
DISPOSAL

Capital Cost:	$93,000
O& M Cost:	$0
Total Present Worth:	$93,000

In Alternative 3, approximately 275 cubic yards (cy) of soil would be excavated to a depth of up to two feet below the ground surface in the area where elevated arsenic concentrations were identified (see Figure 5). It is assumed that the soil would be disposed of off base at a waste facility permitted to accept non-hazardous contaminated waste. Following completion of the initial excavation, soil samples would be collected from the bottom and sides of the excavation and analyzed for arsenic. Results would be compared to the remediation goal (7.5 mg/kg). If any soil samples contained arsenic at concentrations exceeding the goal, then additional soil would be excavated and additional samples taken from the fresh excavation. The process would continue until all soil containing arsenic above the remediation goal was removed and disposed of. Clean soil would then be placed into the open excavation to grade.

Figure 5

10.0 SUMMARY OF COMPARATIVE ANALYSIS

The alternatives for site SS-033 were analyzed with respect to nine criteria specified in the National Contingency Plan, which directs remediation of inactive hazardous waste sites. A brief description of each criterion and the evaluation of alternatives based on these criteria are 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).

3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume
5. Short-term effectiveness
6. Implementability
7. Cost

Modifying Criteria – The recommended alternative may be modified by public input before it is finalized and presented in the Record of Decision.

8. State Acceptance
9. Community Acceptance

Analysis

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

Alternative 2 (Institutional Controls) and Alternative 3 (Excavation and Offsite Disposal) are protective of human health and the environment. Alternative 1 (No Action) is not protective.

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

Organic chemicals were not detected in groundwater at site SS-033. Metals were detected at concentrations below groundwater ARARs and/or base background groundwater concentrations (URS 1996), except for thallium. Thallium was detected (ND to 3.9 µg/l) at a concentration slightly above its ARAR (2 µg/l) in groundwater but does not appear to be site related since it was not detected in any site soil sample. Therefore, all three alternatives comply with groundwater ARARs.

- **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.

Alternative 1 (No Action) does not provide long-term effectiveness and permanence. Alternative 2 (Institutional Controls) is effective as long as the institutional controls it specifies are maintained and enforced. Alternative 3 (Excavation and Offsite Disposal) provides a permanent solution by removing the remaining principal threat waste from the site.

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

None of the alternatives include treatment as an element of remediation. However, for Alternative 3 (Excavation and Offsite Disposal), the waste will be placed at a permitted disposal facility.

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

Alternative 1 (No Action), does not achieve protection. Alternative 2 (Institutional Controls) achieves protection with the implementation of deed restrictions. Alternative 3 (Excavation and Offsite Disposal) achieves protection after excavation is complete, expected to be about 6 months following signing of the Record of Decision. Alternative 3 includes intrusive activities that could produce dust emissions potentially impacting workers. Potential short-term risk easily can be controlled or minimized by implementing standard environmental health and safety measures.

- **Implementability** addresses aspects of implementing 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.

All alternatives employ conventional measures or technologies, at a relatively small scale, that are easily implemented.

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

There is no cost for implementing Alternative 1 (No Action). It is estimated that the institutional controls specified under Alternative 2 would cost approximately $30,000 to implement and result in annual expenditures of approximately $1,000 per year for enforcement. The capital cost for implementation of Alternative 3 (Excavation and Offsite Disposal) is $93,000. There are no O&M costs associated with Alternative 3.

- **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).

11.0 PRINCIPLE THREAT WASTE

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. Arsenic contaminated soil has been identified as the principle threat waste at site SS-033. This soil only poses a significant potential threat to human health were the site to be developed for residential use in the future; the soil does not pose a threat given other land uses. Although treatment is not an element of the selected remedy for site SS-033, the principle threat waste will be removed from the site and disposed of at an appropriate permitted disposal facility.

12.0 SELECTED REMEDY

The USAF has selected **Excavation and Offsite Disposal** as the selected remedy for site SS-033. The remedy includes excavation of site soils containing arsenic in excess of the remediation goal (7.5 mg/kg) and offsite disposal of the soil according to NYSDEC and USEPA waste disposal regulations. This remedy is selected because it provides a permanent solution that is protective of human health and the environment, at a relatively low cost. In addition to providing a permanent solution, the remedy will result in unrestricted use of land at site SS-033, reduce long term liabilities associated with leaving contamination in place, eliminate the need for long term land use controls, and eliminate the cost associated with management of land use controls.

12.1 Basis

Two separate removal actions conducted at site SS-033, in 1993 and 1997, resulted in the removal of lead contaminated soil. The human health risk assessment indicated that no unacceptable risk is associated with exposure to residual soil contaminants, or with exposure to chemicals in site groundwater, given current or future commercial/industrial land use conditions. Also, no unacceptable risk is associated with exposure to groundwater given future residential land use. The hazard index for exposure to soil under a hypothetical future residential land use scenario, however, is above the acceptable limit of one due to arsenic contamination. The selected remedy addresses arsenic contaminated soil, which is the sole remaining principal threat waste at the site. Since the principal threat will be removed, no institutional controls will be placed on the site, which will be available for unrestricted reuse. Because implementation of the selected remedy will result in levels of contamination at the site that allow for unlimited use and unrestricted exposure, five-year site reviews for site SS-033 will not be necessary.

12.2 Identification of Remedy

The selected remedy for remediation at site SS-033 includes the following components:

- Excavation of arsenic contaminated soil containing arsenic greater than 7.5 mg/kg
- Disposal of arsenic contaminated soil off base

The location of the initial excavation is shown in Figure 5. The actual location of disposal of the arsenic contaminated soil will be determined following the submission of analytical test results to various permitted disposal facilities; it is likely that the soil will be disposed of as a non-hazardous contaminated waste. Before initiating excavation activities, the USAF will prepare a Work Plan for NYSDEC and USEPA review. This plan will specify the proposed location and frequency of confirmatory soil samples, sampling and analytical testing procedures, work procedures, and health and safety procedures. The plan will meet the requirements of the remedial action work plan specified in Part IX, item H, of the Federal Facilities Agreement. Following completion of the excavation and disposal, a Closure Report will be prepared to document the execution of the alternative. Subsequent to NYSDEC and USEPA concurrence, the site will be restored by placing clean soil to grade to insure stabilization of the berm/slope.

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 uses permanent solutions to the extent practicable. Treatment is not used in the remedy, which does not satisfy the statutory preference for treatment as a principle element of the remedy. However, the waste will be taken to a permitted disposal facility. As shown on Table 3, the selected remedy is the only alternative evaluated that is effective and provides a permanent solution.

After the remedy is executed, contaminants will remain on site, but at levels that allow for unlimited use and unrestricted exposure. Therefore, a statutory review, according to Section 121(c) of CERCLA, will not be necessary to ensure protection of human health and the environment.

TABLE 3

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	Does not Achieve Goals
2	Institutional Controls	$43,765	Does Not Offer Long-Term Effectiveness and Permanence	Does Not Reduce TMV by Treatment	Achieves Goals Upon Implementation of Institutional Controls
3 (Selected Remedy)	Excavation and Offsite Disposal	$93,000	Provides a Permanent Solution that is Protective of Human Health and the Environment	Does Not Reduce TMV by Treatment but will be Disposed of at a Permitted Facility	Achieves Goals Upon Execution (less than 1 year)

TMV = Toxicity, Mobility, and 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 ROD.

REFERENCES

Malcolm Pirnie, Inc. 1992. *Draft Final Report Preliminary Assessment.*

National Bureau of Standards (NBS). 1977. *The Reduction of Airborne Lead in Indoor Firing Ranges by Using Modified Ammunition* (NBS SP-480-26).

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

NYSDEC. 1998. *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.* Technical and Operational Guidance Series (TOGS 1.1.1). Albany, NY: Division of Water.

OHM Remediation Services Corporation (OHM) 1999. *Final Closure Report, Removal of Lead Impacted Soil at the Old Small Arms Range, SS-033, Plattsburgh Air Force Base*; prepared for the Air Force Center for Environmental Excellence, Brooks AFB, Texas; July.

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

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

URS Consultants, Inc. 1995. *Draft Old Small Arms Range (SS-033) Site Investigation Report.* Buffalo, NY. June.

URS Consultants, Inc. 1996. *Final Background Surface Soil and Groundwater Survey for Plattsburgh Air Force Base.* Buffalo, NY.

URS Consultants, Inc. 2000. *Draft-Final Old Small Arms Range (SS-033) Site Investigation Report.* Buffalo, NY. June.

URS Consultants, Inc. 2001. Site SS-033 *Old Small Arm Range, Final Proposed Plan.* Buffalo, NY. January.

United States Environmental Protection Agency (USEPA). 1989. *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation (Part A), Interim Final,* EPA/540/1-89/002. Cincinnati, Ohio: USEPA.

USEPA. 1991. *Standard Default Exposure Factors. Human Health Evaluation Manual, Supplemental Guidance.* OSWER Directive 9285.6-03. Cincinnati, Ohio: USEPA

USEPA. 1994. *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities.* OSWER Directive 9355.4-12. July 14.

USEPA. 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents,* EPA 540-R-98-031. July. Cincinnati, OH.

GLOSSARY

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.

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 environmental 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.

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

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.

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.

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

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 clean up hazardous waste disposal and spill sites at Department of Defense facilities nationwide.

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 the 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: The 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.

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

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

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 Site Investigation or RI/FS. The recommended remedial action could be modified or changed based on public comments and community concerns.

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 Site Investigation or 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: A long-term 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.

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

Site Investigation: A site investigation gathers and evaluates data regarding potentially harmful chemicals at a site in an effort to determine whether further action is necessary to protect human health and the environment.

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 the 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 clean up the site or pay back the federal government for the cost of the remediation. Federal facilities are not eligible for Superfund monies.

Technical and Administrative Guidance Memorandum (TAGM): TAGM #4046 issued by NYSDEC Division of Environmental Remediation (formerly known as the Division of Hazardous Waste Remediation) establishes chemical-specific soil cleanup objectives in the vadose zone. The document is entitled *Determination of Soil Cleanup Objectives and Cleanup Levels* (NYSDEC 1994).

To Be Considered (TBCs): 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.

Volatile Organic Compounds (VOCs): Organic compounds that have a high propensity to volatilize or to change from a liquid to a gas form.

APPENDIX A

TRANSCRIPT OF PUBLIC MEETING

APPENDIX B

RESPONSIVENESS SUMMARY

APPENDIX C

NYSDEC CONCURRENCE LETTER