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Spills - SP
ERP - E
VCP - V
BCP - C

No Further Response Action Planned Decision Document – IRP Site 2 POL Bulk JP-4 Tank C Leak Niagara Falls Air Reserve Station

July 2000

Prepared for:

UNITED STATES DEPARTMENT OF THE AIR FORCE
Air Force Reserve Command
914th Airlift Wing

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List of Acronyms

AFRC	United States Air Force Reserve Command
AFRF	Niagara Falls Air Force Reserve Facility
AW	Airlift Wing
BOMARC	Boeing Michigan Aeronautical Research Center
DoD	U.S. Department of Defense
HARM	U.S. Air Force Hazard Assessment Rating Methodology
HI	Hazard Index
HQ	Hazard Quotient
IRP	Installation Restoration Program
MSL	mean sea level
NFARS	Niagara Falls Air Reserve Station
NFRAP	No Further Response Action Planned
NYANG	New York Air National Guard
NYSDEC	New York State Department of Environmental Conservation
POL	petroleum, oil and lubricant
RAB	Restoration Advisory Board
RBCs	risk-based concentrations
RBSCs	risk-based screening concentrations
RFI/CMS	RCRA facility investigation/corrective measures study
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
TCE	trichloroethene
USAF	United States Department of the Air Force
VOCs	volatile organic compounds

Declaration

Site Name and Location

Installation Restoration Program (IRP) Site 2, petroleum, oil, and lubricant (POL) bulk JP-4 Tank C Leak, is located at the Niagara Falls Air Reserve Station (NFARS) in the Town of Wheatfield, Niagara County, New York.

Statement of Basis and Purpose

This No Further Response Action Planned (NFRAP) decision document presents the no further action alternative as the selected remedial action for Site 2. This alternative has been chosen in accordance with the Resource Conservation and Recovery Act (RCRA) and, more specifically, is consistent with the Corrective Action Requirements Module III of the installation's Part 373 Hazardous Waste Storage Permit. This permit was issued by New York State in accordance with Title 6, Part 373, of the New York Codes, Rules, and Regulations (6 NYCRR 373) and regulates the management and releases of hazardous wastes at NFARS. This NFRAP is being issued by the United States Department of the Air Force (USAF), 914th Airlift Wing (AW) of the United States Air Force Reserve Command (AFRC) at the NFARS, following consultation with, and the concurrence of, the New York State Department of Environmental Conservation (NYSDEC). This decision is based on the administrative record file for this site.

Description of the Selected Remedy

The selected remedy for soils and groundwater at Site 2 is no further action.

Declaration Statement

AFRC has determined, with the concurrence of NYSDEC, that no further action is warranted for soils and groundwater at Site 2, POL bulk JP-4 Tank C Leak, because the baseline risk assessment performed during the remedial investigation (RI) and the subsequent preliminary risk evaluations performed as part of the Installation-Wide Groundwater Monitoring Project concluded that the site

poses no current or potential threat to human health or the environment.

Air Force Signature

See Exhibit 1-1 for Air Force signature and acceptance of the declaration statement.

EXHIBIT 1-1

DECLARATION STATEMENT

On the basis of the remedial investigation and installation-wide groundwater monitoring performed at Installation Restoration Program (IRP) Site 2, there is no evidence to conclude that the previous operations conducted at this site have resulted in environmental contamination that poses a current or potential threat to human health or the environment. This decision removes Site 2 from further consideration in the IRP pursuant to Corrective Action Module III under the installation's Part 373 Hazardous Waste Storage Permit.

GERALD C. VONBERGE, COL, USAFR
Commander

10 Jul 02
Date

1 Decision Summary

1.1 Introduction

This decision document is issued by the United States Department of the Air Force (USAF), 914th Airlift Wing (AW) of the Air Force Reserve Command (AFRC), following consultation with the New York State Department of Environmental Conservation (NYSDEC).

1.2 Site Name, Location, and Description

Regional Site Description

The Niagara Falls Air Reserve Station (NFARS) is located in Niagara County, New York, approximately 15 miles north of the city of Buffalo and 6 miles east of the city of Niagara Falls (see Figure 1-1). The installation, located in an area of varied land use, covers approximately 547 acres in the Towns of Wheatfield and Niagara (see Figure 1-2). Areas of industrial use are primarily located 2 miles to the west and southwest along Niagara Falls Boulevard, Porter Road, Packard Road, and Interstate 190. Additional industrial areas are located adjacent to the southeast corner of the installation (Carborundum Co. and the former Bell Aerospace Textron plant) and 1 mile north of the installation (Carborundum Co. and Redlein Quarry. Residential areas are adjacent to all sides of the installation. Areas zoned for agricultural/rural use are located to the southeast and adjacent to the northern and eastern boundaries. Commercial areas are located primarily to the west and south, along Military Road and Niagara Falls Boulevard.

Topography in the area of the installation is relatively flat. The majority of land is classified as grassland-type vegetative cover with scattered shrubs and trees. Most of the land is actively mowed and landscaped, and natural habitat is limited. Ground surface elevations at the installation range from approximately 600 feet above mean sea level (MSL) along the northern boundary to 585 feet above MSL along the southern boundary. Surface water

drainage from the installation flows into Cayuga Creek, and then into the Little River, which in turn flows into the upper Niagara River and eventually Lake Ontario. Regional groundwater flow in the vicinity of NFARS is to the south-southwest toward the Niagara River.

The installation is located within the Huron Plain of the Central Lowland physiographic province. Bedrock strata in this area are comprised of Lockport Dolostone from the Middle Silurian age and are approximately 140 feet thick in the vicinity of the installation. Bedrock groundwater flows through horizontal bedding planes and vertical fractures and joints within the Lockport Dolostone. Naturally occurring soils in the area are classified as Wisconsin-age glacial till, lacustrine silt and clay, and Holocene fluvial deposits.

Site 2, POL Bulk JP-4 Tank C Leak

Site 2, POL bulk Tank C Leak, is located in the POL storage yard, between Kinross Street and Utzig Drive (see Figure 1-3). The underground inlet and outlet pipes leading to POL Bulk Storage Tank C began leaking JP-4 in 1982. The leaks were discovered when fuel was observed in the dike area, the tank truck loading facilities, and the oil/water separator. Corrosion and leakage were confirmed when the underground pipes were excavated and repaired. A minimum of 4,000 gallons of fuel is estimated to have leaked from the pipes (SAIC 1991).

The ground surface at NFARS is characterized by generally flat terrain that slopes gradually from an elevation of about 600 feet above mean sea level (MSL) along the northern site boundary to an elevation of 585 feet above MSL along the southern site boundary. Site 2 is located in the northeastern portion of NFARS, between Kinross Street and Utzig Drive, at an approximate elevation of 600 feet above MSL.

The site is underlain by lacustrine deposits, glacial till, and bedrock. The unconsolidated material above the bedrock is generally 11 to 13 feet thick near Tank C, but only 5 to 6 feet thick on the north side of Building 600. The lacustrine deposits are comprised of horizontally bedded and varved, reddish brown, silty clay with laminae of gray clay and lenses of tan silt and fine sand. The glacial till underlies the lacustrine deposits and consists of an unsorted mix of saturated reddish brown clay, silt, sand, gravel, cobbles, and boulders. The till directly overlies the bedrock, which is the

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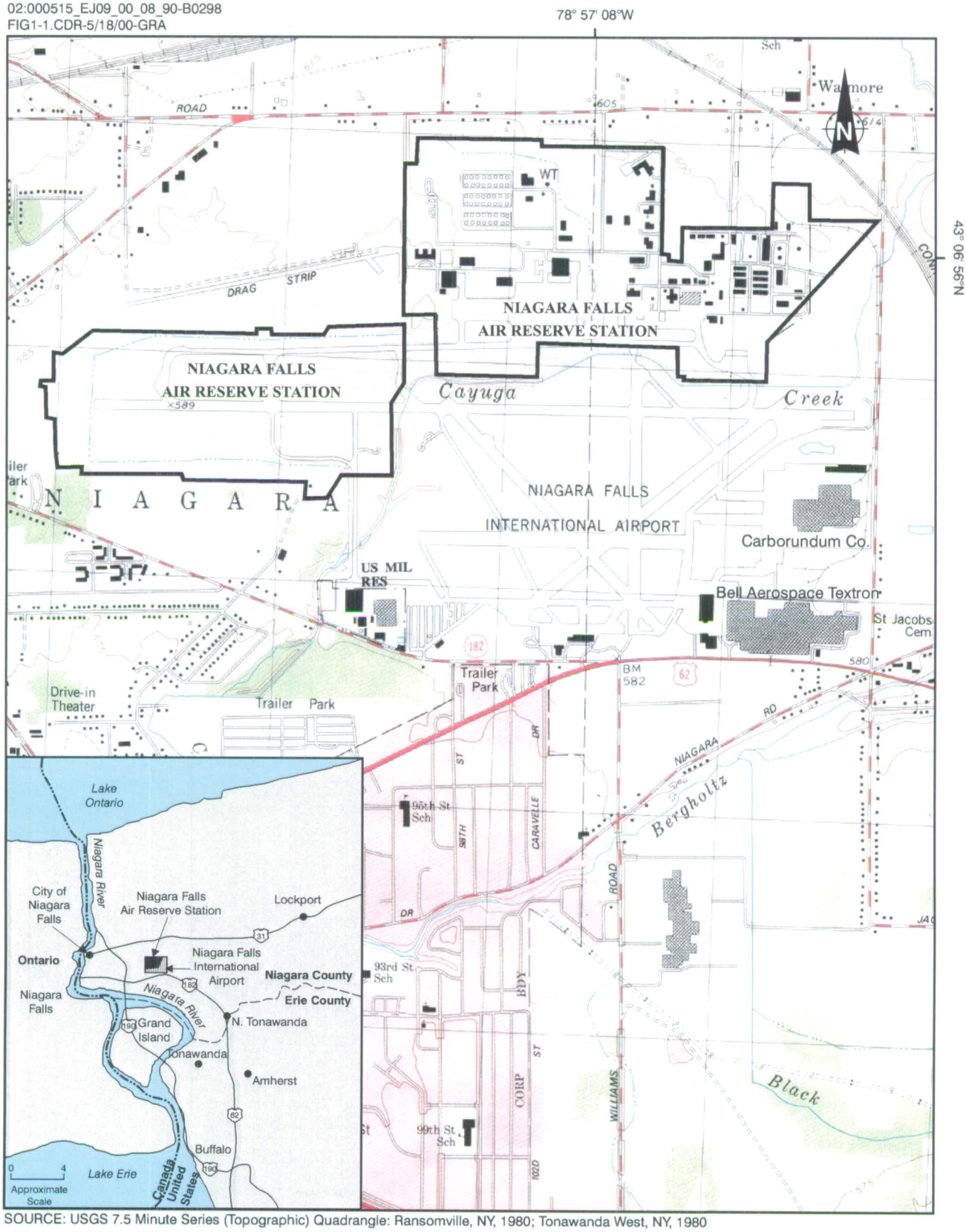
FIG1-1.CDR-5/18/00-GRA



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle: Ransomville, NY, 1980; Tonawanda West, NY, 1980

SCALE 1:24,000

0 ½ 1 Mile

0 .5 1 Kilometer

Figure 1-1 REGIONAL LOCATION MAP

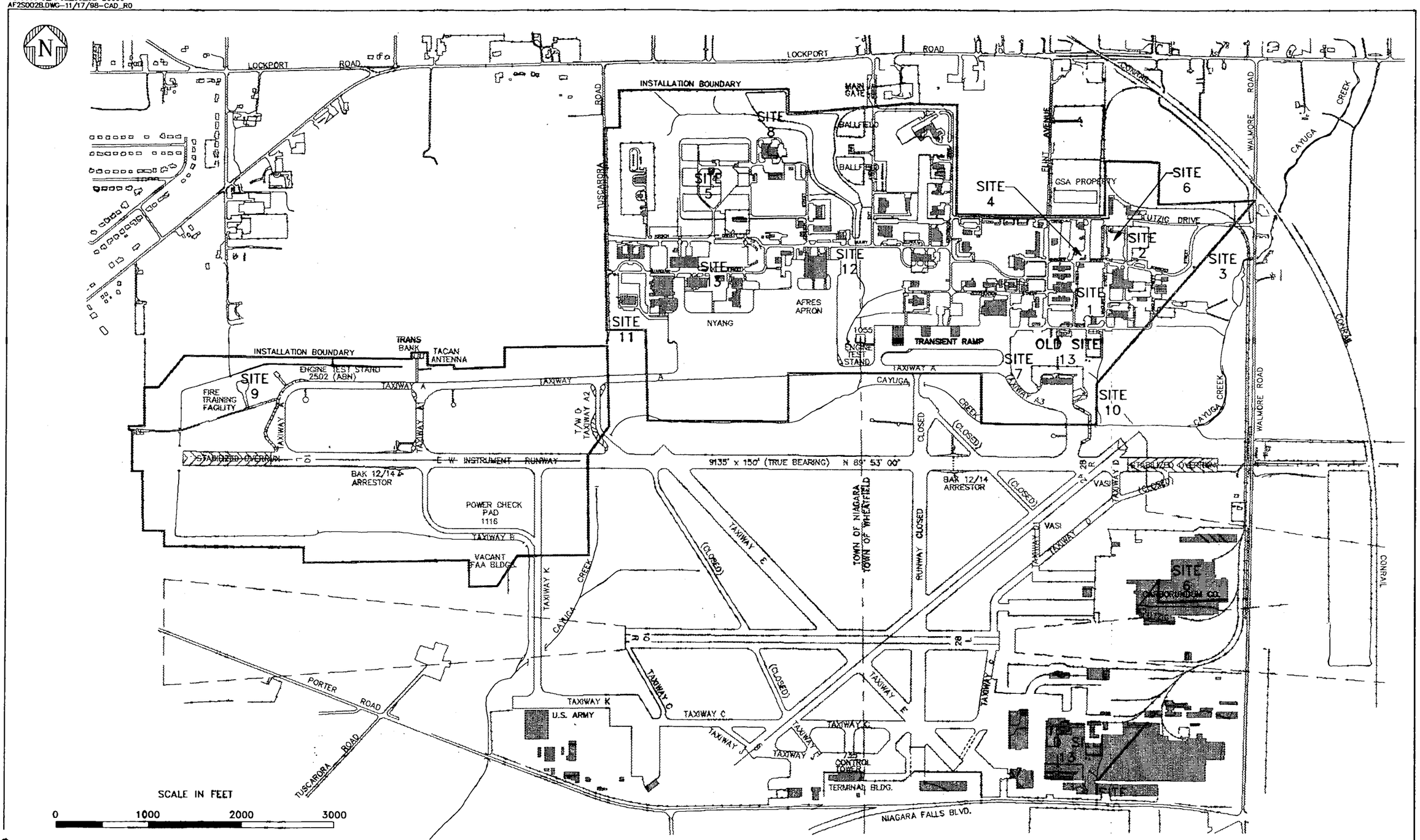


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Figure 1-2 NIAGARA FALLS AIR RESERVE STATION INSTALLATION PLAN

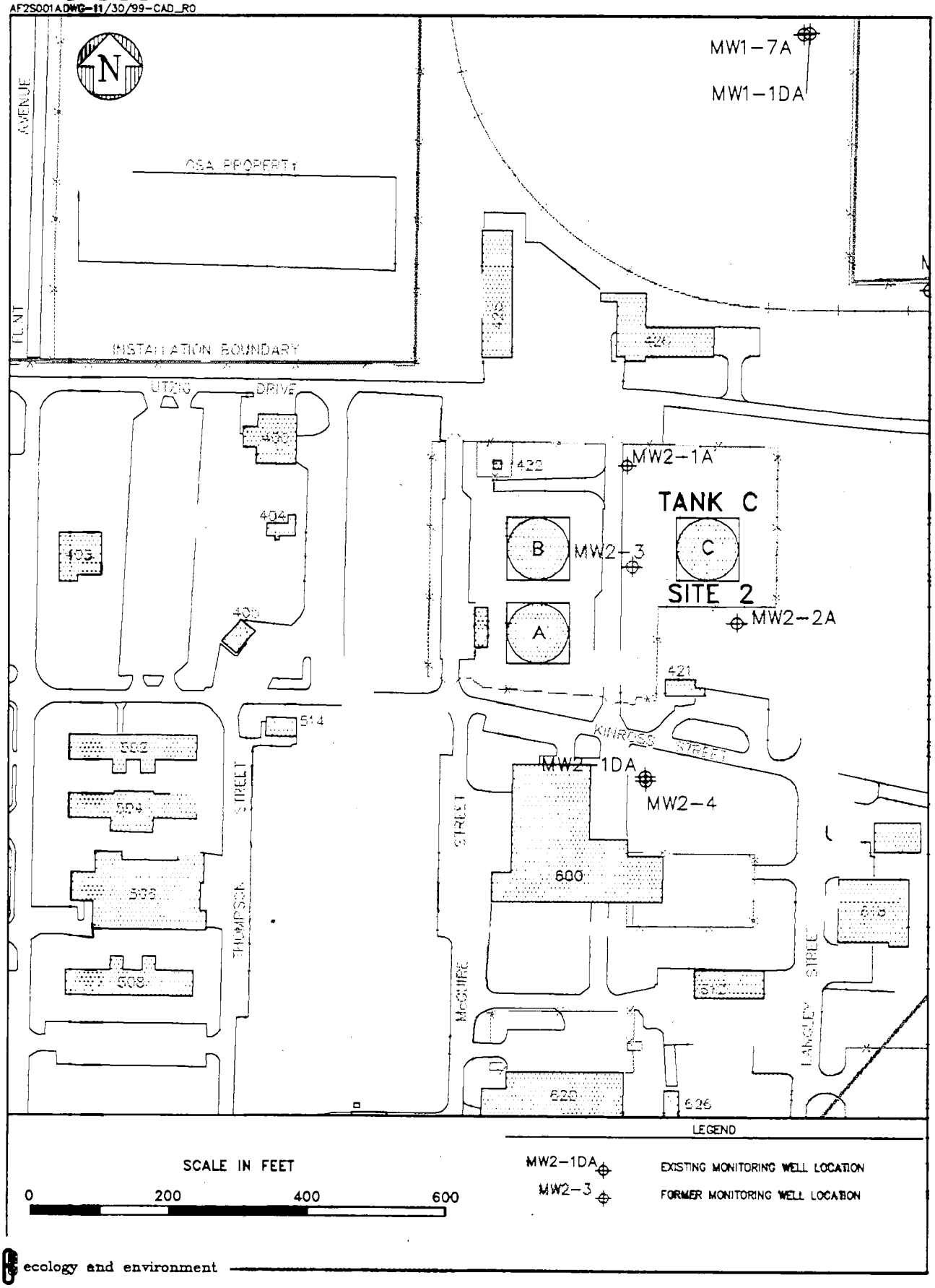


Figure 1-3
IRP SITE 2, POL JP-4 TANK C LEAK
SITE LAYOUT
NIAGARA FALLS ARS

Middle Silurian Lockport Dolostone. The Lockport Dolostone consists primarily of gray to brownish gray, fine- to coarse-grained dolostone. It is approximately 140 feet thick in Niagara County, strikes approximately east-west, and dips gently to the south at about 25 feet per mile. At NFARS the upper 10 feet of the Lockport Dolostone at NFARS are highly fractured, with fractures decreasing but still present with increasing depth. Fractures include horizontal bedding plane fractures and some vertical fracturing (joints and stress relief fractures). Fracture concentrations vary greatly from one location to the next.

Water-bearing zones in the overburden and shallow bedrock have been identified at the site. In general, overburden groundwater flows from a high, which extends eastward from Site 2 to the south and southwest. The depth to groundwater averages approximately 5 feet below ground surface. Groundwater within the shallow bedrock generally flows from the north toward the south and southeast. There is a general downward vertical gradient between the overburden and shallow bedrock water-bearing zones.

1.3 Operations History and Environmental Background

Niagara Falls Operations History

NFARS was established as Niagara Falls Air Force Reserve Facility (AFRF) in November 1942. The federal government leased 468 acres of municipal airport land for use by the Army Air Corps. In 1946, 132.2 acres of the leased land were returned to the City of Niagara Falls. The 136th Fighter Squadron of the New York Air National Guard (NYANG) was established on December 8, 1948 and occupied Old Camp Bell near the Bell Aircraft plant on the installation. The 76th Air Base Squadron was activated on February 1, 1952 as the installation host unit.

On February 16, 1953, the 518th Air Defense Group replaced the 76th Air Base Squadron as the host unit, and the NYANG 47th Fighter Interceptor Squadron replaced the 136th Fighter Interceptor Squadron. In August 1955, the USAF reactivated the 15th Fighter Group to replace the 518th Air Defense Group. In July 1960, the 15th Fighter Group was deactivated, and the 4621st Support Group began operations as the installation host unit. The 4621st Support Group was redesignated as the 4621st Air Base Group in July 1964.

The North American Defense Command Defense System CIM-10B Boeing Michigan Aeronautical Research Center (BOMARC) missile was deployed in the western portion of the installation in

1959. The 35th Air Defense Missile Squadron was activated to maintain the BOMARC missiles at the installation. The 35th Air Defense Missile Squadron and the missiles were deactivated in the late 1960s, and the NYANG 107th Tactical Fighter Group became the tenant organization occupying the western portion of the installation.

The 49th Fighter Interceptor Squadron, 1st Detachment, assumed responsibility for the installation from the 4621st Air Base Group in March 1970. On January 1, 1971, the installation was transferred from the Aerospace Defense Command to AFRC, and the 914th Tactical Airlift Group became the host unit. The main tenant organization, NYANG 107th Tactical Fighter Group, was redesignated as the 107th Fighter Interceptor Group. In early 1992, the Niagara Falls AFRF was renamed the Niagara Falls Air Reserve Station, the 914th Tactical Airlift Group became the 914th Airlift Group, and the 107th Fighter Interceptor Group became the 107th Fighter Group. In 1994, the NYANG 107th Fighter Group was redesignated as the 107th Air Refueling Group, and the 914th Airlift Group was redesignated as the 914th AW. In 1995, the NYANG 107th Air Refueling Group was redesignated at the 107th Air Refueling Wing. When activated, the units are commanded by Air Mobility Command.

The 914th AW has the primary installation mission and trains approximately 1,860 reserve officers and airmen to combat-ready status for any national emergency. Current activities include airlifting troops and supplies, providing front line troops with personnel and logistical support, and conducting medical evacuations. In 1994, the NYANG converted from 18 F-16 A/B fighters to 10 KC-135R tankers, and the 914th AW converted to the C-130H cargo airplane.

Environmental Background

Since 1942, various national defense missions have been carried out at the installation, including storage, maintenance, and shipping of war material; research and development; and aircraft operations and maintenance. As a result, hazardous substances and wastes were used, stored, or disposed of at various sites.

Several studies and investigations have been conducted under the U.S. Department of Defense (DoD) Installation Restoration Program (IRP) to detect, locate, and quantify contamination resulting from hazardous substances and wastes. To date, 14 sites at NFARS have been identified as potential sources of environmental

contamination. Installation-wide studies and investigations conducted include the following:

- A 1983 Phase I record search involving interviews with base personnel, a field inspection, compilation of an inventory of wastes, evaluation of disposal practices, and an assessment of the potential for site contamination (Engineering-Science 1983);

- A Phase II/Stage 1 confirmation/quantification investigation conducted between 1984 and 1986 to identify areas of contamination (SAIC 1986);

- A comprehensive remedial investigation/feasibility study (RI/FS) conducted between 1987 and 1991 designed to identify and quantify the extent of environmental contamination, screen remedial alternatives, and assess potential risks to human health and the environment (SAIC 1991);

- Several site-specific limited or focused investigations performed between 1991 and 1994 designed to fill data gaps identified by the RI/FS;

- Installation-wide groundwater monitoring projects conducted annually since 1995 designed to further quantify the extent of contamination, perform long-term monitoring, evaluate potential corrective actions, and evaluate potential risks to human health and the environment;

- The preparation of site-specific decision documents identifying six sites that were closed with recommendations for no further action (Sites 1, 4, 6, 11, 12, and old Site 13); and

- The preparation of site-specific decision documents outlining future actions at eight IRP sites (Sites 1, 2, 3, 4, 5, 8, 9, and new Site 13).

Since 1991, additional projects have been performed, including corrective measures studies, remedial design, and construction at three sites (Sites 3, 10, and 13), and long-term groundwater monitoring at numerous sites. A 1994 decision document recommended additional monitoring for Site 2 (Law 1994).

Pursuant to the corrective action requirements under the installation's NYSDEC Part 373 Hazardous Waste Storage Permit, AFRC has continued long-term groundwater monitoring at 10 IRP sites

(including Site 2); prepared a RCRA facility investigation/corrective measures study (RFI/CMS) for three of the 10 sites (Sites 3, 10, and 13); and developed and implemented remedial designs involving groundwater extraction and discharge systems at the same three sites. These efforts were initiated in 1994. The extraction systems are currently in operation.

Based on the following investigation criteria, AFRC has proposed no further action at Site 2. The standards and guidance values were determined by using the federal and state environmental and public laws that were identified as potentially applicable or relevant and appropriate requirements (ARARs) at the site. Currently, there are no chemical-specific ARARs for soil. Therefore, other nonpromulgated federal and state advisories and guidance values, referred to as "to be considereds" (TBCs), and background levels of the contaminants in the absence of TBCs, were considered. Second, a site-specific baseline risk assessment, using appropriate toxicological and exposure assumptions, was conducted to evaluate the risks posed by detected site contaminants. In addition, as part of the Installation-Wide Groundwater Monitoring Project, a preliminary risk evaluation was conducted to further assess potential risks posed to human and environmental receptors.

1.4 Highlights of Community Participation

Public interest in the creation of a Restoration Advisory Board (RAB) was solicited in November 1996 and again in January 1998. A RAB allows the public to become involved in the investigations and remedial actions performed on base. However, due to a lack of community interest, a RAB was not formed.

This document is available to the public in an information repository maintained at the Niagara Falls Public Library at 1425 Main Street, Niagara Falls, New York, 14305. This decision document presents the selected remedial action for IRP Site 2 at NFARS, chosen in accordance with RCRA and, more specifically, Module III of the base's 6 NYCRR Part 373 Hazardous Waste Storage Permit. The decision for this site is based on the administrative record. No public meeting was required.

1.5 Scope of Response Action

No streams or swales are located at Site 2; all surface water drainage is via overland flow. Because the site does not contain surface water or sediment, the NFRAP for IRP Site 2 addresses soil and groundwater only. Based on the concentration of chemicals in the soil and groundwater, the baseline and supplemental risk assessments, and the preliminary risk evaluations, there is no evidence

that previous operations conducted at this site have resulted in environmental contamination posing a current or potential threat to human health or the environment.

2 Summary of Site Activities

The following section provides a detailed summary of the groundwater and subsurface soil sampling that has been conducted at NFARS IRP Site 2. Analytical results are discussed in the following sections and are summarized in Table 2-1 (soils) and on Figures 2-1 through 2-5 (groundwater). The letter designations (suffixes) assigned to the monitoring wells discussed below are defined as follows:

- No designation: overburden well, set at the top of bedrock (approximately 5 to 12 feet BGS);
- A: replacement well, similar construction as original well; and
- D: shallow bedrock well, set 10 feet into bedrock.

Several metals, particularly lead and zinc, have been detected consistently in the groundwater at the installation, occasionally at concentrations above standards. Many of these metals are known to be naturally occurring in the local soil and bedrock, and, in some cases, are inconsistent with known installation activities. An April 30, 1996, letter from NYSDEC concurred that some metals present may be attributed to native soil and bedrock, but also stated that a specific list of metals should still be analyzed for on an annual basis. Therefore, discussion of the following analytical results for metals detected in both groundwater and subsurface soil samples has been limited to highlight only the following metals identified by NYSDEC as those of greatest concern: arsenic, cadmium, chromium, copper, lead, nickel, and zinc.

1983 Phase I Records Search

During the 1983 Phase I records search (Engineering-Science 1983), information was collected from file materials, site visits, and interviews. Sites identified by this search were ranked by the U.S. Air Force Hazard Assessment Rating Methodology (HARM). The POL bulk JP-4 Tank C Leak site ranked second highest at the

installation and was therefore identified as Site 2. The report indicated potential environmental contamination and contaminant migration at this site and recommended the installation of monitoring wells to characterize groundwater quality and identify contaminant migration.

1984-1986 Phase II/Stage 1 Confirmation/Quantification Investigation

During the Phase II investigation, three shallow and one deep groundwater monitoring wells (MW2-1, MW2-2, MW2-3, and MW2-1D) were installed. Analysis of groundwater samples indicated the presence of oil and grease in two wells at a maximum concentration of 3.89 mg/L. Total organic carbon (TOC) was detected in all wells at this site, including the bedrock well, at concentrations ranging from 20 to 72 mg/L. Purgeable organic carbon (POC) was detected at a maximum concentration of 7 mg/L. The Phase II report concluded that further investigation was necessary to delineate the extent of contamination and identify specific contaminants (SAIC 1986).

1987-1991 IRP RI/FS

Based on the results of the Phase II investigation, additional work was conducted during the comprehensive IRP RI/FS between 1987 and 1991 (SAIC 1991). This included installation of one additional shallow monitoring well (MW2-4) and collection of groundwater and soil samples in September 1989. Groundwater sample analysis indicated the presence of several common, naturally occurring metals, including copper, iron, manganese, nickel, and zinc. Copper was detected in two wells at concentrations of 11 µg/L and 13 µg/L; iron concentrations ranged from 676 µg/L to 4,430 µg/L; manganese concentrations ranged from 260 µg/L to 1,840 µg/L; nickel was detected in two wells at concentrations of 16 µg/L and 26 µg/L; and zinc concentrations ranged from 36 µg/L to 456 µg/L.

Volatile organic compounds (VOCs) were detected only in one well. Benzene and toluene were detected at concentrations of 0.33 µg/L and 0.52 µg/L, respectively, in the groundwater sample collected from well MW2-4 (see Figure 2-5). Total petroleum hydrocarbons (TPH) was also detected in MW2-4 at a concentration of 1.3 mg/L.

Six subsurface soil samples from two borings, one on the northeast side of Building 600 and one south of Tank C, were collected during the RI. TPH was detected in five of the six soil samples at

concentrations ranging from 6.6 mg/kg to 290 mg/kg (see Table 2-1).

Table 2-1 IRP Site 2, Historical Subsurface Soil Sample Analytical Results Summary, Niagara Falls IAP-ARS

Investigation	Samples Collected	Description	Analytical Results: Sample Depth (ft BGS)	Analytical Results: Positive Hits (mg/kg)
Phase II Investigation (SAIC 1986)	No subsurface soil samples were collected at Site 2 under this investigation.			
RI/FS (SAIC 1991)	Three subsurface soil samples from each of two borings installed along the northeast side of Building 600 and south of Tank C were analyzed for VOCs and TPH.	Five of the six samples contained high levels of TPH. Methylene chloride and acetone were also detected at low concentrations; however, these VOCs were also detected in laboratory blanks.	0-1.5 3-4.5 4.5-6	TPH: 290 TPH: 9.4 TPH: 8.8
			0-1.5 4.5-6 9-10.5	TPH: 6.6 TPH: ND TPH: 9.4
Additional RI/FS (E & E 1992)	No subsurface soil samples were collected at Site 2 under this investigation.			
Installation-Wide Groundwater Monitoring Project (E & E 1996-1998)	No additional subsurface soil samples were collected.			

Key:
BGS = Below ground surface.
mg/kg = Milligrams per kilogram.
ND = Not detected.

TPH = Total petroleum hydrocarbons.
VOC = Volatile organic compounds.

Based on previous studies and the RI/FS results, SAIC recommended no further action for Site 2.

1992 Additional RI/FS

As part of an investigation performed at Sites 2, 4, 5, and 9 in October 1992, all five wells at Site 2 were sampled and analyzed for VOCs, metals, and general analytical parameters (E & E 1992). The VOCs trans,1,2-dichloroethene (trans-1,2-DCE) and trichloro-

ethene (TCE) were detected in two of the wells. Trans-1,2-DCE was detected in MW2-4 at 3.4 µg/L, and TCE was detected in MW2-4 and MW2-1D at 29 µg/L and 10 µg/L, respectively (see Figures 2-2 and 2-5). These compounds were not analyzed for during the RI. Benzene and toluene were not detected during this additional RI. TPH was detected in well MW2-1D at a concentration of 40 mg/L. Iron, lead, manganese, and sodium were present above standards or guidance values in the groundwater samples. Unfiltered groundwater samples contained manganese at concentrations ranging from 300 µg/L to 2,200 µg/L; iron at concentrations ranging from 560 µg/L to 40,000 µg/L; lead at concentrations ranging from 8.5 µg/L to 65 µg/L; and sodium at concentrations ranging from 72,000 µg/L to 120,000 µg/L. Nickel, chromium, zinc, and copper were also detected in the groundwater samples at low concentrations (see Figures 2-1 through 2-5). The filtered samples had generally lower concentrations of these metals than the unfiltered samples.

NYSDEC and EPA reviewed the analytical results for the above investigations in 1993 and subsequently requested that semi-annual groundwater sampling be conducted at this site for at least two years.

1995 Installation-Wide Groundwater Monitoring

Under the Installation-Wide Groundwater Monitoring Project that began in September 1994 (E & E 1996, 1997, 1998), bedrock well MW2-1D was replaced with a properly constructed shallow bedrock well, MW2-1DA. The previous well, MW2-1D, was constructed with an inappropriately long screen and a sandpack that extended to the surface. Overburden monitoring well MW2-2 was replaced by well MW2-2A because of frost damage in 1995. In 1997, overburden well MW2-3 was permanently abandoned, and overburden well MW2-1 was replaced by well MW2-1A because of frost heaving.

Groundwater sampling was conducted in various wells twice in 1995, 1996, and 1997 and once in 1998. Two nested wells, including one overburden well (MW2-4) and one bedrock well (MW2-1DA), were found to contain the VOCs TCE, cis-1,2-DCE, and/or trans-1,2-DCE. These compounds have been detected in both wells each time they have been sampled since 1992 (see Figures 2-1 and 2-5). TCE concentrations in MW2-1DA increased to a maximum of 21 µg/L in May 1995 and have decreased significantly since, with the lowest concentration of 4.3 µg/L detected in September 1997. Total 1,2-DCE levels increased to a maximum of 70.2 µg/L in November 1996 and have decreased since to a con-

centration of 33 µg/L, detected in March 1998. TCE concentrations in MW2-4 have generally remained stable, with the lowest concentrations of 3.5 µg/L and 3.0 µg/L detected in the March 1998 and September 1997 samples, respectively. The total 1,2-DCE concentration increased to a maximum of 110 µg/L in March 1995 and has decreased since to a concentration of 19 µg/L, detected in March 1998. Only lead was present above NYSDEC class GA water standards in wells MW2-1A, MW2-1DA, and MW2-2A in 1992 and 1995. However, no metals exceeded standards in the last two or more sampling rounds.

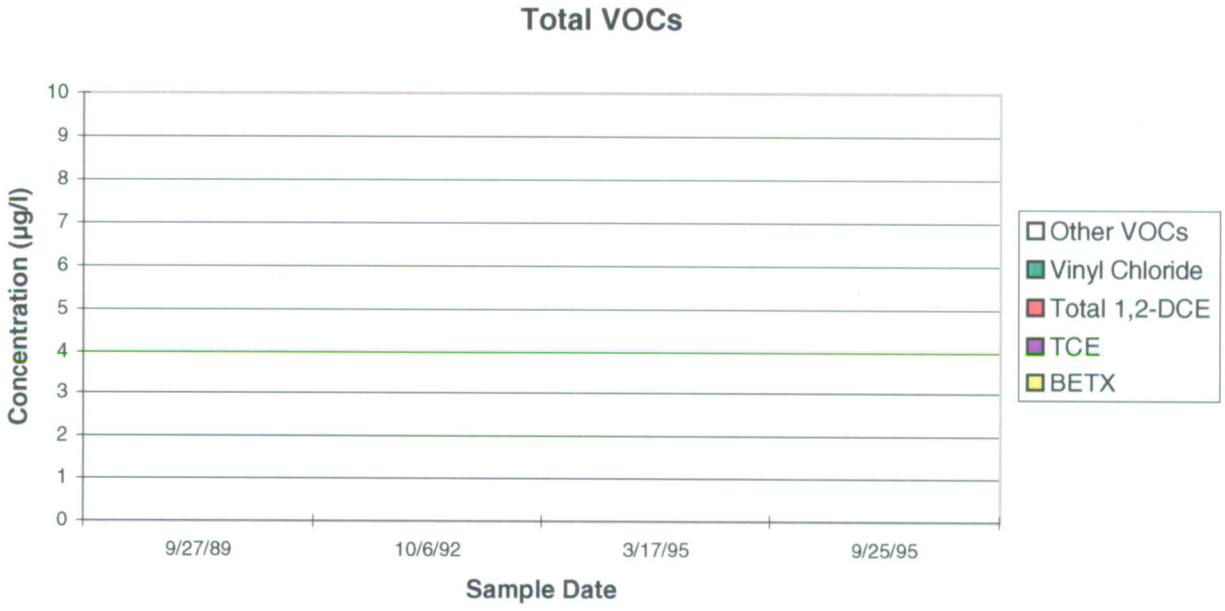
This is a site of a jet fuel tank leak where the presence of aromatic hydrocarbons was expected. No local source has been identified to explain the presence of TCE and 1,2-DCE in the well pair by Building 600. Their presence is consistent with historical base-wide activities (use of chlorinated solvents) but is not associated with the known source at Site 2.

Figure 2-1: MW2-1A Analytical Summary - VOCs and Metals

IRP Site No.: 2
Well Type: Overburden
Installation Date: 10/24/84 (Replaced 7/14/97)
Total Depth: 11.7 feet BGS
Sand Pack Interval: 4.7 - 11.7 feet BGS
Depth to Bedrock: 11.7 feet BGS

Due to frost heave the original well (MW2-1) was replaced by one of similar construction (MW2-1A). Data for both are included here.

VOC Results (µg/l)



Date	BETX	TCE	Total 1,2-DCE	Vinyl Chloride	Other VOCs
9/27/89	ND	NA	NA	NA	ND
10/6/92	ND	ND	ND	ND	ND
3/17/95	ND	ND	ND	ND	ND
9/25/95	ND	ND	ND	ND	ND

Metals Results (µg/l)

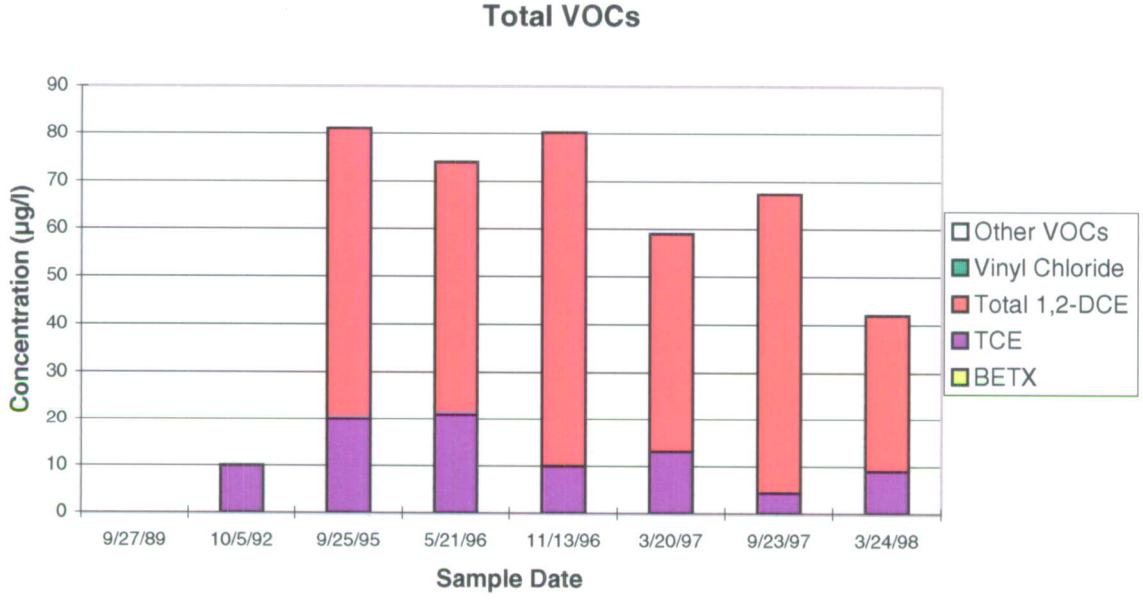
Date	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
9/27/89	ND	ND	ND	11	ND	16	184
10/6/92	ND	ND	19	35	40	30	1200
3/17/95	9.2	ND	22	96	58	51	1900
11/14/96	6.8	ND	ND	ND	16	ND	490
3/20/97	ND	ND	ND	ND	ND	ND	380
9/24/97	ND	ND	ND	ND	ND	ND	12
3/24/98	ND	ND	ND	ND	ND	ND	340

Figure 2-2: MW2-1DA Analytical Summary - VOCs and Metals

IRP Site No.:	2	**Total Depth:**	15.5 feet BGS
Well Type:	Shallow Bedrock	**Sand Pack Interval:**	8.5 - 15.5 feet BGS
Installation Date:	10/31/84 (Replaced 6/22/1995)	**Depth to Bedrock:**	5.5 feet BGS

This well replaced one of inappropriate construction (MW2-1D), data for which are also included here (1989 and 1992).

VOC Results (µg/l)



Date	BETX	TCE	Total 1,2-DCE	Vinyl Chloride	Other VOCs
9/27/89	ND	NA	NA	NA	ND
10/5/92	ND	10	ND	ND	ND
9/25/95	ND	20	61	ND	ND
5/21/96	ND	21	53	ND	ND
11/13/96	ND	10	70.2	ND	ND
3/20/97	ND	13	46	ND	ND
9/23/97	ND	4.3	63	ND	ND
3/24/98	ND	9	33	ND	ND

Metals Results (µg/l)

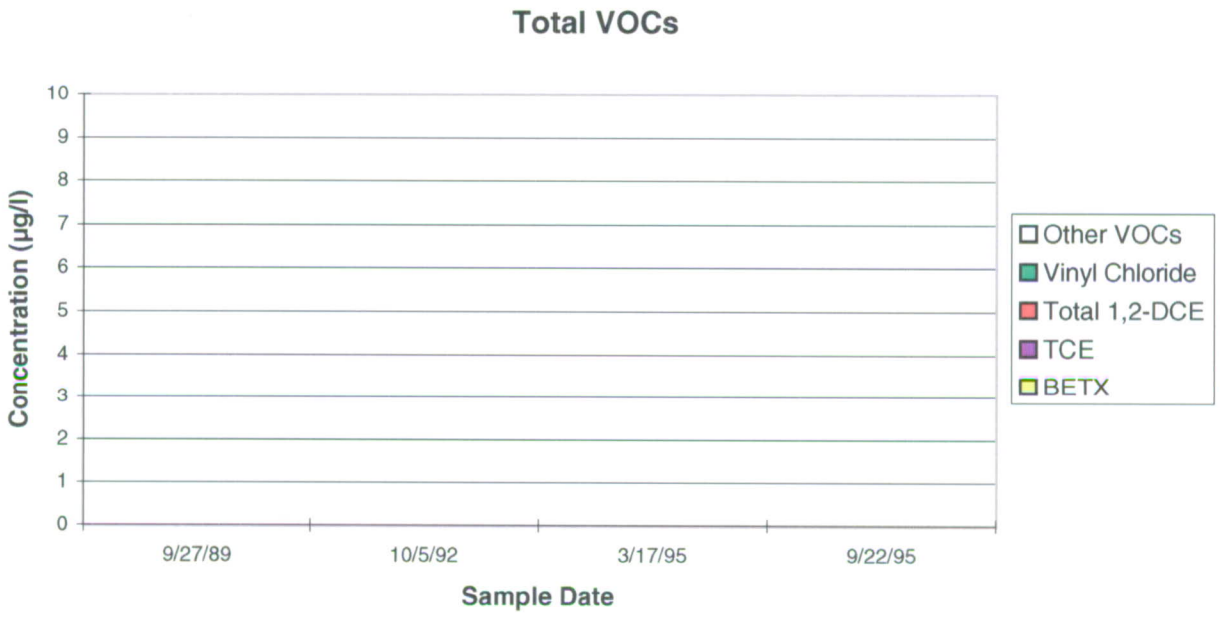
Date	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
9/26/89	ND	ND	ND	ND	ND	ND	186
10/5/92	ND	ND	ND	ND	62	ND	520
9/25/95	5.6	ND	ND	ND	81	ND	430
11/13/96	6.9	ND	ND	ND	24	ND	360
3/20/97	ND	ND	ND	ND	ND	ND	100
9/23/97	ND	ND	ND	ND	ND	ND	34

Figure 2-3: MW2-2A Analytical Summary - VOCs and Metals

IRP Site No.: 2
Well Type: Overburden
Installation Date: 10/24/84 (Replaced 10/16/95)
Total Depth: 10.8 feet BGS
Sand Pack Interval: 6.0 - 10.8 feet BGS
Depth to Bedrock: 11.1 feet BGS

Due to frost heave this well replaced one of similar construction (MW2-2), data for which are also included here.

VOC Results (µg/l)



Date	BETX	TCE	Total 1,2-DCE	Vinyl Chloride	Other VOCs
9/27/89	ND	NA	NA	NA	ND
10/5/92	ND	ND	ND	ND	ND
3/17/95	ND	ND	ND	ND	ND
9/22/95	ND	ND	ND	ND	ND

Metals Results (µg/l)

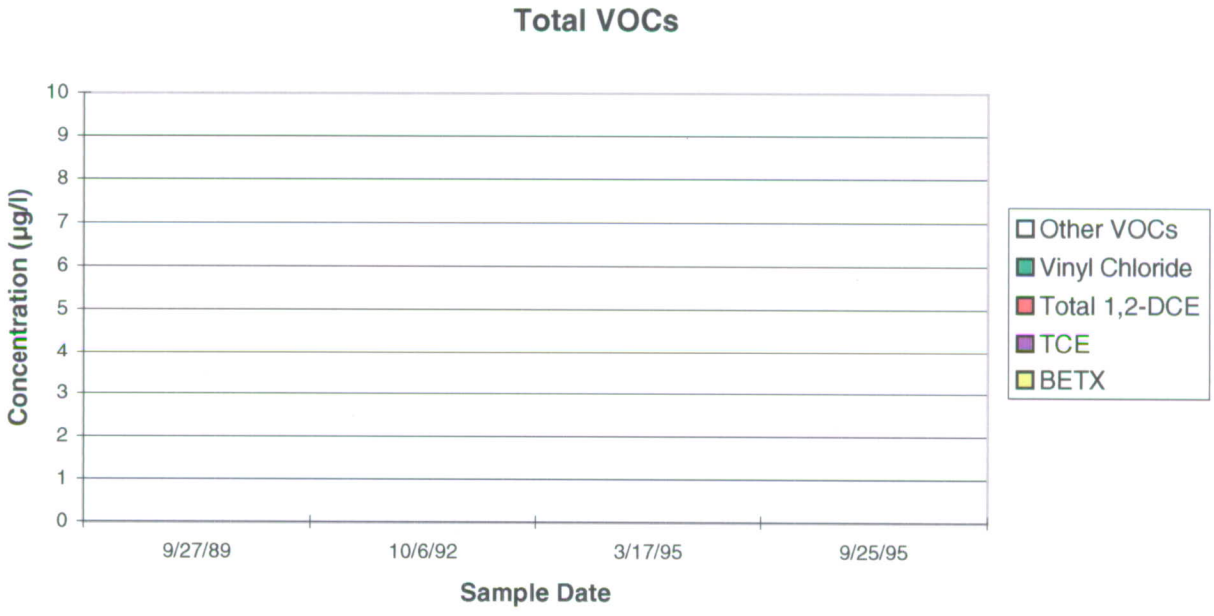
Date	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
9/27/89	ND	ND	ND	13	ND	ND	42
10/5/92	NA	NA	20	45	42	26	290
3/17/95	ND	ND	ND	ND	ND	ND	80

Figure 2-4: MW2-3 Analytical Summary - VOCs and Metals

IRP Site No.: 2
Well Type: Overburden
Installation Date: 10/24/84
Total Depth: 12.8
Sand Pack Interval: 5.8 - 12.8 feet BGS
Depth to Bedrock: 12.8 feet BGS

MW2-3 was abandoned in 1997 because it was no longer needed.

VOC Results (µg/l)



Date	BETX	TCE	Total 1,2-DCE	Vinyl Chloride	Other VOCs
9/27/89	ND	NA	NA	NA	ND
10/6/92	ND	ND	ND	ND	ND
3/17/95	ND	ND	ND	ND	ND
9/25/95	ND	ND	ND	ND	ND

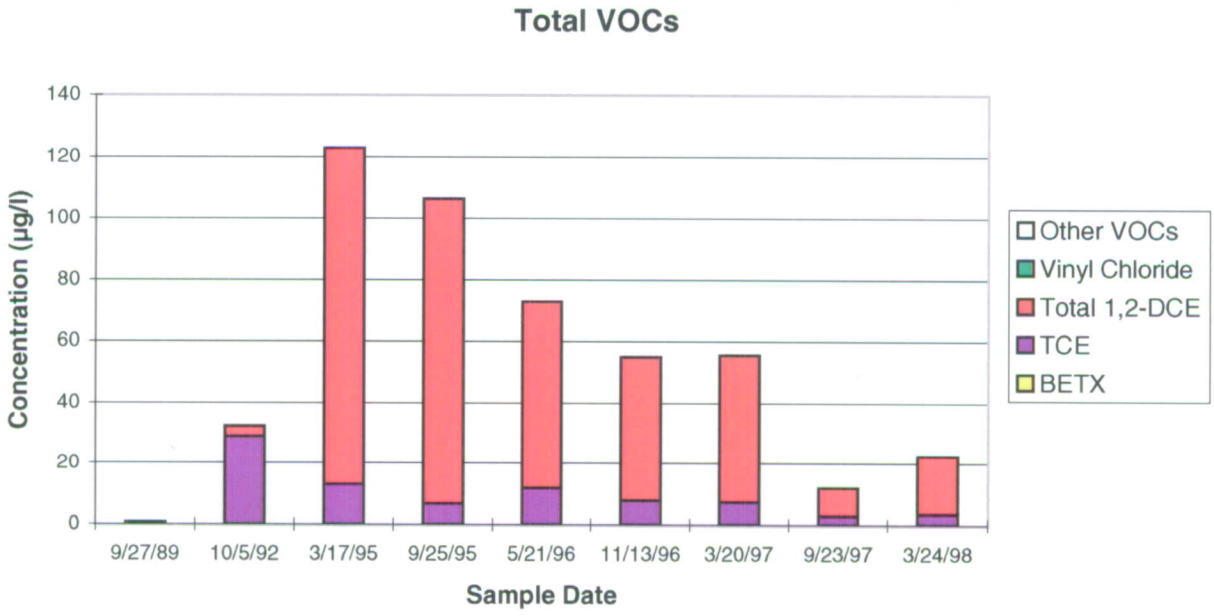
Metals Results (µg/l)

Date	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
9/27/89	ND	ND	ND	ND	ND	26	456
10/6/92	ND	ND	38	42	65	39	1100
3/17/95	16.4	ND	25.2	60.8	59.8	42.4	1340

Figure 2-5: MW2-4 Analytical Summary - VOCs and Metals

IRP Site No.:	2	**Total Depth:**	5.2 feet BGS
Well Type:	Overburden	**Sand Pack Interval:**	2.5 - 5.2 feet BGS
Installation Date:	7/28/89	**Depth to Bedrock:**	5.2 feet BGS

VOC Results (µg/l)



Date	BETX	TCE	Total 1,2-DCE	Vinyl Chloride	Other VOCs
9/27/89	0.85	NA	NA	NA	ND
10/5/92	ND	29	3.4	ND	ND
3/17/95	ND	13	110	ND	ND
9/25/95	ND	6.9	99.4	ND	ND
5/21/96	ND	12	61	ND	ND
11/13/96	ND	7.9	47	ND	ND
3/20/97	ND	7.5	48	ND	ND
9/23/97	ND	3	9.1	ND	ND
3/24/98	ND	3.5	19	ND	ND

Metals Results (µg/l)

Date	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
9/27/89	ND	ND	ND	ND	ND	ND	36
10/5/92	ND	ND	ND	ND	8.5	ND	59
3/17/95	ND	ND	29	ND	ND	26	130

3

Summary of Site Risks

Several studies have been conducted to assess the extent of and potential exposure to contaminants at IRP Site 2. As part of the RI/FS (SAIC 1991), a baseline human health risk assessment was conducted to evaluate potential current and future risks to human health associated with contaminants detected in groundwater and soil at the site. Concentrations of chemicals detected in the soil and groundwater were compared with standard EPA risk-based screening levels and NYSDEC Class GA groundwater standards. The results of this assessment are included in the October 1994 final decision document prepared for the site (Law 1994). In addition, as part of the Installation-Wide Groundwater Monitoring Project, preliminary risk evaluations were conducted annually from 1995 through 1997 to further assess potential risks associated with exposure to contaminants detected in groundwater at the site (E & E 1996a, 1997, 1998a). This section summarizes the results of the previous studies. If the risk assessment is to be used as a basis for future decision making, the detailed assessments included in the above mentioned documents should be consulted.

3.1 Human Health Risk Assessment

3.1.1 RI/FS Baseline Risk Assessment

As part of the baseline risk assessment, the following four-step process was used to assess site-related human health risks for a reasonable maximum exposure scenario: (1) hazard identification, (2) exposure assessment, (3) toxicity assessment, and (4) risk characterization. Current and potential site risks from chemicals of concern were evaluated using likely exposure scenarios. All chemicals detected in the soil and groundwater at the site were considered chemicals of concern, with the exceptions of TPH and those chemicals excluded during the data quality review. TPH is a complex mixture whose component chemicals were not identified, and there are no EPA toxicity values available for this class of compounds for use in risk characterization. However, the individ-

ual petroleum hydrocarbon constituents detected (e.g., benzene, toluene) were evaluated.

Routes of exposure and occupational receptors were selected for soils and groundwater at Site 2 based on its current and future land use designation as industrial. The site, which is located in the highly developed northern portion of the base and consists of paved roads, parking lots, buildings, and maintained lawns, is regularly used by base personnel. Access to the base is controlled by a perimeter fence and armed security police. There are no plans to close the installation.

Quantitative estimates of carcinogenic and noncarcinogenic risks were calculated for the site as part of the risk characterization, which evaluated potential health risks based on estimated exposure intakes and toxicity values. For carcinogens, risks were estimated as the incremental probability of an individual developing cancer over a 70-year lifetime as a result of exposure. The cancer risks of the individual chemicals were summed for each pathway to develop a total risk estimate. Under current EPA Superfund policy, acceptable exposures to known or suspected carcinogens are generally those that represent an excess lifetime cancer risk to an individual of between 1 in 10,000 (1×10^{-4}) and 1 in 1,000,000 (1×10^{-6}) (SEPA 1992).

To assess the likelihood of noncarcinogenic effects from exposure to a contaminant, EPA has developed the Hazard Quotient (HQ). The HQ is the ratio of the chronic daily intake of a chemical to the chronic reference dose for that chemical. The reference dose is an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. For screening purposes, the HQs are summed for all contaminants within an exposure pathway (e.g., ingestion of soils) to determine the Hazard Index (HI). If the HI exceeds 1, there may be concern for potential noncarcinogenic health effects if a single contaminant is responsible or if the contaminants responsible cause similar toxic effects. An HI less than 1 indicates that adverse health effects would not be expected.

Cleanup actions may be taken when the regulatory agencies determine that the risk at a site exceeds the cancer level of 1×10^{-4} in 10,000 or if the noncarcinogenic HI exceeds 1. Once either of these thresholds has been exceeded, remedial action alternatives are evaluated to reduce the risk levels to within the acceptable ranges.

Surface Water/Sediments

No streams or drainage ditches are located close to Site 2; therefore, exposure to contaminated surface water and sediment is not a concern.

Soils

A leak in the underground inlet and outlet pipes leading to POL Bulk Storage Tank C, which was discovered in 1982, is the source of contamination at Site 2. Routine exposure to the contaminated soils via ingestion, inhalation, or dermal contact was not evaluated under the baseline risk assessment because of the limited access and the existence of paved areas.

Groundwater

Although the installation and surrounding communities are currently provided with a municipal water supply, the baseline risk assessment assumed that base personnel hypothetically could ingest groundwater having contaminant concentrations equal to those detected at the site. The excess lifetime cancer risk was estimated to be 2×10^{-8}. This estimate falls below the acceptable range for cancer risk established by EPA. Benzene was the only potentially carcinogenic compound in groundwater at the site (chlorinated solvents were not analyzed for in 1989).

The HI for a combined exposure to all detected compounds was calculated to be approximately 0.1. Therefore, no adverse noncarcinogenic effects were anticipated for chronic exposure to groundwater.

3.1.2 Additional RI/FS

The Additional RI/FS (E & E 1992) revealed the presence of compounds in the groundwater that could pose a carcinogenic risk (i.e., TCE and trans-1,2-DCE). However, it was determined that the potential for adverse health effects from the groundwater at Site 2 was insignificant since the potable water source for the base and surrounding area is the Niagara Falls municipal water supply.

3.2 Preliminary Risk Evaluation

The preliminary risk evaluation performed as part of the Installation-Wide Groundwater Monitoring Project (E & E 1996, 1997, 1998) assessed potential risks posed to human and ecological receptors from exposure to contaminants detected in groundwater.

3.2.1 Human Health Risk Evaluation

The preliminary risk evaluation compared organic chemical concentrations detected in the groundwater to New York State Class

GA Groundwater Standards and EPA Region III risk-based concentrations (RBCs) for tap water. The RBCs are based on potential residential exposures through consumption of drinking water and inhalation of volatile chemicals. The criteria are consistent with the target risk levels used in the baseline risk assessment (i.e., lifetime cancer risk of 1×10^{-6} or a noncancer HI of 1.0). The RBCs were used to provide a conservative estimate of potential risks if site groundwater was used as a water supply source. This scenario is not realistically expected to occur since the base and surrounding areas are served by a municipal water supply system.

It was also assumed that groundwater contaminants could migrate to downgradient surface water bodies, where human exposure is possible but not likely. Therefore, the chemical concentrations in groundwater were also compared to the risk-based screening concentrations (RBSCs) that were derived for surface water screening by assuming daily incidental ingestion by site workers. This exposure scenario is also unrealistic since the nearest surface water is more than 1,400 feet away and groundwater contaminants would degrade and disperse with time and distance from the source. The RBSCs were intended only to provide a further conservative assessment of potential risks.

The presence of metals in groundwater was not considered to be site-related; therefore, they were not included in this evaluation.

The only organic compounds detected at Site 2 during this investigation were TCE, cis-1,2-DCE, and trans-1,2-DCE. Data from the most recent sampling round (March 1998) indicates that TCE and cis-1,2-DCE were detected in two wells at levels exceeding the NYSDEC Class GA standard. TCE also exceeded the EPA RBC for tap water. However, if present in tap water, the maximum detected concentration of TCE was determined to pose an estimated upper-bound cancer risk of only 6×10^{-6}. This value falls within the acceptable range of 1×10^{-6} to 1×10^{-4}. TCE and cis-1,2-DCE concentrations were much lower than the RBSCs for incidental ingestion, indicating that even routine contact with these concentrations in surface water would not pose a significant health risk.

Based on the low cancer risks and the lack of a direct exposure pathway, it is considered unlikely that contamination in groundwater at or adjacent to Site 2 poses a significant risk to human health.

3.2.2 Ecological Risk Evaluation

IRP Site 2 is located in the highly developed, northern portion of the installation (see Figure 1-2). The area consists of paved roads, parking lots, buildings, and maintained lawns, and is regularly used by base personnel. It is not considered of ecological importance because it is suitable habitat for only a few individuals of common wildlife species that are habituated to humans. Consequently, the Site 2 area was not considered an ecosystem of concern and was not evaluated further.

4 Description of the NFRAP Alternative

No further action is proposed for Site 2, POL JP-4 Tank C Leak. No existing wells have been found to contain analytes related to this leak since 1989, and the concentrations of VOCs detected during the RI/FS were below NYSDEC standards. The presence of chlorinated solvents in the well pair located northeast of Building 600 (one bedrock and one overburden well) is not consistent with the suspected source of contamination (JP-4) but is consistent with historical practices performed at military installations.

The recommendation of no further action is further supported by the baseline risk assessment and preliminary risk evaluations, which determined that no significant exposure pathways exist and that the concentrations of compounds detected over the past four years do not exceed applicable risk-based screening criteria. Therefore, these compounds do not pose an unacceptable risk to human health or the environment.

5

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