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ERP - E
VCP - V
BCP - C

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No Further Response Action Planned Decision Document - IRP Site 4 BX Gas Station MOGAS Tank Leak Niagara Falls International Airport- Air Reserve Station

June 1999

Prepared for:

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

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Declaration

Site Name and Location

Installation Restoration Program (IRP) Site 4, BX Gas Station MOGAS Tank Leak, is located at the Niagara Falls International Airport-Air Reserve Station (IAP-ARS) in the Town of Wheatfield, Niagara County, New York.

IRP
Installation Restoration Program

IAP-ARS
International Airport-Air Reserve Station

NFRAP
No Further Response Action Planned

RCRA
Resource Conservation and Recovery Act

NYCRR
New York Code of Rules and Regulations

USAF
United States Air Force

AFRC
Air Force Reserve Command

NYSDEC
New York State Department of Environmental Conservation

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 4. 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 Code of Rules and Regulations (6 NYCRR 373) and regulates the management and releases of hazardous wastes at Niagara Falls IAP-ARS. This NFRAP is being issued by the United States Department of the Air Force (USAF), 914th Airlift Wing of the United States Air Force Reserve Command (AFRC) at the Niagara Falls IAP-ARS, following consultation with 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 4 is no further action.

Declaration Statement

AFRC has determined that no further action is warranted for soils and groundwater at Site 4, BX Gas Station MOGAS Tank Leak. Based on the results of the baseline risk assessment performed

RI
remedial investigation

during the remedial investigation (RI) and the subsequent preliminary risk evaluations performed as part of the Installation-Wide Groundwater Monitoring Project, 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 regarding 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 4, 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 4 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, USAFRC Date 16 Aug 99
Commander

1 Decision Summary

USAF
United States Air Force

AW
Airlift Wing

AFRC
Air Force Reserve Command

NYSDEC
New York State Department of Environmental Conservation

IAP-ARS
International Airport-Air Reserve Station

MSL
mean sea level

1.1 Introduction

This decision document has been issued by the United States Department of the Air Force (USAF), 914th Airlift Wing (AW) of the United States 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 International Airport-Air Reserve Station (IAP-ARS) 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. The installation, located in an area of varied land use, covers approximately 547 acres in the towns of Wheatfield and Niagara (see Figure 1-1). Areas of industrial use are primarily located 2 miles to the west and southwest, as well as adjacent to the southeast corner of the installation. 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. 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 Niagara Falls IAP-ARS 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, vertical fractures, and joints within the Lockport Dolostone. The area=s naturally occurring soils are classified as Wisconsin-age glacial till, lacustrine silt and clay, and holocene fluvial deposits.

Site 4, BX Gas Station MOGAS Tank Leak (ST-09)

Site 4, BX Gas Station MOGAS Tank Leak, is located at the corner of Kinross Street and Thompson Street, in the former Base Ex-change Gas Station (Building 405) (see Figure 1-2). In 1982 a pipe leading to an underground motor vehicle gasoline (MOGAS) tank ruptured and allowed groundwater to enter the tank. Water dis-placed an undetermined amount of MOGAS, which entered the surrounding soil. For several weeks following the rupture, gasoline was observed in the storm sewers, and the product softened the asphalt pavement in the vicinity of the gas pumps.

The average thickness of unconsolidated material above bedrock at Site 4 is 12 feet. Depth to groundwater averages approximately 7 feet below ground surface (BGS), and the groundwater generally flows southwest. The underground MOGAS tank was in direct contact with the overburden groundwater. The site is paved with asphalt, and surface runoff flows to a storm drain along the north side of Kinross Street. Site 4 lies approximately 1,800 feet west and 2,000 feet north of Cayuga Creek. The site is not located within the 100- or 500-year floodplain of Cayuga Creek.

BGS
below ground surface

AFRF
Air Force Reserve Facility

NYANG
New York Air National Guard

1.3 Operations History and Environmental Background

Niagara Falls Operations History

Niagara Falls IAP-ARS 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 8 December 1948 and occupied Old Camp Bell near the Bell Aircraft plant on the installation. The 76th Air Base Squadron was activated on 1 February 1952 as the installation host unit.

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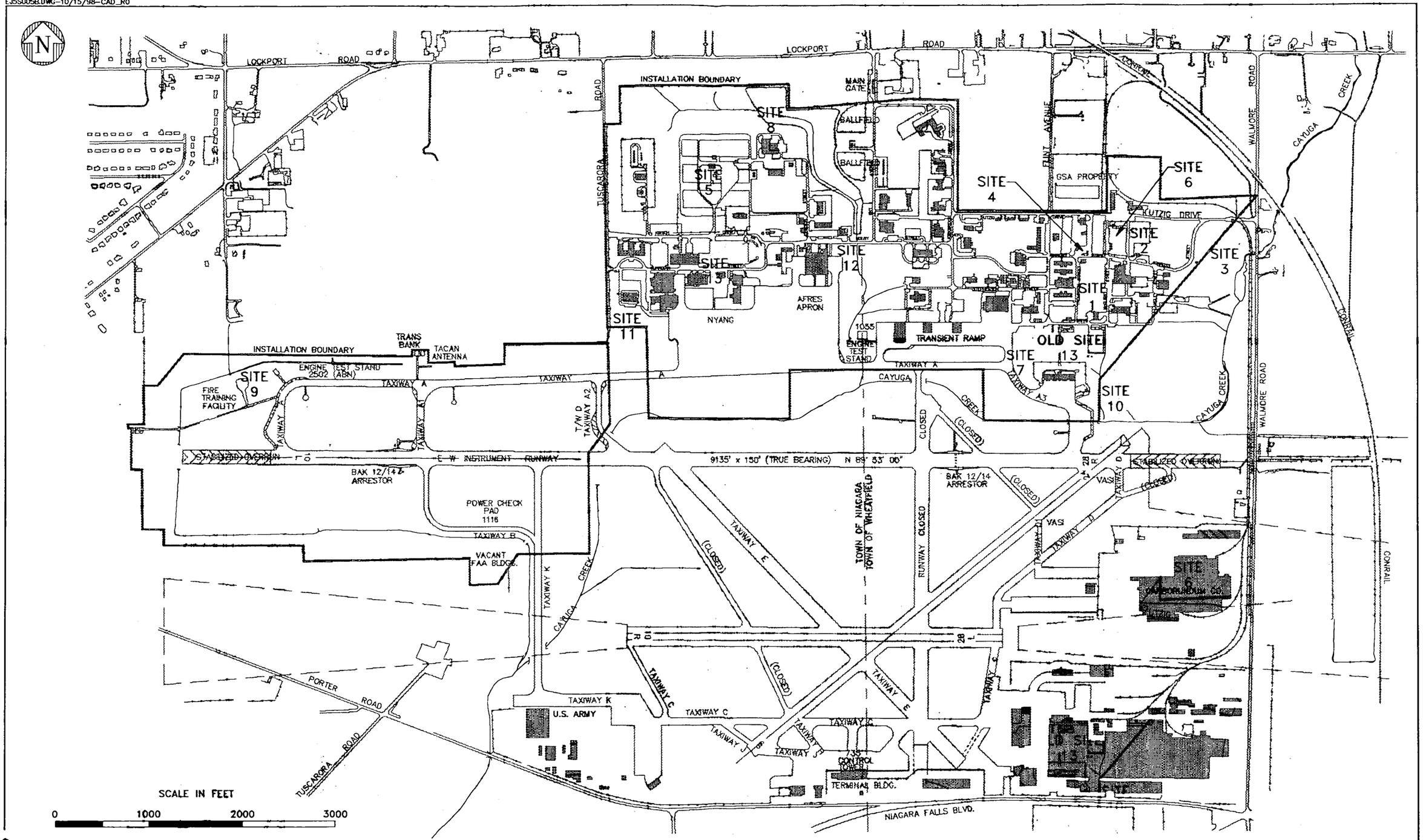

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Figure 1-1 NIAGARA FALLS IAP-ARS
LOCATION MAP

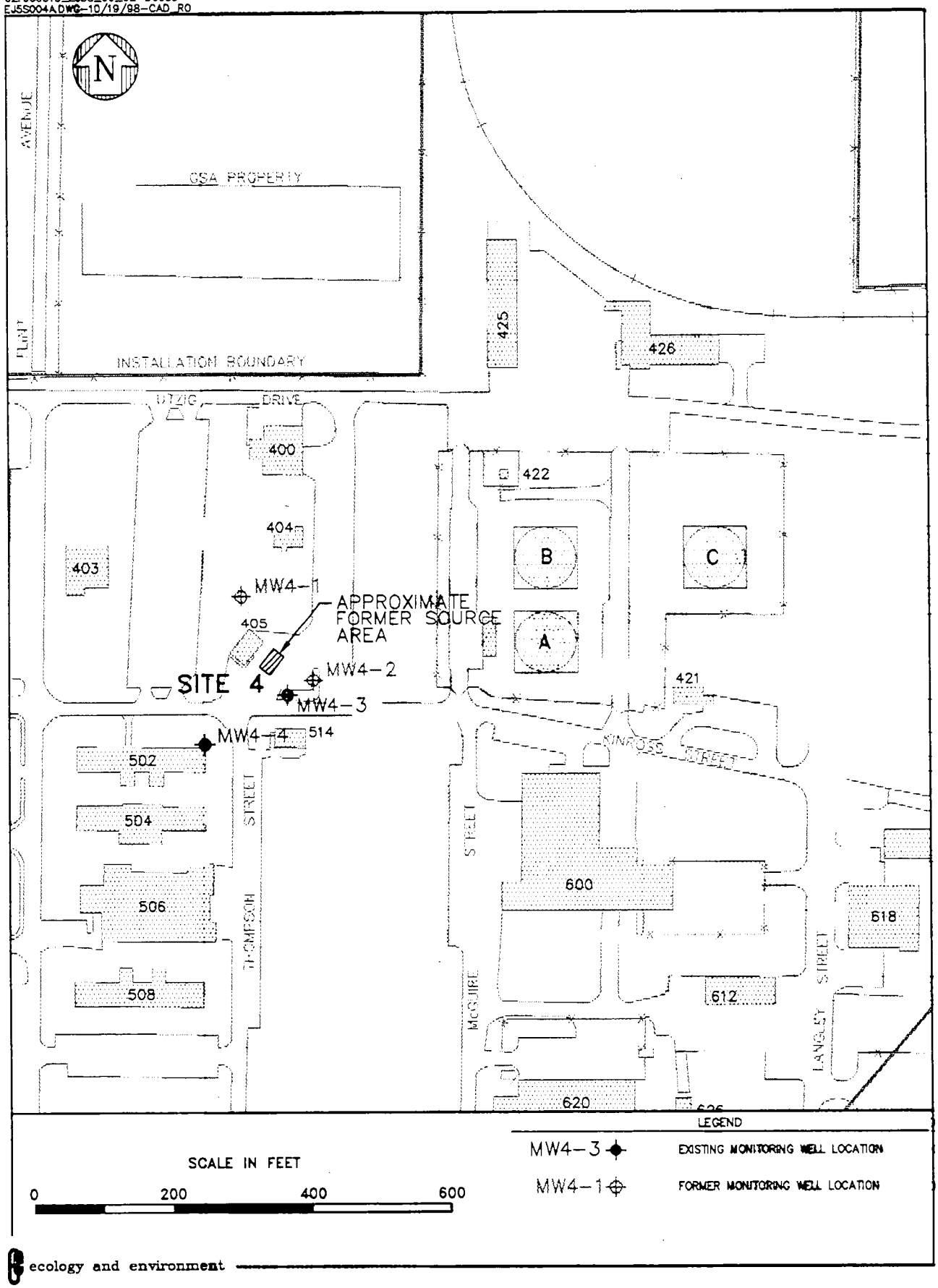


Figure 1-2
IRP SITE 4, BX GAS STATION MOGAS TANK LEAK
SITE LAYOUT
NIAGARA FALLS ARS

On 16 February 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.

BOMARC
Boeing Michigan Aeronautical Research Center

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 1 January 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 IAP-ARS, 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 from18 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.

DoD
Department of Defense

IRP
Installation Restoration Program

RI/FS
remedial investigation/feasibility study

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 these substances and wastes. To date, 14 sites have been identified at the Niagara Falls IAP-ARS 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);

- 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 four sites that were closed with recommendations for no further action (Sites 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 investigations have been performed at the installation, including focused and limited RI/FS studies, corrective measures studies, remedial design and construction, and long-term groundwater monitoring. A 1994 decision document recommended continued groundwater monitoring at Site 4 (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 4); prepared a RCRA facility investigation/corrective measures study (RFI/CMS) for three of the 10 sites (Sites 3, 10, and 13); and developed 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.

RFI/CMS
RCRA facility investigation/corrective measures study

ARAR
applicable or relevant and appropriate requirement

TBC
to be considered

RAB
Restoration Advisory Board

Based on the following investigation criteria, AFRC has proposed no further action at Site 4. 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 considered (TBC), or 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 the 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 4 at Niagara Falls

IAP-ARS, 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

Conceptual models developed for IRP Site 4 indicate that the site has no direct impact on Cayuga Creek or other surface water bodies. Therefore, the scope of the NFRAP for IRP Site 4 specifically addresses soil and groundwater. Based on the concentrations of chemicals in the soil and groundwater, the baseline risk assessment, and the preliminary risk evaluations, there is no evidence that previous operations conducted at this site have resulted in environmental contamination that poses current or potential threats 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 Niagara Falls IAP-ARS. All monitoring wells installed at IRP Site 4 were constructed in the overburden to depths ranging from 10 to 13 feet BGS.

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 traditional list of metals should still be analyzed for on an annual basis. Therefore, the following analytical results discussion 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.

Phase I Records Search

During the 1983 Phase I Records Search (Engineering-Science 1983), information was collected from interviews, site visits, and file materials. The U.S. Air Force Hazard Assessment Rating Methodology (HARM) was used to rank sites identified by this search. This site ranked fourth highest at the installation and was subsequently identified as IRP Site 4. The report indicated that environmental contamination was potentially present at this site and that it had the potential to migrate. The report recommended the installation of monitoring wells to characterize groundwater quality and identify contaminant migration.

HARM
Hazard Assessment Rating Methodology

TOC
total organic carbon

POC
purgeable organic carbon

TRPH
total recoverable petroleum hydrocarbons

Phase II/Stage 1 Confirmation/Quantification Investigation

During the Phase II investigation conducted in 1984, three overburden monitoring wells (MW4-1, MW4-2, and MW4-3) were installed and sampled (SAIC 1986). Elevated levels of oil and grease (3.65 µg/L) and lead (44.5 µg/L) were detected in upgradient well MW4-1. Elevated levels of total organic carbon (TOC) (49 to 100 µg/L) and purgeable organic carbon (POC) (6.1 to 25 µg/L) were detected in all three wells. The Phase II report concluded that additional investigation was necessary to further delineate the extent of contamination and identify specific contaminants.

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 1990 (SAIC 1991). This included the drilling of one soil boring and the installation of one new downgradient overburden well (MW4-4) in 1989. Contaminants detected in soil above background concentrations included total recoverable petroleum hydrocarbons (TRPH), benzene, ethylbenzene, and xylenes (see Table 2-1). Contaminants detected in groundwater included benzene (23 µg/L) and ethylbenzene (2.3 µg/L) in MW4-3 and several common, naturally occurring metals. Lead exceeded NYSDEC groundwater standards in MW4-1 and MW4-3 (76 µg/L and 78 µg/L, respectively) and nickel exceeded the standards in MW4-3 (510 µg/L). However, only nickel exceeded background levels.

Because no fuel-related organic compounds were detected in downgradient well MW4-4, the RI/FS concluded that contaminant migration was minimal. In addition, the report concluded that the metals detected in the groundwater samples were the result of natural processes and were not associated with activities conducted at the site. The RI/FS report recommended no additional investigation be performed at Site 4.

Remedial Action

USTs
underground storage tanks

A remedial action was conducted at IRP Site 4 under NYSDEC petroleum bulk storage regulations. The underground storage tanks (USTs) and associated piping were excavated and removed in 1990. In 1992, a groundwater and soil vapor extraction system, consisting of two groundwater extraction wells, two soil vapor extraction wells, and associated carbon filtration units, was in-stalled to remediate petroleum-contaminated groundwater and

Table 2-1 IRP Site 4, Historical Subsurface Soil Analytical Results Summary, Niagara Falls IAP-ARS

Investigation	Samples Collected	Description	Analytical Results: Sample Depth (feet BGS)	Analytical Results: Positive Hits
Phase II Investigation (SAIC 1986)	Three monitoring wells installed; no analytical subsurface soil samples collected.			
RI/FS (SAIC 1991)	Three subsurface soil samples were collected from one soil boring located immediately adjacent to the source area, just south of the southern corner of Building 405. The samples were analyzed for VOCs and TRPH.	VOCs were detected in two of the samples, TRPH in one. No contaminants were detected in the shallow sample.	4.5 - 6.0	—
			6.0 - 7.5	TRPH: 120 mg/kg
			7.5 - 9.0	2-Butanone: 0.019 mg/kg Benzene: 0.013 mg/kg Ethylbenzene: 0.087 mg/kg Xylenes: 0.087 mg/kg
Remedial Activities at Building 405 Former UST (TreaTek 1992)	Four subsurface soil samples were collected from three borings adjacent to Building 405 on November 1991. All were analyzed for TCLP VOCs and PAHs.	BETX and several other VOCs were detected in TCLP extracts prepared from all of the samples.	6.0 - 8.0	BETX: 1.08 mg/L Chlorobenzene: 0.8 mg/L 1,2-Dichlorobenzene: 0.003 mg/L 1,3-Dichlorobenzene: 0.04 mg/L Naphthalene: 0.2 mg/L 2-Methylnaphthalene: 0.2 mg/L
			2.0 - 4.0	BETX: 0.9 mg/L Chlorobenzene: 0.4 mg/L 1,2-Dichlorobenzene: 0.007 mg/L 1,3-Dichlorobenzene: 0.02 mg/L Naphthalene: 0.08 mg/L 2-Methylnaphthalene: 0.07 mg/L
			6.0 - 8.0	BETX: 0.014 Chlorobenzene: 0.001 1,3-Dichlorobenzene: 0.0006

Table 2-1 IRP Site 4, Historical Subsurface Soil Analytical Results Summary, Niagara Falls IAP-ARS

Investigation	Samples Collected	Analytical Results		
		Description	Sample Depth (feet BGS)	Positive Hits
			2.0 - 4.0	BETX: 0.54 mg/L Chlorobenzene: 0.2 mg/L 1,2-Dichlorobenzene: 0.006 mg/L 1,3-Dichlorobenzene: 0.02 mg/L **Naphthalene: 0.1 mg/L** **2-Methylnaphthalene: 0.06 mg/L**
Remediation Verification Sampling (TreaTek 1992)	**Two subsurface soil samples from the immediate area of the former tank were** collected in October 1992 and analyzed for TCLP VOCs and PAHs. Both samples were composited from two different depths.	**The same compounds as detected previously, with** the addition of 1,4-Dichlorobenzene, were detected in both samples. However, concentrations were much lower.	**4.0 - 6.0, 10+**	**BETX: 0.016 mg/L** **Chlorobenzene: 0.008 mg/L** 1,2-Dichlorobenzene: 0.0005 mg/L 1,3-Dichlorobenzene: 0.0009 mg/L 1,4-Dichlorobenzene: 0.0075 mg/L Naphthalene: 0.004 mg/L 2-Methylnaphthalene: 0.002 mg/L
			6.0 - 8.0, 8.0 - 10.0	BETX: 0.024 mg/L Chlorobenzene: 0.0028 mg/L 1,2-Dichlorobenzene: 0.0024 mg/L 1,3-Dichlorobenzene: 0.0024 mg/L 1,4-Dichlorobenzene: 0.021 mg/L Naphthalene: 0.002 mg/L
Additional RI/FS (E & E 1992)	No subsurface soil samples were collected under this investigation.			
Installation-wide Groundwater Monitoring Project (E & E 1995-1998)	One replacement well was installed in 1995; no subsurface soil samples were collected.			

Key:

BETX = Benzene, ethylbenzene, toluene, xylenes.
BGS = Below ground surface.
mg/kg = Milligrams per kilogram.
mg/L = Milligrams per liter.
PAH = Polycyclic aromatic hydrocarbon.
TCLP = Toxicity characteristics leachate potential.
TRPH = Total recoverable petroleum hydrocarbons.
VOCs = Volatile organic compounds.

BETX
benzene, ethylbenzene, toluene, and xylenes

GAC
granular activated-carbon

EPA
United States Environmental Protection Agency

soil in the source area. Pretreatment soil and groundwater samples were collected from the source area in November and December 1991 (TreaTek-CRA 1992a). Compounds detected in the soil above NYSDEC guidance values for petroleum-contaminated soil included benzene, ethylbenzene, toluene, and xylenes (BETX), naphthalene, 2-methylnaphthalene, and 1,2-dichlorobenzene (see Table 2-1). Source-area groundwater contained naphthalene and BETX above NYSDEC groundwater standards. Dewatering of the site began in April 1992 and groundwater was treated with granular activated-carbon (GAC) prior to being discharged into the Niagara County Sewer District system. Alternating periods of soil vapor extraction and air injection were also performed. Discharge vapors were also treated with GAC.

Remediation lasted for 6 months and was completed in October 1992, at which time post-remediation soil and groundwater samples were collected from the source area (TreaTek-CRA 1992b). No BETX compounds were detected in the groundwater with the exception of xylene, which was detected below its standard. However, 1,4-dichlorobenzene, benzene, and xylene were detected above NYSDEC guidance values in the soil samples (see Table 2-1).

In March 1993 NYSDEC informed 914th AW/CEV that remedial work could stop (NYSDEC 1993). However, due to residual contaminant concentrations in soil above state guidance values, the site was not closed but classified as "inactive." The sample results were further reviewed by NYSDEC and the United States Environmental Protection Agency (EPA) in 1993, and as a result NYSDEC requested additional semiannual groundwater sampling for at least two additional years.

Additional RI/FS

In October 1992, an additional round of groundwater samples was collected from all IRP Site 4 wells to supplement the IRP RI/FS (E & E 1992). Several naturally occurring metals and anions were detected above NYSDEC groundwater standards; most of the exceedances were detected in MW4-3 (see Figure 2-1). In addition, benzene was detected in well MW4-3 above NYSDEC standards. No VOCs were detected in any of the other wells. The additional RI/FS report concluded that the presence of metals was not related to activities conducted at the site and that the migration of organic contaminants from the source area was mini-mal. Therefore, no further action was recommended.

Installation-Wide Groundwater Monitoring

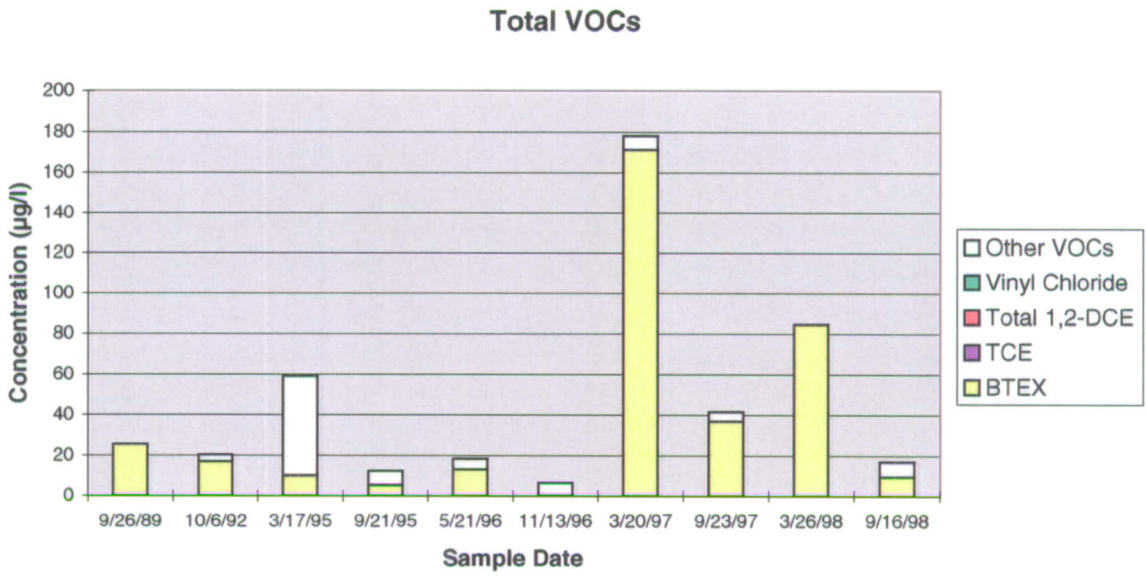
The Installation-Wide Groundwater Monitoring Project began in September 1994 (E & E 1996a; 1997; 1998a; 1998b). All groundwater monitoring wells were sampled semiannually in 1995, and semiannual sampling of MW4-3 continues to the present. MW4-4 was also sampled in 1998. The only metal detected above current NYSDEC groundwater standards was lead in upgradient wells MW4-1 (80.2 µg/L) and MW4-2 (28.7 µg/L) in March 1995. However, it was deter-mined during this and previous investigations that the presence of these metals in the groundwater is naturally occurring. Two monitoring wells that were never found to contain site-related contaminants (MW4-1 and MW4-2) were decommissioned in 1997 and 1998.

BETX and 1,2-dichloroethane have been detected in all seven rounds of groundwater sampling conducted at MW4-3 since inception of this project. Concentrations of 1,2-dichloroethane have remained relatively stable, just above or below the NYSDEC standard of 5 µg/L (see Figure 2-1). Total BETX concentrations decreased to nondetect in November 1996; however, the concentration increased to approximately 170 µg/L during the following round (March 1997). The results of subsequent sampling rounds conducted through March 1998 also indicate the presence of BETX, but at lower concentrations (see Figure 2-1).

Figure 2-1: MW4-3 Analytical Summary - VOCs and Metals

IRP Site No.:	4	**Total Depth:**	12.9 feet BGS
Well Type:	Overburden	**Sand Pack Interval:**	5.9 - 12.9 feet BGS
Installation Date:	10/18/84	**Depth to Bedrock:**	12.9 feet BGS

VOC Results (µg/l)



Date	BTEX	TCE	Total 1,2-DCE	Vinyl Chloride	Other VOCs
9/26/89	25.3	NA	NA	NA	ND
10/6/92	16.9	ND	ND	ND	3.3
3/17/95	10	ND	ND	ND	49
9/21/95	5.1	ND	ND	ND	7.3
5/21/96	13	ND	ND	ND	5.3
11/13/96	ND	ND	ND	ND	6.4
3/20/97	171.1	ND	ND	ND	6.9
9/23/97	36.6	ND	ND	ND	4.8
3/26/98	84.5	ND	ND	ND	ND
9/16/98	9.4	ND	ND	ND	7.4

The other VOCs detected were 1,2-dichloroethane in all rounds between 10/6/92 and 9/23/97; acetone, a suspected laboratory contaminant, on 3/17/95; and chloromethane on 9/16/98.

Metals Results (µg/l)

Date	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
11/15/84	NA	NA	NA	NA	10.5	NA	NA
9/26/89	ND	ND	ND	22	78	510	388
10/6/92	ND	ND	150	270	720	210	5800
3/17/95	7.5	ND	ND	ND	7	ND	110
11/13/96	10	ND	ND	ND	8.3	ND	70
3/20/97	ND	ND	ND	ND	ND	ND	32
9/23/97	ND	ND	ND	ND	ND	ND	42
3/26/98	7	ND	ND	ND	5.8	ND	42

3 Summary of Site Risks

Several studies have been conducted to assess the extent of and the potential exposure to contaminants at IRP Site 4. 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. In addition, as part of the Installation-Wide Groundwater Monitoring Project, preliminary risk evaluations were conducted annually from 1995 through 1997 to further assess the potential risk from exposure to contaminants detected in ground-water and surface water at the site (E & E 1996a; 1997; 1998a). The intent of this section is not to provide a full risk assessment, but to summarize 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-referenced documentation should be consulted.

3.1 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 assessment. 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, except TRPH and those chemicals excluded during the data quality review. TRPH 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. Only the detected petroleum hydrocarbon constituents that were identified (e.g., benzene, toluene) were evaluated.

Routes of exposure and occupational receptors were selected for soils and groundwater at Site 4 based on its current and future land use designation of industrial. The site, which is located in the highly developed northern portion of the base, consists of paved

roads, parking lots, buildings, and maintained lawns and 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}) (USEPA 1992).

HQ
Hazard Quotient

HI
Hazard Index

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 the chemical. The chronic reference dose is an estimate (with uncertainty spanning an order of magnitude or greater) 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 a 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 are responsible. An HI less than 1 indicates that adverse health effects would not be expected.

Cleanup actions may be taken when the agencies determine that the risk at a site exceeds the cancer level of 1 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/Sediment

No streams or drainage ditches are located close to Site 4; therefore, exposure to contaminated surface water and sediments is not a concern.

Soil

A pipe leading to an underground gasoline storage tank ruptured in 1981, permitting groundwater intrusion into the tank. As a result, an undetermined amount of fuel was displaced into the surrounding soil. A hypothetical exposure pathway was evaluated for the contaminants detected in the subsurface soil, including the fuel-related compounds benzene, ethylbenzene, and xylenes; and the suspected laboratory contaminants acetone, 2-butanone, and methylene chloride. This assessment was based on the conservative assumption that base personnel ingest 0.1 gram of soil per day, 2 days per week, 20 weeks per year, for 20 years of a 70-year lifetime. It was also assumed that contaminants are completely bioavailable and do not degrade over time.

Based on these assumptions, an HI of 1.3×10^{-5} was calculated for a combined exposure to all contaminants. Therefore, no adverse, noncarcinogenic effects are anticipated. The excess lifetime cancer risk associated with Site 4 soil contaminants was calculated to be 1×10^{-9}, which is even lower than the acceptable risk range established by EPA.

Note that this baseline risk assessment was performed prior to remediation of the source area, and that exposure to subsurface soil at the site is unlikely since the site is paved with asphalt.

Groundwater

Although the installation and surrounding communities have been provided with a municipal water supply since 1969, the baseline risk assessment assumed that base personnel hypothetically could ingest groundwater having contaminant concentrations equal to those detected at the site. Off-site exposure to contaminated groundwater was not considered due to the location of Site 4 within the installation and the degradation and dispersion of contaminants as they migrate away from the site. The hypothetical exposure to contaminants detected in groundwater, including eight metals, benzene, and ethylbenzene, was based on the conservative assumption that base personnel ingest 1 liter of groundwater per day, every day, for 20 years of a 70-year lifetime. It was also assumed that contaminants do not degrade over time.

Based on these assumptions, an HI of 0.66 was calculated for a combined exposure to all contaminants. Therefore, no adverse, noncarcinogenic effects are anticipated. As discussed above, the HI included eight metals, which have been determined to be naturally occurring. The excess lifetime cancer risk associated with Site 4 groundwater contaminants was calculated to be 5×10^{-7}

which is below the low end of the acceptable risk range established by EPA.

3.2 Preliminary Risk Evaluation

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

3.2.1 Human Health Risk Evaluation

RBCs
risk-based concentrations

RBSCs
risk-based screening concentrations

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 risk-based screening concentrations (RBSCs) that were derived for surface water by assuming daily incidental ingestion by site workers. This exposure scenario is also unrealistic since the nearest surface water is 1,800 feet away and groundwater contaminants would degrade and disperse with time and distance from the source. These 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.

Organic compounds detected at Site 4 during this investigation include BTEX and 1,2-dichloroethane. Only benzene and 1,2-dichloroethane were detected at concentrations exceeding both NYSDEC Class GA standards and tap water RBCs. The maxi-mum concentrations of benzene (160 µg/L) and 1,2-dichloroethane (6.9 µg/L) were detected in March 1997 and exceeded their RBCs by 440 times and 58 times, respectively. These data indicate that the estimated upper-bound lifetime cancer risk associated with groundwater use would be approximately

5 x 10^{-4}, which is slightly above the upper end of the range regarded as acceptable by EPA. However, contaminant concentrations have decreased in the two subsequent sampling rounds. Using the most current data, the cancer risk associated with groundwater use would be 2 x 10^{-4}. All concentrations were well below the RBSCs for incidental ingestion, indicating that even routine contact with these levels in sur-face water would not pose a significant health risk.

Based on the lack of a direct exposure pathway, it is considered unlikely that contamination in groundwater at or adjacent to Site 4 poses a significant risk to human health.

3.2.2 Ecological Risk Evaluation

IRP Site 4 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 4 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 4, BX Gas Station MOGAS Tank Leak. Only one well at the site (MW4-3) has been found to contain contaminants associated with the MOGAS tank leak. Since MOGAS is lighter than water, it would be expected to mi-grate at the water table within the overburden water-bearing zone. Migration has not been observed in this water-bearing zone, as evidenced by the lack of contamination in downgradient well MW4-4. Furthermore, migration is not expected to occur over a significant distance, since the overburden consists of low-permeability clay and a sanitary sewer line exists along Kinross Street downgradient of the former spill location.

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 most concentrations of compounds detected over the past nine years do not exceed applicable risk-based screening criteria. Therefore, these compounds do not pose an unacceptable risk to human health or the environment.

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