# DRAFT

# RECORD OF DECISION

## BUILDING 101 AREA OF CONCERN
## (IRP Site ST-06)

## FORMER GRIFFISS AIR FORCE BASE
## ROME, NEW YORK

## UNITED STATES DEPARTMENT OF THE AIR FORCE
## AIR FORCE REAL PROPERTY AGENCY

**SEPTEMBER 2012**

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## TABLES

## ACRONYMS

| | |
|---|---|
| AFB | Air Force Base |
| AFRPA | Air Force Real Property Agency |
| AOC | Area of Concern |
| ARARs | Applicable or Relevant and Appropriate Requirements |
| ATSDR | Agency for Toxic Substances and Disease Registry |
| BADP | Battery Acid Disposal Pit |
| BADrP | Battery Acid Drainage Pit |
| bgs | below ground surface |
| BRAC | Base Realignment and Closure Act |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| COC | Contaminants of Concern |
| DCE | cis-1,2-dichloroethene |
| DFAS | Defense Finance and Accounting Services |
| EADs | Eastern Air Defense Sector |
| EPA | Environmental Protection Agency |
| FFA | Federal Facility Agreement |
| ft | feet |
| HRC | Hydrogen Release Compound |
| IRP | Installation Restoration Program |
| LUC/IC | Land-Use Controls/Institutional Controls |
| µg/kg | microgram per kilogram |
| µg/L | microgram per Liter |
| $\mu g/m^3$ | microgram per cubic meter |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NPL | National Priority List |
| NYANG | New York Air National Gaurd |
| NYSDEC | New York State Department of Environmental Conservation |
| PAH | polycyclic aromatic hydrocarbons |
| PCBs | polychlorinated biphenyls |
| PCE | tetrachloroethylene |
| PID | photoionization detector |

## ACRONYMS (continued)

| | |
|---|---|
| RI | Remedial Investigation |
| ROD | Records of Decision |
| RSCOs | Recommended Soil Cleanup Objective |
| SCGs | Standards, Criteria, and Guidance values |
| SI | Supplemental Investigation |
| STARS | Spill Technology and Remediation Series |
| SVI | Soil Vapor Intrusion |
| SVOC | semi-volatile organic compound |
| TAGM | Technical and Administrative Guidance Memorandum |
| TCE | trichloroethylene |
| UST | underground storage tank |
| VOC | volatile organic compound |

## 1.0 DECLARATION

### 1.1 Site Name and Location

The Building 101 Area of Concern (AOC) (site identification designation ST-06) is located at the former Griffiss Air Force Base, Rome, Oneida County, New York.

### 1.2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the selected remedial alternative for the Building 101 AOC at the former Griffiss Air Force Base (AFB) in Rome, New York. It has been developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601-9675, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision is based on the Administrative Record for this site, a copy is available on-line at https://afrpaar.lackland.af.mil/ar.

The remedy of Land-Use Controls/Institutional Controls (LUC/ICs) has been selected by the United States Air Force (Air Force) in conjunction with the United States Environmental Protection Agency (EPA) and with the New York State Department of Environmental Conservation (NYSDEC) pursuant to the former Griffiss AFB Federal Facility Agreement (FFA).

### 1.3 Description of the Remedy

The Selected Remedy of LUC/ICs for the Building 101 AOC is protective of human health and the environment and complies with the federal and state Applicable or Relevant and Appropriate Requirements (ARARs). As a result of the Building 101 remedial actions, the majority of soil and groundwater contamination has been removed. LUC/ICs will be in the form of land use restrictions for industrial/commercial and re-evaluation for Soil Vapor Intrusion (SVI) if new construction is performed in the SVI restriction area identified in Figure 6 (BADP or BADrP). Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that future land use is in compliance with the deed restriction for industrial/commercial use and to ensure that future land use is in compliance with the land use controls to manage the potential for SVI. Five-year reviews will ensure that the selected remedy is protective of human health and the environment. The transfer documents will contain the following restrictions to ensure that the reuse of the site is consistent with the risk assessment:

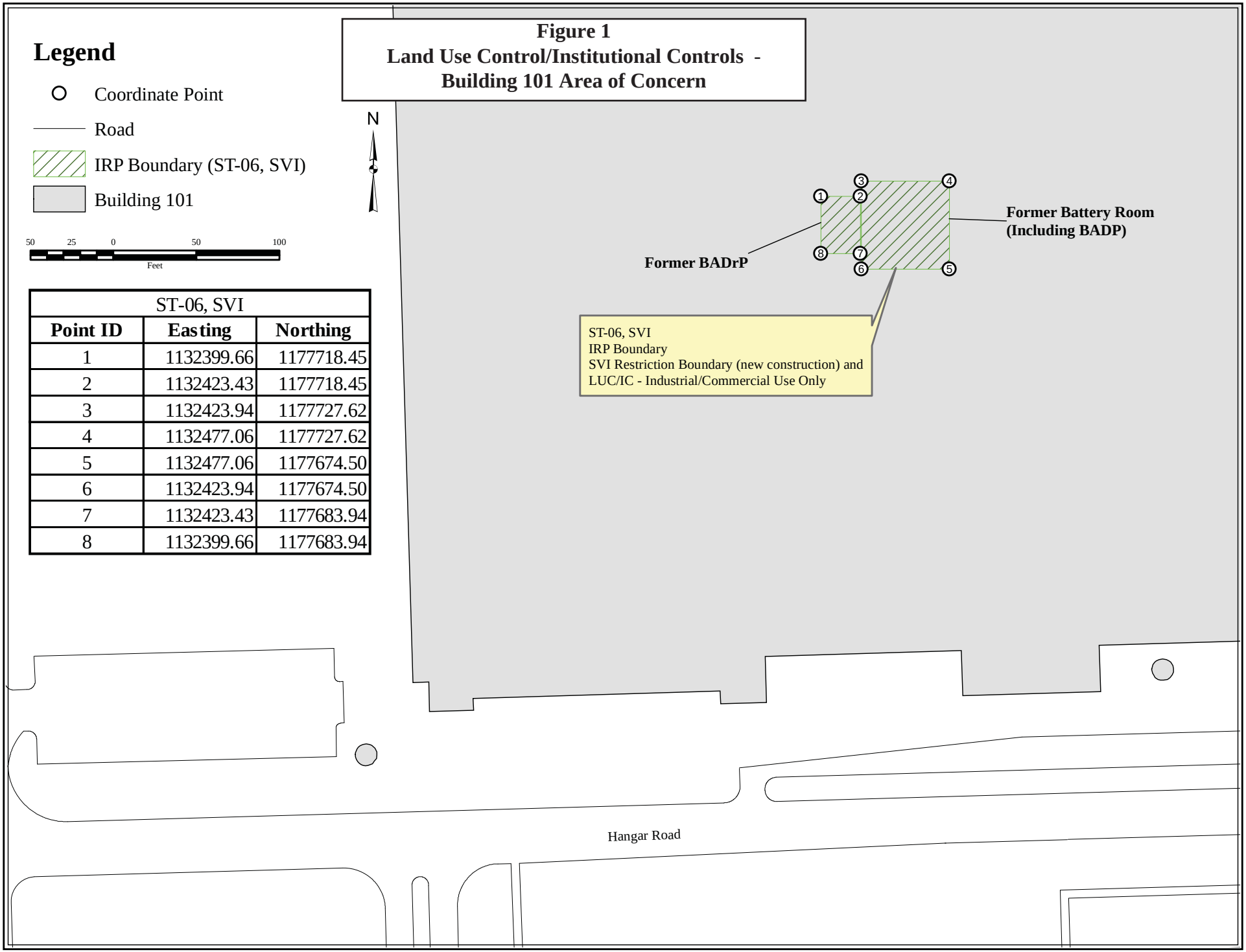
- Development and use of the entire Building 101 AOC property for residential housing, elementary and secondary schools, childcare facilities and playgrounds will be prohibited unless prior approval is received from the Air Force, EPA, and NYSDEC.
- The owner/occupant of the property shall evaluate the potential for soil vapor intrusion if future construction is performed in the SVI restriction area.

The soil vapor intrusion evaluation conducted at the Building 101 AOC in fall 2006 and winter 2007 included soil vapor (exterior) and sub-slab vapor (interior) (2006) and indoor and outdoor air samples (2007). Results indicate that all soil vapor, indoor, and outdoor air detections are below screening levels for industrial/ commercial use. Sub-slab detections were detected above screening levels but are within one order of magnitude of the sub-slab screening levels. Since no exceedances have been reported for the indoor air samples, no further action or evaluation of SVI is required, unless construction within the SVI restriction area identified in Figure 1 is to be performed.

### 1.4 Statutory Determinations

The selected remedy (LUC/ICs) for Site ST-06 is protective of human health and the environment and complies with federal and state applicable or relevant and appropriate requirements (ARARs). Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that future land use is in compliance with the deed restriction for industrial/commercial/non-residential use and to ensure that future land use is in compliance with the land use controls to manage the potential for SVI. These reviews will also ensure that the selected remedy is protective of human health and the environment.

# Figure 1
## Land Use Control/Institutional Controls - Building 101 Area of Concern




| ST-06, SVI | | |
|---|---|---|
| **Point ID** | **Easting** | **Northing** |
| 1 | 1132399.66 | 1177718.45 |
| 2 | 1132423.43 | 1177718.45 |
| 3 | 1132423.94 | 1177727.62 |
| 4 | 1132477.06 | 1177727.62 |
| 5 | 1132477.06 | 1177674.50 |
| 6 | 1132423.94 | 1177674.50 |
| 7 | 1132423.43 | 1177683.94 |
| 8 | 1132399.66 | 1177683.94 |

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## 1.5 Authorizing Signatures

On the basis of the remedial investigations and successfully completed removal actions performed at the Building 101 AOC, there is no evidence that residual contamination at the site poses a current or future potential threat to human health or the environment. The NYSDEC has concurred with the Selected Remedy presented in this Record of Decision.

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ROBERT M. MOORE — Date
Director
Air Force Real Property Agency

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WALTER E. MUGDAN — Date
Director, Emergency and Remedial Response Division
United States Environmental Protection Agency, Region 2

## 2.0 DECISION SUMMARY

### 2.1 Site Name, Location, and Description

The former Griffiss AFB, located in Oneida County in central New York State, covered approximately 3,552 contiguous acres in the lowlands of the Mohawk River Valley in the city of Rome. Topography within the valley is relatively flat, with elevations on the former Griffiss AFB ranging from 435 to 595 feet above mean sea level. Three Mile Creek, Six Mile Creek (both of which drain into the New York State Barge Canal, located to the south of the base), and several state-designated wetlands are located on the former Griffiss AFB, which is bordered by the Mohawk River on the west.

The Building 101 AOC is located south of Apron 3 in the central portion of the base along the northern margin of the industrial complex (see Figure 2). It is bounded by Hangar Road to the south, Building 100 to the east, and Apron 4 parking area to the west. Building 101 operated as an aircraft maintenance hangar. The Building 101 AOC consists of three separate areas, a former 12,000-gallon reinforced fiberglass underground storage tank (UST), known as the Yellow Submarine, a former Battery Acid Disposal Pit (BADP), and a former Battery Acid Drainage Pit (BADrP) (see Figure 3).

The former Yellow Submarine UST was located approximately 15 feet from the southern wall of Building 101 until June 1993, at which time it was removed. The Yellow Submarine UST was situated within a small graveled area of approximately 20 feet by 30 feet and rested on a concrete pad approximately 15.5 feet below grade. The UST measured approximately 10 feet in diameter by 20 feet in length. A partially buried vault above the UST housed a pump station. The Yellow Submarine UST was used as a holding and dilution tank for plating wastes from a metals plating shop that was located within Building 101. The wastes were discharged into the sanitary sewer system. The UST was in operation from 1973 to 1987 and reportedly received about 20 gallons per day in plating wash-down and about 10 gallons per year of plating solids and plating bath solutions.

The former BADP was located in the central portion of the building in an area designated as the Lead Battery Room. The BADP was in use from the early 1940s until 1985, when it was excavated. The BADP consisted of a pit beneath the concrete floor measuring approximately 2 feet long by 2 feet wide by 10 feet deep and covered with a steel grate. Acids from spent batteries were neutralized with baking soda and poured into the BADP, where the neutralized liquid was allowed to percolate into the underlying soil. A 4-inch floor drain and overflow piping from the BADP ran west to the BADrP located beyond the west wall of the Lead Battery Room. The BADrP was approximately 17.5 feet long by 5.5 feet wide. Following removal of the BADP, a new 4-inch floor drain was installed and piped to the BADrP.

### 2.2 History and Enforcement Activities

<u>The Former Griffiss AFB Operational History</u>
The mission of the former Griffiss AFB varied over the years. The base was activated on February 1, 1942, as Rome Air Depot, with the mission of storage, maintenance, and

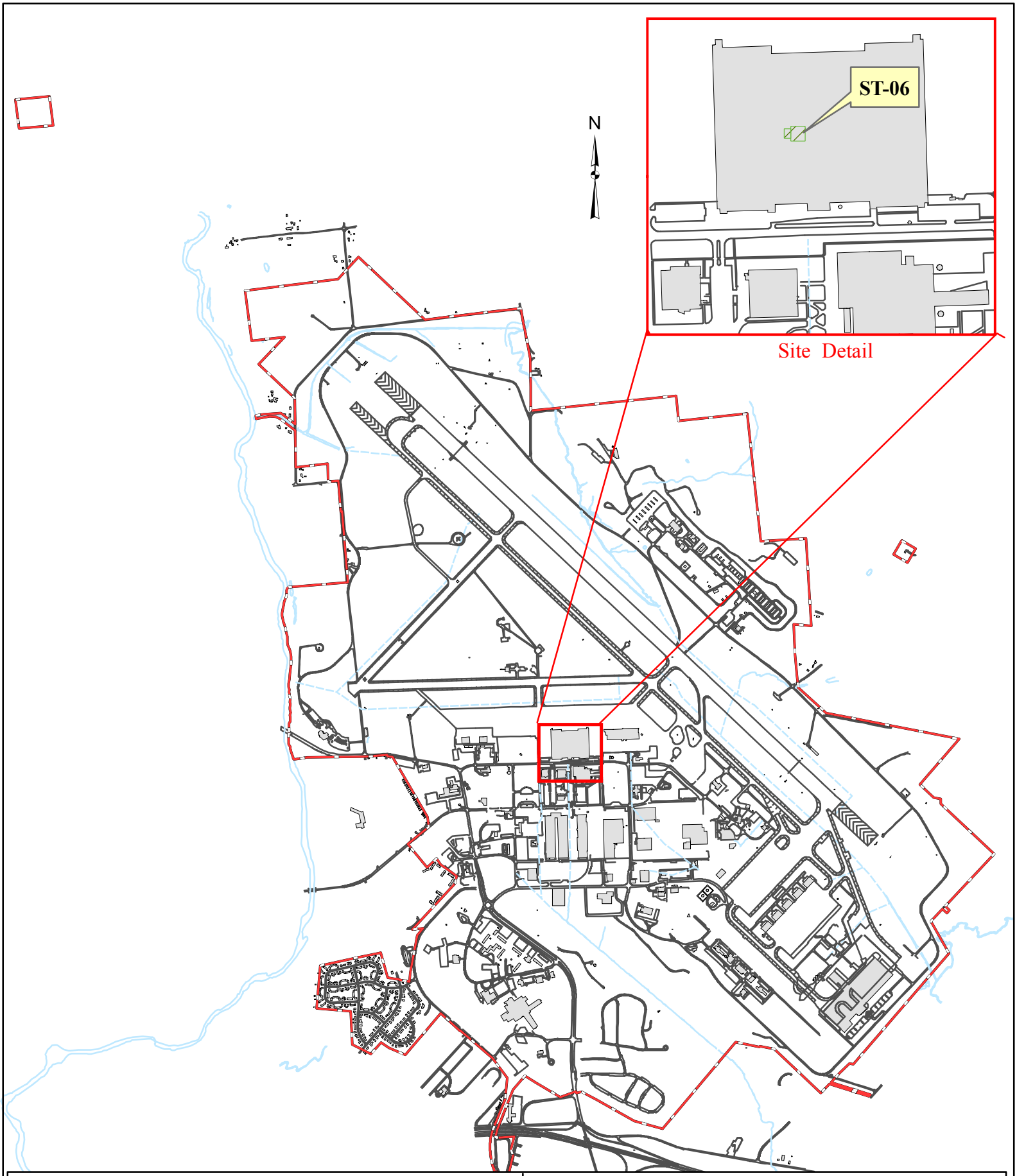


**Figure 2**
**Building 101 AOC Site Location Map**

**Legend**

- Boundary
- Airfield/Road
- Culvert / Ditch
- Surface Water
- LUC/IC Site Boundary
- Facilities

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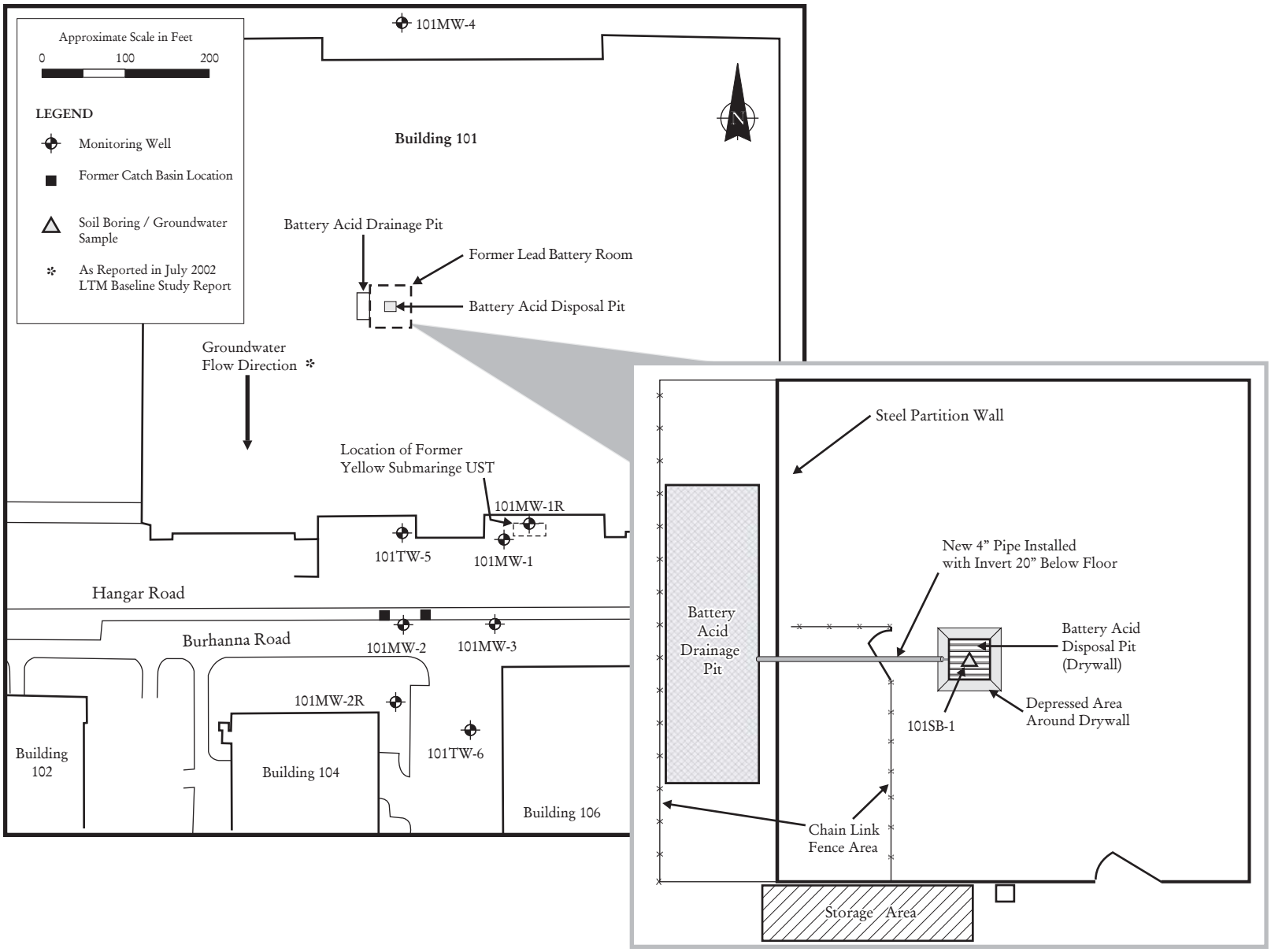



**Figure 3**
**Building 101 AOC Site Features**

shipment of material for the U.S. Army Air Corps. Upon creation of the U.S. Air Force in 1947, the depot was renamed Griffiss Air Force Base. The base became an electronics center in 1950, with the transfer of Watson Laboratory Complex (later Rome Air Development Center [1951], Rome Laboratory, and then the Information Directorate at Rome Research Site, established with the mission of accomplishing applied research, development, and testing of electronic air-ground systems). The 49th Fighter Interceptor Squadron was also added. The Headquarters of the Grounds Electronics Engineering Installations Agency was established in June 1958 to engineer and install ground communications equipment throughout the world.

On July 1, 1970, the 416th Bombardment Wing of the Strategic Air Command (SAC) was activated with the mission of maintenance and implementation of both effective air refueling operations and long-range bombardment capability.

Griffiss AFB was designated for realignment under the Base Realignment and Closure Act (BRAC) in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. The Information Directorate at Rome Research Site and the Eastern Air Defense Sector (EADS) will continue to operate at their current locations; the New York Air National Guard (NYANG) operated the runway for the 10th Mountain Division deployments until October 1998, when they were relocated to Fort Drum; and the Defense Finance and Accounting Services (DFAS) has established an operating location at the former Griffiss AFB.

Environmental Background

As a result of the various national defense missions carried out at the former Griffiss AFB since 1942, hazardous and toxic substances were used and hazardous wastes were generated, stored, or disposed at various sites on the installation. The defense missions involved, among others, procurement, storage, maintenance, and shipping of war material; research and development; and aircraft operations and maintenance.

Numerous studies and investigations under the U.S. Department of Defense Installation Restoration Program have been carried out to locate, assess, and quantify the past toxic and hazardous waste storage, disposal, and spill sites.

These investigations included a records search in 1981, interviews with base personnel, a field inspection, compilation of an inventory of wastes, evaluation of disposal practices, and an assessment to determine the nature and extent of site contamination; Problem Confirmation and Quantification studies (similar to what is now designated a Site Investigation) in 1982 and 1985; soil and groundwater analyses in 1986; a base-wide health assessment in 1988 by the U.S. Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR); base-specific hydrology investigations in 1989 and 1990; a groundwater investigation in 1991; and site-specific studies and investigations between 1989 and 1995. The ATSDR issued a Public Health Assessment for Griffiss AFB, dated October 23, 1995, and an addendum, dated September 9, 1996.

Pursuant to Section 105 of CERCLA, Griffiss AFB was included on the National Priorities List (NPL) on July 15, 1987. On August 21, 1990, the agencies entered into a FFA under Section

120 of CERCLA. On March 20, 2009, approximately 2,900 acres of the 3,552 acres at the former Griffiss AFB were removed from the NPL. The site in this ROD remains on the NPL.

## 2.3 Community Participation

A proposed plan for the Building 101 AOC (Air Force Real Property Agency (AFRPA), August 2012), recommending LUC/IC, was released to the public on August 15, 2012. The document was made available to the public in the administrative record file available on-line at https://afrpaar.lackland.af.mil/ar.

The notice of the availability of these documents was published in the Rome Daily Sentinel Newspaper on August 15, 2012. In addition, a 30-day public comment period was held from August 15, 2012 to September 14, 2012 to solicit public input on the final Proposed Plan for the Building 101 AOC. During this period, the public was invited to review the Administrative Record and comment on the preferred alternative being considered.

In addition, Griffiss AFB hosted a public meeting on August 28, 2012 at the Griffiss Institute located at 725 Daedalian Drive, Rome, New York 13441. The date and time of the meeting was published in the Rome Daily Sentinel Newspaper. At the meeting, the Air Force provided data gathered at the site, the preferred alternative, and the decision-making process. The meeting provided the opportunity for the community to comment officially on the plan. The public meeting has been recorded and transcribed, and a copy of the transcript has been added to the Administrative Record. No public comments on the Proposed Plan were submitted. A Responsiveness Summary documenting the comment solicitation process is included in Section 3.0.

## 2.4 Scope and Role of Area of Concern

The Building 101 AOC is one of several sites administered under the Griffiss AFB Installation Restoration Program (IRP). The Building 101 AOC includes both previously contaminated soil in the unsaturated zone and previously contaminated groundwater at the site. LUC/ICs are recommended for the Building 101 AOC.

Interim actions conducted at the site have eliminated the source of soil and groundwater contamination.

## 2.5 Site Characteristics

Various actions undertaken at the site have removed the sources of groundwater and soil contamination. Currently, no significant threat to human health is posed by the groundwater or soil at the Building 101 AOC. Previous Investigations and Removal Actions (Section 2.5.1), Groundwater Monitoring (Section 2.5.2), and Soil Vapor Intrusion Evaluations (Section 2.5.3) are summarized below.

In the discussion below, “most stringent criteria”, “soil clean-up goals”, and “groundwater standards” refer to the lowest values among all identified federal and state standards that have

been identified as ARARs at the site or in other federal and state advisories, guidance, and standards referred to as To-Be-Considereds (TBCs).

### 2.5.1 Previous Investigations and Removal Actions

#### 2.5.1.1 Yellow Submarine

The aqueous and sludge phase contents of the Yellow Submarine UST were sampled in 1992. Cadmium, chromium, nickel, lead, cyanide, and chlorinated solvents (methylene chloride, tetrachloroethylene, 1,2-trans-dichloroethylene, and trichloroethylene) were detected in both the aqueous and sludge phase samples. In addition, benzene, 1,1-dichloroethylene, ethylbenzene, and toluene were also identified in the sludge sample. The UST was evacuated and removed in 1993. Samples of soil from the excavation and the tank contents (sludge and liquid) were analyzed for chemical characterization. Fourteen soil samples collected from the tank excavation and sidewall samples collected from just above the groundwater table revealed the presence of only one volatile organic compound (VOCs) (tetrachloroethylene) and three metals (chromium, lead, and nickel), which were below screening levels. The soil was determined to be suitable to use as backfill for the excavation and was not removed from the site.

As part of the 1992/1993 quarterly groundwater sampling program, monitoring well 101MW-1 was sampled for three consecutive quarters. Samples were analyzed for semi-volatile organic compounds (SVOCs), VOCs, metals, and glycols. Tetrachloroethylene, trichloroethylene, manganese, and zinc were the only chemicals detected in the quarterly groundwater samples with the highest concentrations occurring in June 1993.

In 1994, an RI was performed. The main objective of the RI was to investigate the nature and extent of environmental contamination from historical releases at the AOC in order to determine whether any further remedial action was necessary to prevent potential threats to human health and the environment that might arise from exposure to site conditions. The RI field investigation activities performed at the former location of the Yellow Submarine UST included a soil gas/groundwater screening survey at 30 sample locations; the installation and sampling of two groundwater monitoring wells (101MW-2 and 101MW-3), the sampling of the one existing well (101MW-1), and the collection of a sediment sample from one storm water catch basin nearest the former UST location.

The soil gas/groundwater screening survey was performed in order to determine if fuel products, petroleum-based solvents, or chlorinated solvents were present. Analysis of the soil gas/groundwater screening samples revealed the presence of fuel products or petroleum-based solvents in the headspace of 8 out of the 30 groundwater samples and in 2 of the 30 gas samples, and chlorinated hydrocarbon compounds were detected in the headspace of 16 of the 30 groundwater samples and in 1 of the 30 soil gas samples. The analyte concentrations were greatest near the southwest corner of Building 101 and at an adjacent area on Hangar Road.

Analyses of the groundwater samples from monitoring wells 101MW-1, 101MW-2, and 101MW-3 indicated the presence of eight VOCs, 15 SVOCs, five polychlorinated biphenals (PCBs), six pesticides, 21 metals, and cyanide (Table 1).

Table 1
Building 101 AOC
Compounds Exceeding Standards and Guidance Values
Yellow Submarine UST - RI Monitoring Well Groundwater Samples

| Compound | Range of Detected Concentration | Frequency of Detection Above Most Stringent Criterion | RCRA Corrective Action Level | NYS Groundwater Standard | NYS Groundwater Guidance Value | Federal secondary maximum contaminant level |
|---|---|---|---|---|---|---|
| Volatiles (µg/L) | | | | | | |
| Tetrachloroethylene | ND - 7.7 | 1/3 | 0.7 [a] | 5 [b] | NA | NA |
| cis-1,2-Dichloroethene | 0.3 J - 120 DJ | 1/3 | NA | 5 [b] | NA | NA |
| Semi-Volatiles (µg/L) | | | | | | |
| 2,2,4,4,5,6-Hexachlorobiphenyl | ND - 0.2 J | 1/3 | NA | 0.1 [b] | NA | NA |
| 2,4-Dichlorophenol | ND - 10 J | 2/3 | 5 [a] | 5 [b] | NA | NA |
| Benzo(a)anthracene | ND - 0.1 J | 1/3 | NA | NA | 0.002 [c] | NA |
| gamma-chlordane | ND - 0.02 J | 1/3 | NA | 0.05 [b] | NA | NA |
| Pesticides (µg/L) | | | | | | |
| Aldrin | 0.002 J - 0.008 J | 3/7 | ND [a] | NA | NA | NA |
| Total PCB* | 0.1 J - 0.49 J | 2/3 | NA | 0.1 [b] | NA | NA |
| Metals (mg/L) | | | | | | |
| Aluminum | 0.39 J - 1 J | 3/3 | NA | NA | NA | 0.05 [d] |
| Iron | 0.081 J - 2.76 J | 2/3 | NA | 0.0007 [b] | NA | NA |
| Manganese | 0.359 - 0.796 | 3/3 | NA | NA | NA | 0.05 [d] |
| Mercury | 0.00004 J - 0.00084 J | 1/3 | NA | 0.0007 [b] | NA | NA |
| Sodium | 4.07 - 56.5 | 1/3 | NA | 20 [b] | NA | NA |

Notes:

[a] RCRA Corrective Action Levels

[b] NYSDEC Class GA groundwater standard; June 1998

[c] NYSDEC Class GA groundwater guidance values; June 1998

[d] Federal secondary maximum contaminant level

* New York State Standard for Groundwater of 0.1 µg/L applies to the sum of all components

Key:

D = Indicates the compound was identified in an analysis from a diluted sample

J = Estimated concentration

NA = not applicable

ND = non-detect

A sediment sample was collected from a catch basin located near the former Yellow Submarine UST. The sample was collected to evaluate potential residual contamination in the storm water system associated with the discharge of plating wastes directly into the storm water system prior to the installation of the UST in 1973. One VOC (acetone) and 11 metals were detected in the sediment sample. Six metals, (hexavalent chromium, lead, molybdenum, sodium, strontium and zinc) exceeded background screening concentrations for soil. Acetone is not expected to be associated with the plating waste discharges occurring before 1973 because it is highly volatile and would have evaporated. It is most likely a laboratory contaminant because it is used to clean glassware and is present at low levels in most laboratories.

Both catch basins shown on Figure 3 were removed during the reconstruction of Hangar Road in 1997 and 1998.

#### 2.5.1.2 Battery Acid Disposal Pit

In 1984, split-spoon soil samples were taken every 2 feet to a depth of 8 feet from within the BADP. Battery sludge was encountered to a depth of 6 feet. The soil samples were analyzed for heavy metals and revealed high concentrations of antimony, copper, lead, and zinc at shallow depths. In 1985, the BADP was excavated to a depth of approximately 10 feet and replaced with New York State Type 4 fill, and a floor drain with new piping between the BADP and the BADrP was installed (see Figure 3). The former BADP is currently evident by the presence of the floor drain, which was sealed with a rubber cap in 1992 to prevent the emission of vapors from the drainage pit.

The RI field investigation activities performed at the location of the former BADP included the drilling of one soil boring; the collection of six soil samples from the soil boring; and the collection of one groundwater sample from the soil boring.

Analyses of the groundwater sample indicated the presence of one VOC, one SVOC, three pesticides, and 19 metals. The concentrations of one pesticide and 10 metals exceeded the most stringent criterion for groundwater (Table 2). The results of the subsurface soil sampling indicated the presence of two VOCs, eight SVOCs, three pesticides/PCBs, and 23 metals. The concentrations of two SVOCs and six metals exceeded the most stringent criterion (Table 3).

#### 2.5.1.3 Supplemental Investigation

A supplemental investigation (SI) was conducted in 1997. The SI included resampling the three existing wells; installing and sampling one new, permanent, upgradient well (101MW-4) and installing and sampling two downgradient temporary wells (101TW-5 and 101TW-6). Analysis of the samples indicated the presence of bis(2-ethylhexyl)phthalate, chloroform, trichloroethylene, and tetrachloroethylene. The only chemicals that exceeded the most stringent criteria were bis(2-ethylhexyl)phthalate in the upgradient well (8.9 micrograms per liter (µg/L); criteria = 6 µg/L) and chloroform in two downgradient wells (19 µg/L; criteria = 7 µg/L).

**Table 2**
**Compounds Exceeding Standards and Guidance Values**
**RI Soil Boring Groundwater Sample**
**from Temporary Well in Building 101 BADP (101-SB-1)**

| Compound | Detected Concentration | Frequency of Detection Above Most Stringent Criterion | NYS Groundwater Standard | Federal secondary maximum contaminant level | Federal maximum contaminant level | NYS Groundwater Guidance Value |
|---|---|---|---|---|---|---|
| Pesticides/PCBs (µg/L) | | | | | | |
| Aldrin | 0.029 J | 1/1 | ND [a] | NA | NA | NA |
| Metals (mg/L) | | | | | | |
| Aluminum | 71.2 | 1/1 | NA | 0.05 [b] | NA | NA |
| Arsenic | 0.068 | 1/1 | 0.025 [a] | NA | NA | NA |
| Chromium | 0.22 | 1/1 | 0.05 [a] | NA | NA | NA |
| Copper | 0.57 | 1/1 | 0.2 [a] | NA | NA | NA |
| Iron | 922 | 1/1 | 0.3 [a] | NA | NA | NA |
| Lead | 0.093 | 1/1 | NA | NA | 0.015 [c] | NA |
| Magnesium | 47.8 | 1/1 | NA | NA | NA | 35 [d] |
| Manganese | 19.2 | 1/1 | NA | 0.05 [b] | NA | NA |
| Mercury | 0.0009 | 1/1 | 0.0007 [a] | NA | NA | NA |
| Sodium | 123 | 1/1 | 20 [a] | NA | NA | NA |

Notes:
[a] = NYSDEC Class GA groundwater standard; June 1998
[b] = Federal secondary maximum contaminant level
[c] = Federal action level
[d] = NYSDEC Class GA groundwater guidance values; June 1998

Key:
J = Estimated concentration *
NA = not applicable
ND= Non-detect
* = Estimated concentrations are typically due to measuring very low levels below the quantitation limit but above the detection limit or due to a quality control concern identified by a data reviewer.

**Table 3**
**Compounds Exceeding Standards and Guidance Values**
**Building 101 BADP**
**RI Subsurface Soil Samples**

| Compound | Range of Detected Concentration | TAGM 4046 Recommended Soil Cleanup Objective | Frequency of Detection Above TAGM 4046 Recommended | Background screening concentrations | Frequency of Detection Above Background screening | 6-NYCRR Part 375 Unrestricted Use Soil | Frequency of Detection Above |
|---|---|---|---|---|---|---|---|
| SVOCs (µg/kg) | | | | | | | |
| Benzo(a)pyrene | 74 J - 83 J | 61 [a] | 2/6 | NA | NA | 1000 | 0/6 |
| Phenol | 120 J | 30 [a] | 1/6 | NA | NA | 330 | 0/6 |
| Metals (mg/kg) | | | | | | | |
| Antimony | 7.5 - 8.8 | NA | 2/6 | 3.4 [b] | 2/6 | NA | NA |
| Arsenic | 1.2 - 6.8 | NA | 1/6 | 4.9 [b] | 1/6 | 13 | 0/6 |
| Calcium | 1,460 - 276,000 | NA | 3/6 | 23,800 [b] | 3/6 | NA | NA |
| Lead | 8.9 - 369 | NA | 2/6 | 36.2 [b] | 2/6 | 63 | 2/6 |
| Mercury | 0.11 - 0.75 | NA | 2/6 | 0.1 [b] | 2/6 | 0.18 | 1/6 |
| Sodium | 135 J - 2,340 J | NA | 2/6 | 259 [b] | 2/6 | NA | NA |

Notes:
[a] = NYSDEC TAGM 4046 Recommended soil cleanup objective
[b] = Background screening concentration identified during the Remedial Investigation (1996).
* = 6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1 to 375-4 and 375-6

Key:
J = Estimated concentration **
NA = not applicable
** = Estimated concentrations are typically due to measuring very low levels below the quantitation limit but above the detection limit or due to a quality control concern identified by a data reviewer.

### 2.5.1.4 Long Term Monitoring Baseline Study

In 1998, as part of the proposed long term monitoring plan, two new groundwater monitoring wells (101MW-1R and 101MW-2R) were installed. During a groundwater baseline study conducted in 1999, which included four quarterly sampling rounds, all of the wells were sampled and analyzed for the chemicals of potential concern identified during the RI (cis-1,2-dichloroethene (DCE), tetrachloroethylene (PCE), trichloroethylene (TCE), chloroform, and vinyl chloride). Analysis of the samples indicated the presence of DCE, PCE, TCE, and chloroform. The concentration of chloroform in one well exceeded the NYSDEC Groundwater SCGs during the April and August sampling rounds at 8.08 µg/L and 11.4 µg/L; the concentrations of all other chemicals were below the groundwater standards.

### 2.5.1.5 Battery Acid Drainage Pit

A sample of the BADrP contents was collected for analysis in August 1992. Metals, including cadmium, chromium, cobalt, lead, mercury, nickel, silver, vanadium, and zinc were detected, as well as chlorinated hydrocarbons, solvents, and polycyclic aromatic hydrocarbons (PAHs).

A removal action was performed from June 1997 to January 1998 (Figure 4). The work consisted primarily of sludge removal, removal of the concrete floor and sump, soil excavation, waste characterization sampling, confirmatory sampling, backfilling, concrete restoration, and smoke and dye testing of the drain piping under the floor.

Work activities began on June 2, 1997. The BADrP was free of any residual liquids and contained a dry sludge layer that was approximately 8 inches thick and exhibited a solvent-like odor. Photoionization detector (PID) screenings of the sludge vapor indicted the presence of VOCs ranging from 0 to 127 parts per million (ppm) and a four point composite sample was obtained. One VOC, two SVOCs, PCBs, and six metals were detected. The sludge was removed from the pit, placed into drums for disposal, and the concrete bottom was pressure-washed and scrubbed on July 11, 1997. Six wipe samples were collected following the surface remediation, and analyzed for PCBs and metals. While no PCBs were detected in any of the samples at concentrations above the wipe action levels (as indicated by 40 Code of Federal Regulations (CFR) 761.125(b)(1) and site-specific action levels derived from two studies of indoor surface contamination), several metals were detected above the action levels in each of the six wipe samples.

Two smoke tests of the BADrP were conducted in September 1997 in order to determine the drainage discharge location of the pit. Although both tests showed smoke rising from nearby floor drains, it was not clear as to where the drains ultimately discharged. A dye test, also performed in September 1997, revealed that the discharge from the BADrP entered the sanitary sewer system on the south side of Hangar Road just outside the south side of Building 101.

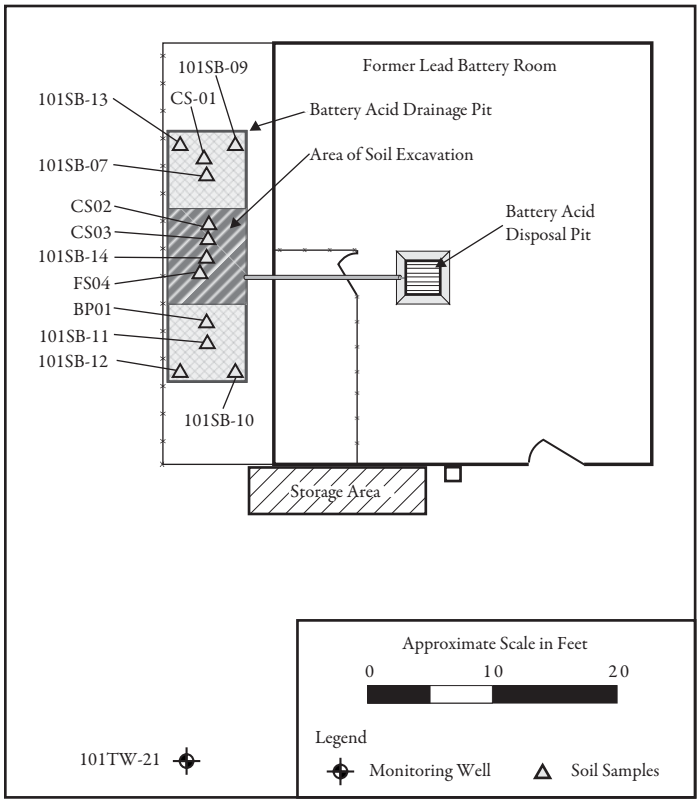



**Figure 4**
**Building 101 Removal Action -**
**BADrP limit**

The concrete sump and a portion of the concrete bottom of the pit were removed in early September 1997 in order to assess soil contamination underneath the pit. PID screenings in the headspace of samples from the pit indicated the presence of VOCs ranging from 50 to 115 ppm. One bucket auger sample (BP01) was collected from where the sump had been removed and was submitted for analysis of VOCs, SVOCs, PCBs, and metals. The results were compared to Technical and Administrative Guidance Memorandum (TAGM) 3028 action levels and this comparison indicated no exceedances. However, the Air Force later determined that this site fell under CERCLA regulatory guidance, and the action levels were replaced by the recommended soil cleanup objectives in TAGM 4046. Results indicated that two SVOCs (phenol and 4-methylphenol) and five metals (cadmium, chromium, lead, mercury, and silver) were detected at concentrations above their respective TAGM 4046 action levels. Another round of soil and wipe sampling was recommended at the time to confirm the results of the initial soil sample and to assess the possibility for remaining contamination on the concrete surface.

In October 1997, three soil samples (CS01, CS02, and CS03) and two wipe samples were collected from the bottom and concrete walls of the pit, respectively. The soil samples were analyzed for VOCs, SVOCs, PCBs, and metals; the wipe samples were analyzed for metals only. At the time of the investigation the soil sample results were compared to TAGM 3028 action levels, which indicated only 1,4-dichlorobenzene in sample CS02 at levels above the action level. The central portion of the pit was recommended for excavation and confirmation samples where analyzed for 1,4-dichlorobenzene only. Later analysis of the same data indicated several SVOCs, including phenol, 4-methylphenol, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene and one metal (cadmium) were detected at concentrations above their respective TAGM 4046 action levels in the soil sample collected from the central portion of the pit bottom (CS02), and 4-methylphenol was found slightly above the TAGM 4046 action level in sample CS01.

In November 1997, the remaining sections of the concrete pit floor were removed, and the underlying soil in the central section of the pit was excavated to a depth of 3 feet. Three soil samples were collected and analyzed for 1,4-dichlorobenzene only. This compound was not found above TAGM 3028 action levels in any of the three soil samples collected.

A sample of crushed concrete floor material was also collected and analyzed for PCBs and metals, and a sample from the pile of excavated soil was collected and analyzed for VOCs, SVOCs, PCBs, and metals. No chemicals were detected at levels above regulatory guidance levels in either the concrete waste sample or the soil waste samples. The concrete removed from the bottom of the BADrP and soil excavated from under the pit were transported to a Subtitle D landfill in Camillus, New York, for disposal.

Also, as a result of this removal action, nine drums of solid material and two drums of rinse water were transported and disposed of as hazardous waste at the Michigan Disposal Waste Treatment Plant in Belleville, Michigan.

In December 1997, one final confirmation soil sample (FS04) was collected from the overexcavated area of the disposal pit and analyzed for VOCs, SVOCs, PCBs, and metals. No compounds were detected above either the TAGM 3028 or 4046 action levels. Although the

October 1997 wipe samples of the pit walls indicated site-specific action level exceedances for cadmium, chromium, lead, mercury, and silver, the concrete walls were not recommended for removal. The BADrP was backfilled and covered with a 6-inch concrete pad in January 1998.

In June 2002, one additional sampling event was performed to compare the existing soil concentrations beneath the former BADrP to TAGM 4046 levels and determine whether closure would be appropriate for the site. A total of seven soil borings were installed within the footprint of the former BADrP. Two soil samples were collected from each boring: one was collected in the native soils directly beneath the fill area, and the second was collected 2 ft below the top of the native soil (i.e., if native soil was encountered at 4 ft BGS, one soil boring was collected from 4 to 6 ft BGS, and a second from 6 to 8 ft BGS). The results of the sampling indicated the presence of 17 VOCs, 8 SVOCs, 22 metals, and 3 PCBs. The concentrations of one SVOC exceeded the TAGM 4046 level (see Table 4); however the data was qualified as being below the laboratory method detection limit. Six metals exceeded the background screening concentrations. Following this sampling event, TAGM 4046 levels were replaced with the *Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375* (NYSDEC 2006) Unrestricted use Soil Clean up Objectives (SCOs). Compared to the 6-NYCRR Part 375 Unrestricted use SCOs, zero SVOCs and only 3 metals concentrations are above the SCOs.

To confirm that previous soil contamination did not affect the groundwater quality in the vicinity of the former BADrP, a groundwater sample was collected from the top of the groundwater table within 100 feet downgradient of the former BADrP (101TW-21). The sample was submitted and analyzed for total VOCs, SVOCs, PCBs, and metals, the results of which did not exceed NYSDEC Groundwater SCGs. Due to the temporary nature of the groundwater monitoring well, the groundwater sample demonstrated excessive quantities of suspended solids, which compromised the integrity of the sample collected at 101TW-21 for metals analysis. Metals results for downgradient wells (101MW-2, -2R, and -3) sampled in March 2002, however, showed minor exceedances for only iron, manganese, and sodium, which are not considered to be chemicals of potential concern.

### 2.5.2 Groundwater Monitoring

FPM performed groundwater sampling from September 2001 to September 2008. Monitoring wells 101MW-1R, 101MW-2, and 101MW-2R were sampled in September and December 2001, March, June, September, and December 2002, March, June, September, and December 2003 and March 2004 for the target VOCs. Monitoring well 101MW-3 was sampled only during the first five sampling rounds, September 2001 through September 2002, before it was decommissioned in November 2002 during the removal of the asphalt parking lot adjacent to Building 101. Due to the confirmed absence of VOC contamination at the other LTM network wells, only 101MW-2 was sampled in June, September and December 2004, and March, June, September, and December 2005, May, September, December 2006, April, October, December 2007, April 2008, and September 2008 for target VOCs. The Building 101 LTM Network is illustrated on Figure 3. Sampling results reported several VOC detections, including TCE and DCE. Only DCE was detected in exceedance of the NYS Groundwater Standards, Criteria, and Guidance values (SCGs) during the sampling events.

**Table 4**
**Compounds Exceeding Standards and Guidance Values**
**Building 101 BADP**
**June 2002 Confirmatory Soil Samples**

| Compound | Range of Detected Concentration | TAGM 4046 Recommended Soil Cleanup Objective | Frequency of Detection Above TAGM 4046 Recommended Soil Cleanup Objective | Background screening concentrations | Frequency of Detection Above Background screening concentrations | 6-NYCRR Part 375 Unrestricted Use Soil Cleanup Objective* | Frequency of Detection Above Unrestricted Use Soil Cleanup Objectives |
|---|---|---|---|---|---|---|---|
| SVOCs (µg/kg) | | | | | | | |
| Phenol | 310 J | 30 [a] | 1/14 | NA | NA | 330 | 0/14 |
| Metals (mg/kg) | | | | | | | |
| Cadmium | 0.091 F - 8.9 | NA | NA | 1.1 [b] | 3/14 | 2.5 | 2/14 |
| Calcium | 1,770 - 136,000 | NA | NA | 23,821 [b] | 2/14 | NA | NA |
| Copper | 10- 47.6 | NA | NA | 43.8 [b] | 1/14 | 50 | 0/14 |
| Mercury | 0.018 F - 1.18 | NA | NA | 0.1 [b] | 1/14 | 0.18 | 1/14 |
| Silver | 0.15 F - 3 | NA | NA | 1.1 [b] | 1/14 | 2 | 1/14 |
| Sodium | 71.8 F - 312 | NA | NA | 259 [b] | 1/14 | NA | NA |

Notes:

[a] = NYSDEC TAGM 4046 Recommended soil cleanup objective

[b] = Background screening concentration identified during the Remedial Investigation (1996).

* = 6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1 to 375-4 and 375-6

Key:

F = The analyte was positively identified but the associated numerical value is below the reporting limit

J = estimated concentration

NA = not applicable

µg/kg = microgram per kilogram

mg/kg = milligram per kilogram

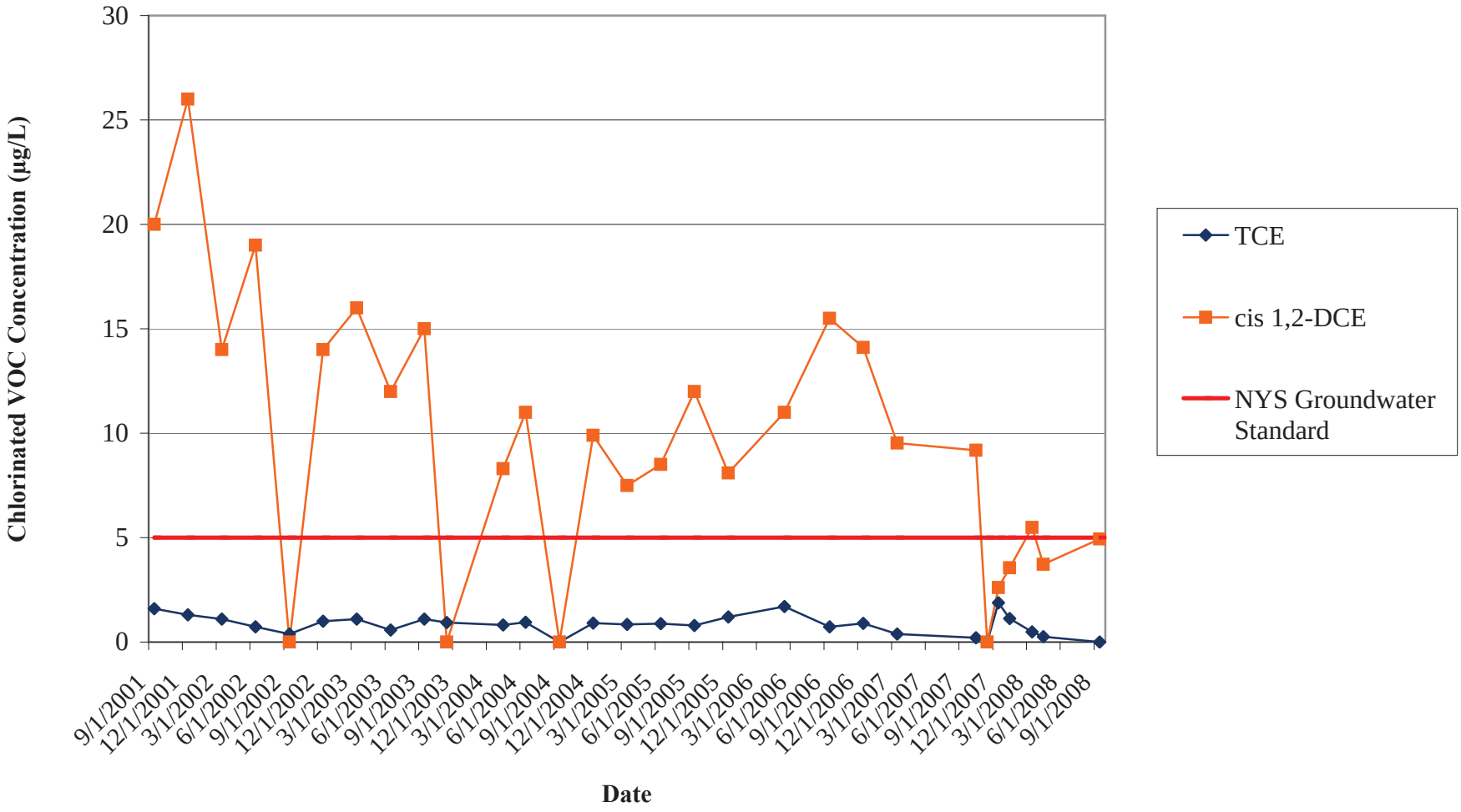
In December 2005, Hydrogen Release Compound (HRC) Advanced™ was injected at the Building 101 AOC. HRC Advanced™ is "a product designed specifically for the in-situ treatment of chlorinated solvent based contamination or any anaerobically degradable substance in the groundwater environment. HRC is a viscous liquid that is pressure injected directly into the subsurface. Upon contact with water, HRC Advanced™ slowly hydrolizes and is broken down by microbial action. During this process, lactic acid is released and utilized by microbes to produce hydrogen. The resulting hydrogen is then used in a microbially mediated process known as reductive dechlorination. This step-by-step biodegradation process (reductive dechlorination) reduces harmful contaminants into harmless end products." (Regenesis website, 9 January 2006). Five injection points were planned in a 50-ft wide injection wall in the former Yellow Submarine UST location. HRC Advanced™ was injected from 20 to 10 ft bgs with an application rate of 8 pounds of product per ft of depth. HRC Advanced™ was also applied in monitoring well 101MW-2 in February 2006. A second HRC Advanced™ injection was performed in August 2006 at the Building 101 AOC. HRC was injected at 5 points from 20 to 10 ft bgs at a rate of 8 pounds of product per foot. These points were directly west of the former Yellow Submarine UST location.

As recommended in the August 2007 monitoring report (FPM, August 2007), an injection of Newman Zone® (a proprietary vegetable oil emulsion with lactate) was performed on November 19, 2007 in monitoring well 101MW-2 at the Building 101 AOC. This product is injected in the soil matrix to create an anaerobic aquifer zone to make it (more) conducive to anaerobic degradation of chlorinated solvents. This injection was performed in the monitoring well, due to the difficult utilities layout on the site. In addition to the LTM sampling performed in December 2007, April 2008, and September 2008, sampling was also performed at monitoring well 101MW-2 in November 2007, January 2008, and March 2008 to monitor the effect of the Newman Zone® injection. The first sample (November 2007) was collected two days after injection. The DCE and TCE results are illustrated in Figure 4. The detected concentrations reported at the Building 101 AOC changed little until the Newman Zone® injection in November 2007. Originally, DCE has consistently been reported at 2 to 3 times the NYSDEC Groundwater Standard of 5 µg/L; however, the sampling results collected after the Newman Zone® injection show that the enhancement of the naturally occurring bioremediation on site has had a positive effect on site COC concentrations; the DCE concentrations have decreased to levels at or below the New York State Groundwater Standard of 5 µg/L, while TCE has remained below state standards.

### 2.5.3 Soil Vapor Intrusion Evaluations

SVI sampling was conducted at the Building 101 AOC in fall 2006 and winter 2007. Soil vapor (exterior) and sub-slab vapor (interior) samples were collected in October 2006. The samples were collected and analyzed for VOCs using the EPA Method TO-15. The results of this initial sampling round were evaluated by the agencies and additional sampling was recommended. The second round of SVI sampling occurred in February 2007. Indoor and Outdoor air samples were collected and also analyzed for VOCs using the EPA Method TO-15. The soil vapor, sub-slab vapor, indoor and outdoor locations are illustrated on Figure 6. Sampling results are provided in Tables 5 and 6, October 2006 and February 2007, respectively. Results were compared to the

**Figure 5**
**101MW-2 TCE and cis 1,2-DCE concentrations**



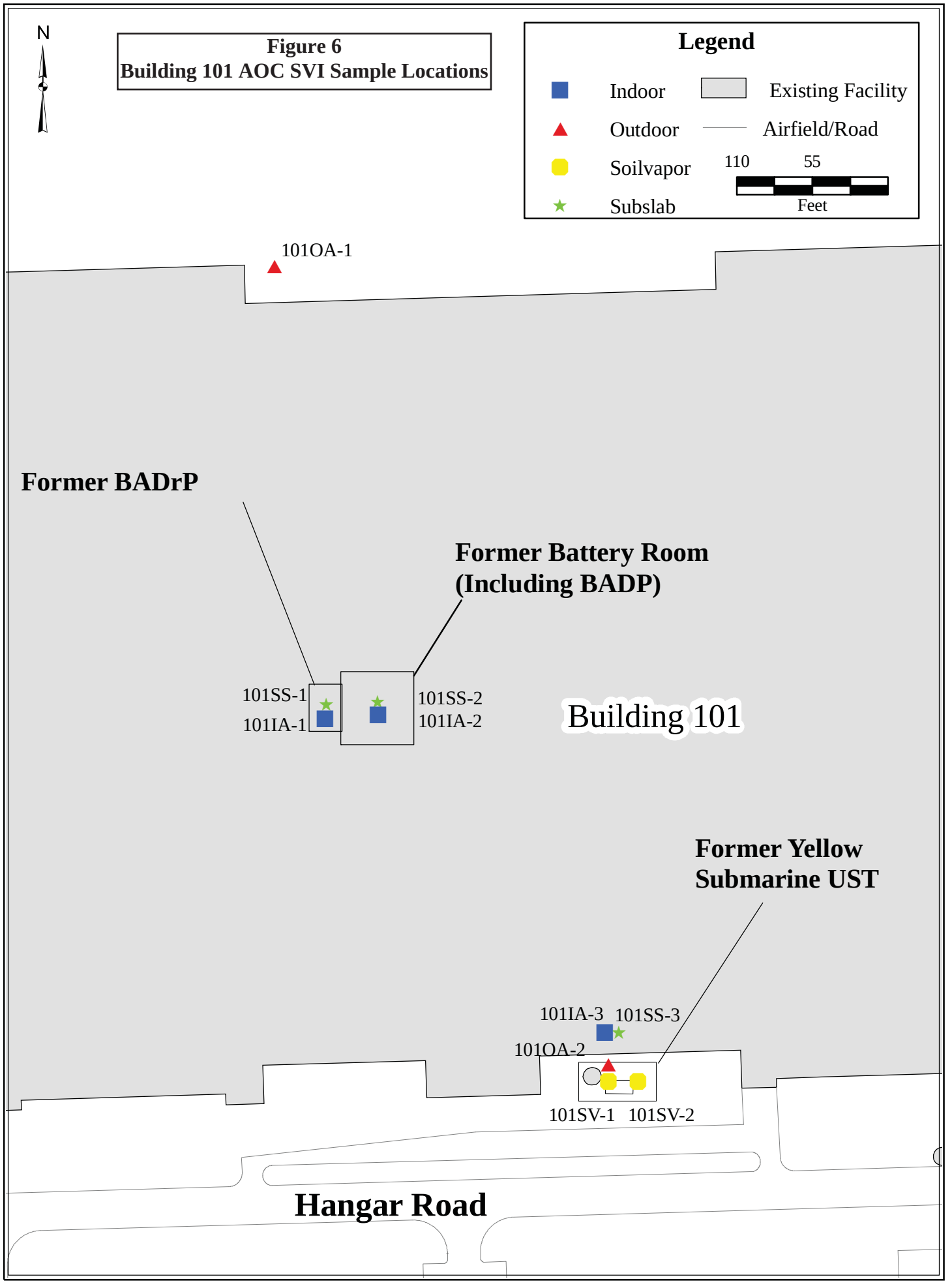

N
Figure 6
Building 101 AOC SVI Sample Locations
Legend
Indoor
Existing Facility
Outdoor
Airfield/Road
Soilvapor
Subslab
110
55
Feet
101OA-1
Former BADrP
Former Battery Room
(Including BADP)
101SS-1
101IA-1
101SS-2
101IA-2
Building 101
Former Yellow
Submarine UST
101IA-3
101SS-3
101OA-2
101SV-1
101SV-2
Hangar Road

**Table 5**
**Building 101 AOC Detected Soil Vapor and Sub-slab Vapor Analytical Results**
**October 2006**

| Sample Location | Sub-slab Vapor Screening Level ($ug/m^3$) | 101SS-1 | 101SS-2 | 101SS-3 | Soil Vapor Screening Level ($ug/m^3$) | 101SV-1 | 101SV-2 |
|---|---|---|---|---|---|---|---|
| **Sample ID** | | **101SS0101AA** | **101SS0201AA** | **101SS0301AA** | | **101SV0105AA** | **101SV0205AA** |
| **Sample Type** | | **Sub Slab** | **Sub Slab** | **Sub Slab** | | **Soil Vapor** | **Soil Vapor** |
| **Sample Date** | | **19-Oct-2006** | **19-Oct-2006** | **19-Oct-2006** | | **19-Oct-2006** | **19-Oct-2006** |
| **Sample Depth (ft bgs)** | | **1** | **1** | **1** | | **5** | **5** |
| **Sample Collection Duration (hr)** | **12** | **24** | **24** | **8** | **12** | **8** | **8** |
| **Volatiles (TO-15) in $\mu g/m^3$** | | | | | | | |
| 1,1,1-trichloroethane | 146,000 | 9.1 | 12 | U | 1,460,000 | U | 1.5 |
| 1,2,4-trimethylbenzene | 175 | 15 | 16 | 9.7 | 1,752 | 11 | 9.2 |
| 1,3,5-trimethylbenzene | 175 | 6.4 | 6.9 | 5.3 | 1,752 | 4.7 | 3.6 |
| 2,2,4-trimethylpentane | NA | 2.4 | U | U | NA | 3.9 | 3.8 |
| 4-ethyltoluene | NA | 7.4 | 7.8 | 4.2 | NA | 5.9 | 3.1 |
| acetone | NA | 130 | 10,000 | 100 | NA | 450 | 78 |
| benzene | 105 | 16 | 75 | 13 | 1,048 | 13 | 8.8 |
| bromomethane | NA | U | 0.55 | U | NA | U | U |
| carbon disulfide | 20,440 | 4.1 | 17 | 9.8 | 204,400 | 10 | 2.4 |
| carbon tetrachloride | 55 | 1.8 | 45 | U | 545 | U | U |
| chloroethane | NA | U | U | 0.56 | NA | U | U |
| chloroform | 36 | 4.8 | 19 | 7.9 | 355 | 1.2 | 1.3 |
| chloromethane | 818 | U | U | U | 8,176 | U | 3.8 |
| cis-1,2-dichloroethene | 1,022 | 2.3 | U | U | 10,220 | U | U |
| cyclohexane | 175,200 | 97 | 36 | U | 1,752,000 | 34 | 16 |
| ethylbenzene | 743 | 92 | 300 | 1,200 | 7,433 | 10 | 8.1 |
| freon 11 | 20,440 | 3.8 | 3.2 | 2.9 | 204,400 | 3.8 | 5.4 |
| freon 113 | 876,000 | 3.8 | 1.4 | 3 | 8,760,000 | 5 | 3.6 |
| freon 12 | 5,840 | 3.4 | 2 | 2 | 58,400 | 2.1 | 1.8 |
| heptane | NA | 150 | 100 | 10 | NA | 30 | 20 |
| hexane | 20,440 | 310 | 160 | 12 | 204,400 | 110 | 50 |
| m,p-xylene (sum of isomers) | 2,920 | 240 | 730 | 3,000 | 29,200 | 32 | 21 |
| methyl ethyl ketone | 146,000 | U | U | U | 1,460,000 | 220 | 110 |
| methyl tert-butyl ether | 87,600 | 3.5 | U | U | 876,000 | U | U |
| methylene chloride | 1,740 | 2.1 | 220 | U | 17,396 | U | 1 |
| o-xylene | 2,920 | 29 | 360 | 590 | 29,200 | 10 | 7 |
| tetrachloroethylene (pce) | 139 | 5.8 | 170 | 13 | 1,386 | 14 | 19 |
| tetrahydrofuran | NA | U | U | U | NA | 23 | U |
| toluene | 146,000 | 240 | 17,000 | 110 | 1,460,000 | 74 | 35 |
| trichloroethylene (tce) | 409 | 1200 | 430 | 14 | 4,088 | 12 | 9.8 |

Notes:

U - < MRL

$\mu g/m^3$ - microgram per cubic meter.

Exceedance of the cancer screening value.

Analytes identified as chemical of potential concern due to detections within one order of magnitude of the screening level.

**Table 6**
**Building 101 AOC Short List Indoor and Outdoor Analytical Results**
**February 2007**

| Sample Location | Indoor Air Screening Level ($\mu g/m^3$) | 101IA-1 | 101IA-2 | 101OA-1 | 101IA-3 | 101OA-2 |
|---|---|---|---|---|---|---|
| **Sample ID** | | **101IA0105AA** | **101IA0205AA** | **101OA0105AA** | **101IA0305AA** | **101OA0205AA** |
| **Sample Type** | | **Indoor** | **Indoor** | **Outdoor** | **Indoor** | **Outdoor** |
| **Sample Date** | | **12-Feb-2007** | **12-Feb-2007** | **12-Feb-2007** | **12-Feb-2007** | **12-Feb-2007** |
| **Sample Depth (ft above ground)** | | **5** | **5** | **5** | **5** | **5** |
| **Sample Collection Duration (hr)** | **12** | **24** | **24** | **24** | **8** | **8** |
| **Volatiles (TO-15) in $\mu g/m^3$** | | | | | | |
| acetone | NA | 700 | 900 | 17.5 | 84.7 | 19.4 |
| benzene | 88 | 6.23 | 5.88 M | 0.520 | 2.86 M | 0.747 |
| chloroform | 36 | U | U | U | U | U |
| cis-1,2-dichloroethene | 102 | U | U | U | U | U |
| ethylbenzene | 743 | 8.83 | 11.5 | U | 8.39 | 0.485 F |
| m,p-xylene (sum of isomers) | 292 | 32.7 | 38.8 | 0.706 F | 23.8 | 1.24 F |
| o-xylene | 292 | 7.50 | 15.9 | U | 8.74 M | 0.706 |
| tetrachloroethylene (pce) | 102 | U | U | 1.45 M | 1.10 M | 0.896 F |
| trans-1,2-dichloroethene | NA | U | U | U | U | U |
| trichloroethylene (tce) | 41 | U | U | U | 0.765 M | 1.64 |
| vinyl chloride | 186 | U | U | U | U | U |

Notes:

F - The analyte is detected and the qualtitation is between the MDL and RL.

M - A matrix effect was present.

U - < MRL

µg/m3 - microgram per cubic meter.

calculated Industrial/Commercial scenario screening levels provided in the Report for SVI Sampling at Building 101 (FPM, November 2007). Results indicate that all soil vapor, indoor air, and outdoor air detections are below screening levels. Five sub-slab vapor detections were above the sub-slab vapor screening levels, but the detections are within one order of magnitude of the screening levels. This provides evidence that the concrete slab at the building (7-12 inches thick) provides an adequate SVI barrier. Moreover, although not part of the final remedy, the current occupant (an aircraft maintenance operation) has coated the entire floor it occupies with epoxy paint. This type of epoxy coating is one of the options generally applied to eliminate SVI potential, since this epoxy coating can be an effective vapor barrier.

Since the sub-slab detections above screening levels are within one order of magnitude of the sub-slab screening levels, no exceedances have been reported for the indoor air samples, no further action or evaluation of SVI is required at the Building 101 AOC unless building use changes in the future from aircraft maintenance to another industrial/commercial use.

## 2.6 Current and Potential Future Land and Resource Use

The Griffiss Local Development Corporation is responsible for maintaining property and developing base facilities, as necessary, to promote advantageous reuse. The planned future land-use designations for the Building 101 AOC are industrial/commercial/non-residential.

## 2.7 Summary of Site Risks

In 1994, as part of the RI, site risks were analyzed based on the extent of contamination at the Building 101 AOC. The baseline risk assessment was conducted to evaluate current and future potential risks to human health and the environment associated with contaminants found in the soil and groundwater at the site. This risk assessment was performed for the BADP, prior to the investigation and removal action at the BADrP in 1997 and 1998. The results of this assessment and the removal action were considered when formulating this proposed plan.

*Human Health Risk Assessment Background Information*

A baseline human health risk assessment was conducted during the RI to determine whether chemicals detected at the Building 101 AOC could pose health risks to individuals under current and proposed future land use. 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: 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 pathway (e.g., ingestion of contaminated soil) 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); and Risk Characterization—summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative (e.g., one-in-a-million excess cancer risk and noncancer Hazard Index value) assessment of site-related risks

and a discussion of uncertainties associated with the evaluation of the risks and hazards for the site.

Chemicals of potential concern (COPCs) were selected for use in the risk assessment based on the analytical results and data quality evaluation. All contaminants detected in the soil and groundwater at the site were considered chemicals of potential concern with the exception of inorganics detected at concentrations less than twice the mean background concentrations; iron, magnesium, calcium, potassium, and sodium, which are essential human nutrients; and compounds detected in less than 5% of the total samples (unless they were known human carcinogens). As a class, petroleum hydrocarbons were not included as a chemical of concern; however, the individual toxic constituents (e.g., benzene, toluene, ethylbenzene) were evaluated.

The human health risk assessment was conducted consistent with the land use identified in the Master Reuse Plan, which is industrial. As such, the risk assessment evaluated exposure to potential recreational populations and occupational populations (utility, construction, and industrial workers) that may be exposed to chemicals detected in the site media. The various exposure scenarios for each population are described in Table 7. Intake assumptions, which are based on EPA guidance, are more fully described in the RI. The risk assessment was not performed for unrestricted land use receptors.

**Table 7**
**Building 101 AOC Risk Assessment Scenarios and Exposures Pathways**

| Utility Worker (Current and Future) | Construction Worker (Future) | Industrial Worker – BADP (Future) | Industrial Worker – Yellow Submarine UST (Future) |
|---|---|---|---|
| Incidential ingestion of subsurface soil.<br><br>Inhalation of fugitive dust from subsurface soil.<br><br>Dermal contact with subsurface soil. | Incidential ingestion of subsurface soil.<br><br>Inhalation of fugitive dust from subsurface soil.<br><br>Dermal contact with subsurface soil. | Ingestion of groundwater.<br><br>Dermal contact with groundwater.<br><br>Inhalation of volatiles from groundwater. | Ingestion of groundwater.<br><br>Dermal contact with groundwater.<br><br>Inhalation of volatiles from groundwater. |

Quantitative estimates of carcinogenic and noncarcinogenic risks were calculated for the Building 101 AOC as part of a risk characterization. The risk characterization evaluates potential health risks based on estimated exposure intakes and toxicity values. For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen. The risks of the individual chemicals are summed for each pathway to develop a total risk estimate. The range of acceptable risk is generally considered to be 1 in 10,000 ($1 \times 10^{-4}$) to 1 in 1,000,000 ($1 \times 10^{-6}$) of an individual developing cancer over a 70-year lifetime from exposure to the contaminant(s) under specific

exposure assumptions. Therefore, sites with carcinogenic risk below the risk range for a reasonable maximum exposure do not generally require cleanup based upon carcinogenic risk under the NCP.

To assess the overall noncarcinogenic effects posed by more than one contaminant, EPA has developed the Hazard Quotient (HQ) and Hazard Index (HI). The HQ is the ratio of the chronic daily intake of a chemical to the reference dose for the chemical. The reference dose is an estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population, including sensitive sub-populations, that is likely to be without an appreciable risk of deleterious effects during a portion of a lifetime. The HQs are summed for all contaminants within an exposure pathway (e.g., ingestion of soil) and across pathways to determine the HI. When the HI exceeds 1, there may be concern for potential noncarcinogenic health effects if the contaminants in question are believed to cause similar toxic effects.

Whether to conduct site remediation is based on the risk to human health and the environment. Under EPA regulations, for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess cancer risk to an individual of between 1 x $10^{-4}$ and 1 x $10^{-6}$ (USEPA 1990) or the noncarcinogenic HI exceeds a level of 1. Once either of these thresholds has been exceeded, the 1 in 1,000,000 (1 x $10^{-6}$) risk level and an HI of 1 or less may be used as the point of departure for determining remediation goals for alternatives.

*Results of Site-Specific Health Risk Assessment*

Potential risks from exposure to COPCs at the Building 101 AOC were evaluated for utility, construction, and industrial workers during the RI, prior to the interim remedial action at the BADrP. The potential carcinogenic and noncarcinogenic risks from exposure to soil and groundwater are summarized below.

*Carcinogenic Risk*

The total carcinogenic risk associated with exposure by utility workers to subsurface soil at the BADP was 1 x $10^{-6.}$ The pathway-specific risks for utility workers from incidental ingestion of soil, inhalation of fugitive dust, and dermal contact were 6 x $10^{-7}$, 7 x $10^{-10}$, and 6 x $10^{-7}$ respectively. The chemical contributing most to the estimated cancer risks for these exposure scenarios was arsenic, which was detected in all six subsurface soil samples. Although arsenic did not exceed standards, it was included in the risk assessment and did contribute to the potential risk at this site.

The total carcinogenic risk associated with exposure by construction workers to subsurface soil at the former BADP was 9 x $10^{-7}$. The pathway-specific risks for construction workers from incidental ingestion of soil, inhalation of fugitive dust, and dermal contact were 8 x $10^{-7}$, 2 x $10^{-10}$, and 1 x $10^{-7}$ respectively. The risk from incidental ingestion of subsurface soil contaminated with arsenic was the greatest contributor to the risk.

The total carcinogenic risk associated with exposure by industrial workers to contaminants in groundwater at the former BADP was $2 \times 10^{-6}$. The pathway-specific risks for industrial workers from ingestion of groundwater, inhalation of VOCs released from groundwater, and dermal contact with groundwater were $2 \times 10^{-6}$, $1 \times 10^{-11}$, and $2 \times 10^{-8}$ respectively. The risk from ingestion of groundwater contaminated with aldrin was the greatest contributor to the risk.

The total carcinogenic risk associated with exposure by industrial workers to contaminants in groundwater at the former Yellow Submarine UST was $3 \times 10^{-4}$, which is above EPA's target risk range. The pathway-specific risks for industrial workers from ingestion of groundwater, inhalation of VOCs released from groundwater, and dermal contact with groundwater were $3 \times 10^{-4}$, $3 \times 10^{-7}$, and $2 \times 10^{-5}$ respectively. The chemicals contributing to the ingestion pathway were arsenic, tetrachloroethylene, and trichloroethylene. These same chemicals and benzo(a)anthracene were the major contributors to the risk associated with the dermal contact pathway.

*Noncarcinogenic Risk*

The total Hazard Index (HI) for potential utility workers exposed to subsurface soil was 0.01. This cumulative HI is below the acceptable level of 1.

The total HI calculated for potential construction workers exposed to subsurface soil was 0.3. This cumulative HI is below the acceptable level of 1.

The total HI for potential industrial workers exposed to groundwater at the former BADP was 0.01. This HI is below the acceptable level of 1.0.

The total HI for potential industrial workers exposed to groundwater collected in the vicinity of the former Yellow Submarine UST was 5. This HI exceeds the acceptable level of 1. The calculated hazard indices for industrial workers from ingestion of groundwater, inhalation of VOCs released from groundwater, and dermal contact with groundwater were 5, $2 \times 10^{-6}$, and 0.2, respectively. The exposure pathway presenting the greatest potential noncarcinogenic hazard was from the ingestion of groundwater contaminated with arsenic and manganese.

Toxicity values were not available for 2-methylnaphthalene, phenanthrene, lead, and five PCB congeners (2,2,3,3,4,4,6-heptachlorobiphenyl, 2,2,3,3,4,6,6-octochlorobiphenyl, 2,2,3,4,5-pentachlorobiphenyl, 2,2,4,4,5,6-hexachlorobiphenyl, and 2,2,4,4-tetrachlorobiphenyl) and, therefore, the risk arising from exposure to these compounds was assessed qualitatively. In addition, lead was evaluated using the Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) model. Possible exposures to the site concentrations of these compounds are unlikely to pose a health hazard for occupational receptors potentially performing intrusive activities at this site.

The results of the human health baseline risk assessment indicate that chemicals in soil should not present a risk to current and future construction, utility, and industrial workers. The only potentially unacceptable risk was to industrial workers from ingestion of groundwater at the

Building 101 AOC. Quantitative evaluation of risk is subject to several conservative assumptions and should not be considered an absolute measure of risk.

*Uncertainties*

Uncertainties exist in many areas of the human health risk assessment process. However, use of conservative variables in intake calculations and health-protective assumptions throughout the entire risk assessment process results in an assessment that is protective of human health and the environment in the absence of remedial actions or controls. Examples of uncertainties associated with the risk assessment for this AOC include (1) Chemical samples were collected from the suspected source of contamination rather than through random sampling, which may result in a potential overestimation of risk; (2) The HIs associated with dermal contact with soil were not quantified for the majority of COPCs based on the lack of a dermal absorption factor, which may lead to underestimation of the overall risk due to dermal contact; (3) The models used in the RI are likely to overestimate exposure point concentrations in air, which would cause a potential overestimation of risk for the inhalation pathway; (4) Construction at the site was assumed to occur over a one year period. Since construction may take less time to complete, this would result in a potential overestimation of risk; (5) It was assumed that groundwater would be used as a potable water source under the industrial use scenario (i.e., showering, ingestion, industrial processes) in the future, which is unlikely since the site has ready access to the existing water supplies at the former base and in the City of Rome. This assumption would result in a potential overestimation of risk.

*Ecological Risk Assessment*

A baseline risk assessment for ecological receptors at the Building 101 AOC was conducted during the RI. Since Building 101 is located in a highly developed portion of the base, no complete exposure pathways for ecological receptors were identified. Contamination that may be associated with the site is expected to be well below ground surface and ecological receptors are not expected to be found at these depths. In addition, the future land use designation is expected to remain industrial/commercial. Therefore, potential exposures related to this AOC are not expected to exist.

Although certain state-listed endangered plants and animals have been on or in the vicinity of the base, no threatened and/or endangered species have been identified at this site. There are no federally listed (U.S. Department of the Interior) threatened or endangered plant or animal species at the former base.

## 2.8 Remedial Action Objectives

The following are the remedial action objectives developed for this site based upon the site data presented in the RI, Supplemental Investigation reports and Interim Remedial Action reports:

**Restrict Exposure to Contamination**

Land use restrictions within the site boundary (Figure 1) will be implemented to restrict site use to industrial/commercial use only and restrict the potential sub slab soil vapor exposure.

The following are the goals and objectives of the use restrictions:

- Prevent residential housing, elementary and secondary schools, childcare facilities and playgrounds on Building 101 AOC since the risk assessment was evaluated for only non-residential use scenarios (future use) and not for unrestricted use.
- Prevent the potential for soil vapor intrusion if future construction is performed in the SVI restriction area.

**Evaluate Effectiveness of the Remedy**

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that (1) the Selected Remedy is protective of public health and the environment, (2) land use is in compliance with the deed restrictions for industrial/commercial use, and (3) SVI is further evaluated if construction is performed in the SVI restriction area.

## 2.9 Description of Alternatives

CERCLA regulations mandate that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and treatment technologies to the maximum extent practicable. This ROD evaluates a No Action scenario as dictated by CERCLA, and compares it to the land use and SVI restriction alternative. A summary of the two alternatives is presented below.

**No Action Alternative**

CERCLA requires that the No Action alternative be compared with other alternatives. Under the No Action alternative, no remedy would be implemented at the Building 101 AOC. The site would remain as it is presently and no land use restrictions would be established. Costs and construction time are not associated with this alternative.

**Land Use Restrictions for Industrial/Commercial Use and SVI Restriction Alternative**

This alternative includes land use restrictions for industrial/commercial use and SVI restrictions. If the property is transferred to a non-federal entity in the future, the deed from the United States, which includes property within the boundary of the Building 101 AOC, will contain the following elements to ensure that the reuse of the site is consistent with the risk assessment:

- Development and use of the entire Building 101 AOC property for residential housing, elementary and secondary schools, childcare facilities and playgrounds will be prohibited unless prior approval is received from the Air Force, EPA,

and NYSDEC.

- The owner/occupant of the property shall evaluate the potential for soil vapor intrusion if future construction is performed in the SVI restriction area.

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that (1) the Selected Remedy is protective of public health and the environment, (2) land use is in compliance with the deed restrictions for industrial/commercial use, and (3) the potential for soil vapor intrusion is evaluated if future construction is performed in the SVI restriction area. Costs will range between $2,000 and $5,000 per review and construction time is not associated with this alternative.

## 2.10 Comparative Analysis of Alternatives

Remedial alternatives are assessed on the basis of both a detailed and a comparative analysis pursuant to the NCP. The analysis of the Building 101 AOC consisted of (1) an assessment of the individual alternatives against nine evaluation criteria and (2)
a comparative analysis focusing upon the relative performance of each alternative against the criteria. In general, the following "threshold" criteria must be satisfied by an alterna- tive for it to be eligible for selection:

1. Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether a remedy would (a) meet all of the ARARs or (b) provide grounds for invoking a waiver.

In addition, the following "primary balancing" criteria are used to make comparisons and identify the major trade-offs among alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants at the site.

5. Short-term effectiveness addresses (a) the period of time needed to achieve protection and (b) any adverse impacts on human health and the environment that

may be posed during the construction and implementation periods until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. Cost includes estimated capital, operation and maintenance, and present-worth costs.

Finally, the following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. State acceptance indicates whether, based on its review of the RI and the Proposed Plan, the State supports or opposes the preferred alternative and/or has identified any reservations with respect to the preferred alternative.

9. Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI reports. Factors of community acceptance include support, reservation, or opposition by the community.

A comparative analysis of the two alternatives based on the nine evaluation criteria follows.

1. Overall Protection of Human Health and the Environment

   The No Action alternative would potentially not provide adequate protection of human health and the environment since no remedy would be implemented at the Building 101 AOC to restrict its use. The potential risks to utility and construction workers from exposure to soil are expected to be minimal because the contaminated soil was removed and it is unlikely that any residual contamination remains in the soil above the water table. Sub-slab vapors were detected above screening levels but are within one order of magnitude of the sub-slab screening levels. Since no exceedances have been reported for the indoor air samples, no further action or evaluation of SVI is required, unless construction within the SVI restriction area is to be performed.

   The proposed alternative will prevent unnecessary exposure to the soil and sub-slab vapors (not evaluated for residential use scenarios) by limiting the future use of the site and through the implementation of land use restrictions for industrial/commercial use.

2. Compliance with ARARs

   Contaminant concentrations will not immediately comply with the ARARs under the No Action alternative or the Selected Remedy alternative.

   In the RI report, the results of the risk assessment were compared to available

Standards, Criteria, and Guidance values (SCGs) using federal and state environmental and public health laws that were identified as potentially applicable or relevant and appropriate requirements (ARARs) at the site. Chemical specific ARARs are usually health- or risk-based numerical values or methodologies that result in a numerical value when applied to site-specific conditions. Also considered were other non-promulgated 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.

The Selected Remedy alternative applies to soil and sub-slab vapors at the site. The Selected Remedy alternative will limit exposure to soil and Sub-slab vapors through the implementation of land use restrictions. There is no evidence that chemical concentrations in the soil at this site pose a current or future potential threat to human health or the environment when used for industrial/commercial purposes and when construction within the SVI area is restricted. Further, five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to en sure that (1) the Selected Remedy is protective of public health and the environment, (2) future land use is in compliance with the deed restrictions for industrial/commercial use, and (3) the potential for soil vapor intrusion is further evaluated if future construction is performed in the SVI restriction area.

3. Long-term Effectiveness and Permanence

   The No Action alternative would not allow for reliable protection of human health and the environment in the long term due to the potential for exposure to potentially contaminated soil and sub slab vapors by portions of the human population other than utility, construction, and industrial workers.

   For the Selected Remedy alternative, the implementation of land use and sub slab soil vapor restrictions will eliminate human contact with any potentially contaminated soil and sub slab soil vapors. This action, coupled with the five-year reviews, provides reliable long-term protection of human health and the environment.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

   The No Action alternative provides no treatment or containment of contaminants, and therefore does not result in any reduction of toxicity, mobility, or volume.

   The Selected Remedy alternative provides no treatment or containment of contaminants, and therefore, does not result in any reduction of toxicity, mobility, or volume. However, the levels of contamination found in the soil and sub slab do not warrant treatment. Although treatment will not be employed, this alternative will eliminate potential exposures to the soil and sub slab vapors.

5. Short-term Effectiveness

The No Action alternative would not be an effective alternative because the potential for human exposure to contaminated soil and the potential for sub slab vapor exposure would continue to exist.

For the Selected Remedy alternative, land use and sub slab vapor restrictions would be implemented if the property were transferred to a non-federal entity. The present and immediate future use of the property is industrial/commercial.

6. Implementability

   There would be no limitations to implementing the No Action alternative.

   There would be no limitations to implementing the Selected Remedy alternative. Implementation of land use and soil vapor restrictions is feasible and has been incorporated into other property transfers.

7. Cost

   There would be no costs associated with the No Action alternative.

   There are no capital costs or project construction durations associated with the Selected Remedy. Reviews to ensure that the remedy is still performing as planned will cost between $2,000 and $5,000 per review.

8. Agency Acceptance

   AFRPA, NYSDEC, and EPA have mutually agreed to select the land use and SVI use restrictions alternative. The Selected Remedy satisfies the threshold criteria and ensures compliance with applicable regulations.

9. Community Acceptance

   Community acceptance of the Selected Remedy was assessed at the public meeting and during the public comment period.

## 2.11 Principal Threat Wastes

There are no principal threat wastes at the Building 101 AOC.

## 2.12 Selected Remedy

The Selected Remedy of LUC/ICs for the Building 101 AOC is protective of human health and the environment and complies with the federal and state ARARs. As a result of the Building 101 remedial actions, the majority of soil and groundwater contamination have been removed. LUC/ICs will be in the form of land use restrictions for industrial/commercial and re-evaluation

for SVI if new construction is performed in the SVI restriction area identified in Figure 6 (BADP or BADrP). The transfer documents will contain the following restrictions to ensure that the reuse of the site is consistent with the risk assessment:

- Development and use of the entire Building 101 AOC property for residential housing, elementary and secondary schools, childcare facilities and playgrounds will be prohibited unless prior approval is received from the Air Force, EPA, and NYSDEC.
- The owner/occupant of the property shall evaluate the potential for soil vapor intrusion if future construction is performed in the SVI restriction area.

The soil vapor intrusion evaluation conducted at the Building 101 AOC in fall 2006 and winter 2007 included soil vapor (exterior) and sub-slab vapor (interior) (2006) and indoor and outdoor air samples (2007). Results indicate that all soil vapor, indoor, and outdoor air detections are below screening levels for industrial/ commercial use. Sub-slab detections were detected above screening levels but are within one order of magnitude of the sub-slab screening levels. Since no exceedances have been reported for the indoor air samples, no further action or evaluation of SVI is required, unless construction within the SVI restriction area identified in Figure 1.

Prior approval by EPA and NYSDEC will be required for any modification or termination of land use controls, use restrictions, or anticipated actions that may disrupt the effectiveness of or alter or negate the need for land use controls.

In addition to implementing the aforementioned deed restrictions, the Air Force will take the following actions to ensure that the controls are effective at protecting human health and the environment:

The Air Force shall notify the property owner of the annual Institutional Control/Engineering Control Certification requirements of 6 NYCRR Part 375, 1.8, (h)(3). If the property owner fails to provide an annual certification to the Air Force, the Air Force will notify EPA and NYSDEC as soon as practicable.

Should the required certification not be provided by the property owner, the Air Force shall determine the status of land use controls and provide its written findings to EPA and NYSDEC unless either EPA or NYSDEC, in its sole discretion, acts to confirm the status of the land use controls independently.

The Air Force is responsible for insuring implementation, maintenance, monitoring, and enforcement of the LUC/ICs. Although the Air Force may later transfer these responsibilities to another party, the Air Force shall retain ultimate responsibility for implementing, maintaining, monitoring, and enforcing the LUC/ICs.

Five-year reviews will be performed by the Air Force, in conjunction with the EPA and NYSDEC, to ensure that future land use is in compliance with the deed restriction for industrial/commercial use and to ensure that future land use is in compliance with the land use controls to manage the potential for SVI. Five-year reviews will ensure that the selected remedy is protective of human health and the environment.

## 2.13 Documentation of Significant Changes

There are no significant changes between the preferred alternative presented in the Proposed Plan for the Building 101 AOC and the selected remedy presented in this ROD.

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## 3.0 RESPONSIVENESS SUMMARY

On August 15, 2012, the Air Force Center for Engineering and the Environment (AFCEE), following consultation with and concurrence of EPA and NYSDEC, released for public comment the proposed plan for the Building 101 AOC located at the former Griffiss AFB. The release of the proposed plan initiated the public comment period, which concluded on September 14, 2012.

During the public comment period, a public meeting was held on August 28, 2012 at the Griffiss Institute located at 725 Daedalian Drive, Rome, New York 13441. The selected remedy for the Building 101 AOC was presented at the public meeting and a court reporter recorded the proceedings of the meeting. Copies of the transcript and attendance list are included in the Administrative Record. The public comment period and the public meeting were intended to elicit public comment on the proposed plan for the Building 101 AOC.

No verbal or written comments were received at the public meeting or during the public comment period.

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## 4.0 REFERENCES


AFCEE, Quality Assurance Project Plan, Version 3.1, August 2001.

E&E, Basewide Environmental Baseline Survey Supplement (Update 3), Griffiss AFB, *New York*, December 1997.

E&E, Final Report for Supplemental Investigations of Areas of Concern, Griffiss Air Force Base, July 1998.

E&E, Well/Piezometer Inventory (October 1998) Report for the Former Griffiss Air Force Base, Rome, New York, January 1999.

FPM, Petroleum Spill Sites Long Term Monitoring Program Draft Work Plan Addendum III, Former Griffiss Air Force Base, Revision 0.0, May 2003.

FPM, Field Sampling Plan, Long Term Monitoring Program at the Former Griffiss Air Force Base, June 2003.

FPM Group Ltd., Draft Confirmation Sampling Report, Building 101 Battery Acid Drainage Pit Area of Concern, former Griffiss Air Force Base, Rome, New York, Revision 0.0, August 2002.

FPM Group Ltd., Draft Monitoring Report, On-Base Groundwater AOCs, Revision 1.0, November 2004.

FPM Group, Ltd., Draft Report, AOC Long-Term Monitoring Baseline Study, Griffiss Air Force Base, Revision 1.0, July 2000.

FPM Group Ltd., Field Sampling Plan, Long-Term Monitoring Program, Revision 3.0, March 2005.

FPM Group, Ltd., Monitoring Report, On-Base Groundwater AOCs Monitoring Program, Former Griffiss Air Force Base, Rome, New York, Revision 0.0, August 2005.

FPM Group, Ltd., Monitoring Report, On-Base Groundwater AOCs Monitoring Program, Former Griffiss Air Force Base, Rome, New York, Revision 0.0, August 2006.

FPM Group Ltd., Monitoring Report (Spring 2007), On-Base Groundwater AOCs, Revision 0.0, August 2007.

FPM Group Ltd., Draft April 2008 Annual On-base Groundwater AOCs Monitoring Report, Rev. 0.0, April 2009.

NYSDEC, Interim Procedures for Inactivation of Petroleum-Impacted Sites, January 1997.

NYSDEC, New York State Ambient Water Quality Standards and Guidance Values, June 1998.

NYSDEC, Spill Technology and Remediation Series (STARS), Guidance Values for Fuel Contaminated Soil, August 1992.

NYSDEC, TAGM 4046, Determination of Remediation Soil Cleanup Objectives (RSCOs) and Cleanup Levels, January 1994.

NYSDEC, Sampling Guidelines and Protocols Manual, September 1992.

NYSDEC, Spill Technology and Remediation Services (STARS) Memo No. 1: Petroleum-contaminated Soil Guidance Policy, August 1992.

NYSDEC, Determination of Soil Clean-up Objectives and Clean-up Levels, Division of Technical and Administrative Guidance Memorandum DHWR, January 1994.

NYSDEC, Title 6 of the New York Codes, Rules, and Regulations Part 375, December 2006.

## 5.0 GLOSSARY

*Administrative Record:* A file established and maintained in compliance with section 113(K) of the Comprehensive Environmental Response, Compensation, and Liability Act consisting of information upon which the lead agency bases its final decisions on the selection of remedial method(s) for a site. The Administrative Record is available to the public.
*Applicable Requirements*: Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental or facility sitting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent that federal requirements may be applicable. See also Relevant and Appropriate Requirements.
*Aquifer*: A water-bearing formation or group of formations.
*Chlorinated Hydrocarbons*: Organic compounds that contain chloride such as trichloroethylene (TCE) and cis-1,2-dichloroethylene (DCE). Also referred to as chlorinated solvents.
*Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*: A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act requires federal agencies to investigate and remediate releases of hazardous substances.
*Contaminant Plume*: A volume of contaminated groundwater with measurable horizontal and vertical dimensions. Plume contaminants are dissolved in and move with groundwater.
*Environmental Impact Statement*: A study conducted to provide information on potential environmental impacts that could result from a proposed action.
*Groundwater*: Water found beneath the earth's surface that fills pores within materials such as sand, soil, gravel, and cracks in bedrocks, and often serves as a source of drinking water if found in an adequate quantity.
*Hydrogeologic*: Pertaining to subsurface waters and the related geologic aspects of subsurface waters.
*Installation Restoration Program (IRP)*: The United States 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 contaminated sites at Department of Defense facilities nationwide.
*Monitoring*: Ongoing collection of information about the environment that helps gauge the effectiveness of a cleanup action. Information gathering may include groundwater well sampling, surface water sampling, soil sampling, air sampling, and physical inspections.
*National Oil and Hazardous Substances Pollution Contingency Plan (NCP)*: The NCP provides the organization, structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants. The NCP is required under CERCLA and the Clean Water Act, and USEPA has been delegated the responsibility for preparing and implementing the NCP. The NCP is applicable to response actions taken pursuant to the authorities under CERCLA and the Clean Water Act.

*National Priorities List*: USEPA's list of the most serious uncontrolled or abandoned sites with hazardous substance contamination identified for possible long-term remedial action under the Superfund program.
*Organic Compounds*: Any chemical compounds built on the carbon atom, i.e., methane, propane, phenol, etc.
*Polychlorinated Biphenyl (PCB)*: An organic pollutant that was formerly used in electrical transformers and capacitors, their manufacture was banned in 1979. There are 210 different PCB compounds that typically have 40% to 60% chlorine by weight.
*Polycyclic Aromatic Hydrocarbons (PAHs)*: Compounds often associated with combustion process and distillation tars.
*Proposed Plan*: A public document that solicits public input on a recommended remedial alternative to be used at a site. The Proposed Plan is based on information and technical analysis generated during the RI/FS. The recommended remedial action could be modified or changed based on public comments and community concerns.
*Record of Decision (ROD):* A public document that selected and explains the remedial alternative to be used at a CERCLA site. The ROD is based on information and technical analysis generated during the remedial investigation, and on consideration of the public comments and community concerns received on the Proposed Plan. The ROD includes a Responsiveness Summary of public comments.
*Remedial Action:* An action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to human health or the environment.
*Remedial Alternatives:* Options evaluated to address the source and/or migration of contaminants to meet health-based or ecology-based remediation goals.
*Remedial Investigation (RI):* An investigation that determines the nature and extent and composition of contamination at a hazardous waste site. It is used to assess the types of remedial options that are developed in the feasibility study.
*Semivolatile Organic Compounds (SVOCs)*: Organic constituents which are generally insoluble in water and are not readily transported in groundwater.
*Source*: Area at a hazardous waste site from which contamination originates.
*Vadose Zone:* The volume located between the ground surface and the water table. Also known as the unsaturated zone.
*Volatile Organic Compounds (VOCs):* Organic constituents which tend to volatilize or to change from a liquid to a gas form when exposed to the atmosphere. Many VOCs are readily transported in groundwater.
*Water Table*: The surface of a body of unconfined groundwater at which the water pressure is equal to that of the atmosphere.